पत्र संख्या द्वारा..... RAN/WSB/Fe/MP-02/2017-18 dt. 19/05/2017
Vide letter No.

REVIEW OF MINING PLAN
AND
PROGRESSIVE MINE CLOSURE PLAN
OF
BARAIBURU-TATIBA IRON & MANGANESE MINE

(OVER AN AREA OF 258.98968 HECTARES IN BARAIBURU & TATIBA, SINGHBHUM WEST DISTRICT, JHARKHAND STATE)

MINING LEASE AREA	-	258.98968 HECTARES
DIVERTED FOREST LAND	-	23.233 HECTARES
DATE OF EXPIRY	-	27.05.1986.
1ST RML GRANTED ON	-	10.03.1988 FOR 10 YEARS.
2ND RML APPLIED ON	-	09.05.1995 FOR 20 YEARS
CATEGORY OF LAND	-	FOREST & NON-FOREST LAND
CATEGORY OF MINE	-	GROUP 'A' (FULLY MECHANIZED)
SUBMITTED UNDER RULE	-	17 (2) OF MCR, 2016.

GOVT. OF INDIA-INDIAN BUREAU OF MINES

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BLOCK PERIOD OF REVIEW OF MINING PLAN	2016 - 17 TO 2019 - 20
PROPOSED PERIOD OF REVIEW OF MINING PLAN	2017 - 18 TO 2019 - 20

	LAND USE PATTERN OF THE MINING LEASE AREA					TOTAL
	GHATKURI R.F.	TATIBA P.F.	JUNGLE-JHARI	GOVT LAND	TENANTED LAND	
BARAIBURU	77.275	105.512	29.770	3.790	1.520	217.867
TATIBA	18.040	132.740	95.998	131.645	43.710	422.133
M. L. area in Acres	95.315	238.252	125.768	135.435	45.230	640.000
M. L. area in Hects	38.573	96.419	50.898	54.809	18.290	258.98968

19/05/2017
क्षेत्रीय खान नियंत्रक
Regional Controller of Mines

Prepared by:

Dr. GURUPINDER SINGH JAISWAL

M.Sc, Ph.D (Geo), PGDip (Eco & Enviro), FAE (QCI) NABET

(Qualified Person Under Rule 15 of MCR, 2016)

Head Off : **011, Vidyapati Tower, Road No. - 7, Ramnagar, Sonari - 831011, Jamshedpur, Telefax: 0657 – 2309730, Mob- 9431161972, e-mail: smsmines@gmail.com**

Branch Off: **C/284, Road No. 1, Ashok Nagar, Ranchi, Jharkhand, Tele: 0651 – 2243213, Mob- 9234770647, e-mail:smsminesran@gmail.com**

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APPROVED

SUBMITTED

TO

THE REGIONAL CONTROLLER OF MINES

INDIAN BUREAU OF MINES

318/B, ROAD NO. 3

ASHOK NAGAR

RANCHI -834002.

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REVIEW OF MINING PLAN

FOR

BARAIBURU–TATIBA IRON &MANGANESE MINE (258.98968HECTARES)

VILL. - BARAIBURU–TATIBA, DISTRICT–SINGHBHUM WEST, JHARKHAND

(UNDER RULE 17(2) OF MCR, 2016)

OF

M/S THE RAMESHWARA JUTE MILLS LTD

Prepared by:

DR. GURUPINDER SINGH JAISWAL
M.Sc, Ph.D (Geo), PGDip (Eco & Enviro), FAE (QCI) NABET
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BAM/WSB/Fe/MP-02/2017-18
dt-19/05/2017

PREFACE

The mining lease "Baraiburu Tatiba Iron & Manganese Ore Mine" spread over an area of 258.98968 hectares (640 acres) was granted to M/s. Birla Gwalior (P) Limited for 20 years from 28/05/1966 to 27/05/1986. Later, Birla Gwalior Pvt. Ltd amalgamated in M/s. The Rameshwara Jute Mills Ltd and then Govt. of Bihar, by order No.9857/M, dated 30/10/1978 accepting the said amalgamation, and passed an order acknowledging M/s The Rameshwara Jute Mills Ltd in place of M/s Birla Gwalior Pvt. Ltd. as the lessee of the said mining lease. Copy of Lease Deed is enclosed as **Annexure - I**.

The Lessee M/s The Rameshwara Jute Mills Ltd applied for renewal of this mining lease over 640 acres, one year prior to expiry of the lease, in Form J as per provision of Mineral Concession Rules, 1960 on 29.04.1985. Since the state government could not pass any order upon the applied renewal application within six months from 29.04.1985, this renewal application was deemed to be refused as per Mineral Concession Rules, 1960 applicable then. Being aggrieved by such deemed rejection, a revision application was filed by the lessee before the Central Government in terms of Section 30 of the Act read with Rule 54/55 of the Rules as applicable then, which was marked as Revision Application No.2 (709)85-MV. The Central Government, by a final order No. 709/85 dated 11.12.1985 set aside the deemed rejection of the application for renewal of the mining lease and directed the State Government to pass final orders on merits within a period not exceeding 200 days from the date of the order.

The application for renewal of the mining lease was allowed vide Order No. 5/47/86-MV dated 10[th] March 1988 of Government of India, Ministry of Steel and Mines under Section 8(2) of the MMRD Act, 1957 for a period of 10 years along with specific order of working permission subject to approved mining plan and raiyat consent etc. Accordingly State Government, accepted the order dated 10[th] March 1988 of Central Government and passed specific working permission order subject to conditions vide Order No. 4801/M, dated 20.06.1989.

Thereafter, as the period of 10 years of first renewal (as approved by Central Government and duly accepted by the State Government) was due for expiry on 28.05.1996, The Rameshwara Jute Mills Limited applied for the second renewal of this mining lease over an area of 640 acres on 09.05.1995 in accordance with Rule 24A (1) of the Mineral

Concession Rules, 1960 for a further period of 20 years. A copy of the said renewal application in Form J and acknowledgement in Form D are collectively attached herewith along with the letter as **(Annexure - II).**

The said second renewal application dated 09.05.0995 is pending with the State Government for order which is evident from letter No. 1403/M Ranchi dated 10.08.2010. The second renewal application of the lessee is yet to be disposed of by the State government and the matter is pending before the Department of Mines and Geology, Govt. of Jharkhand, Ranchi.

On 18th July, 2014 the Central Government amended Rule 24A (6), which was notified in the gazette of India (Extra Ordinary), whereby Rule 24A (6) was substituted. By virtue of the said substitution, the effect of deemed extension of the lease period was done away with. This amendment came to effect from 18th July, 2014.

That on coming to know about the said amendment, the State Govt. communicated to close the operation vide letter No 458 dated 04.09.2014. However, the lessee stopped the mining activities w e f. 10th August, 2014 voluntarily. The notice of closure of mining operation submitted to DMO Chaibasa is enclosed herewith as **Annexure - XVII**. Since then the mining operation is discontinued till date.

Recently, lessee has obtained a final order of their Revision Application. The Central Government, by a **final order No. 327/2016 dated 29.11.2016** set aside and remanded back to the State Government for suitable re-consideration in line with the Hon'ble Apex Court direction date 04.04.2016 in WP(C) No. 114/2014 **(Annexure – XXVIII)**. After that, DMO, Chaibasa has issued a letter to the Lessee and lessee has submitted the compliance report of the same (**Annexure – XXIX**).

M/s The Rameshwara Jute Mills Ltd is a public limited company having wide scale experience in mining activities in its group companies. Baraiburu-Tatiba Iron & Manganese ore mining project spread over an area of 258.98968 ha is located in Baraiburu and Tatiba villages, Taluka - Noamundi in West Singhbhum district of Jharkhand. The lease area is connected with Barajamda town at a distance of 10 km through a State Highway (Barajamda - Kiriburu highway) which passes through the lease hold area.

BARAIBURU – TATIBA IRON & MANGANESE MINE (258.98968 HA.)
LESSEE: M/S THE RAMESHWARA JUTE MILLS LTD

The nearest railhead is Barajamda public siding of South-Eastern Railway, which is located at a distance of 12 km from the lease hold area. The lease area falls within Ghatkuri Reserve Forest - Compartment No. G32 & Tatiba Protected Forest-Compartment No. P37B in Saranda Forest Division, West Singhbhum, Jharkhand.

The aforesaid lease hold area is located in Topo sheet no 73 F/8 of Survey of India & delineated between the latitude 22^0 07' 38.68646" – 22^0 09' 52.05822" and longitude 85^0 20'02.02762" – 85^0 21' 17.56421" **(Refer Plate – 2).**

The area is irregularly shaped and dominated by flat topped hillocks with gentle slopping and plain country at lower level. The mine is situated in an old mining area of Eastern India which is surrounded by following nearby iron mines as follows:-

1. North – Iron Ore Mine of M/s K.J.S. Ahluwalia, M/s. T.P.Sao, M/s Usha Martin, M/s Dewika Bhai Belji Ltd.
2. South- Odisha boundary & Bolani Iron Ore Mines(SAIL)
3. East - M/s. K. J. S. Ahluwalia.
4. West - M/s. Nirmal Kr. Pradip Kumar, M/s Misrilall Jain., M/s R. Modill & Co.

The mine has been exposed by number of pits of Iron and Manganese deposits at different locations and the deposits have been established by means of boreholes. The lease area of 258.98968 ha comprises of forest and non-forest land with under mentioned break up:- **Reserve Forest = 38.573 ha; Protected Forest = 96.419 ha; Govt land = 54.809 ha of which Jungle Jhari is 50.898 Ha and Tenant land is 18.290 Ha.**

The categories of land within the lease hold area is given in tabular form as follows.-

	LAND USE PATTERN OF THE MINING LEASE AREA					TOTAL
	GHATKURI R.F.	TATIBA P.F.	JUNGLE-JHARI	GOVT LAND	TENANTED LAND	
BARAIBURU	77.275	105.512	29.770	3.790	1.520	217.867
TATIBA	18.040	132.740	95.998	131.645	43.710	422.133
M. L. area in Acres	**95.315**	**238.252**	**125.768**	**135.435**	**45.230**	**640.000**
M. L. area in Hectares	**38.573**	**96.419**	**50.898**	**54.809**	**18.290**	**258.98968**

Mining plan and Scheme of mining for this mine were prepared and approved from time to time. Details of approved mining plan and scheme of mining after the lease was expired is given below table:-

Sl. No.	Mining plan/ Scheme of Mining	Period	Status
1.0	Mining Plan under Rule 24A of MCR, 1960	2006-07 to 2010-11	Mining Plan was approved by Controller of mines, IBM Nagpur on 28.09.2007 vide letter no. 314(3)/2007-MCCM(C)/MP-12
2.0	Modification to the approved Mining Plan under Rule 10 of MCDR 1988	2009-10 to 2010-11	Modified Mining Plan was approved by Indian Bureau Of Mines, Nagpur on 13.11.2009 vide letter no. 314(3)/2009-MCCM(C)/MP-13. A copy of the approved Scheme of Mining is enclosed as **Annexure – VI**.
3.0	Scheme of mining under Rule 12 of MCDR 1988	2011-12 To 2015-16	Scheme of mining was approved by Indian Bureau Of Mines, Nagpur on 05.07.2011 vide letter no. 314(3)/2011-MCCM(CZ)/MS-3. A copy of the approved Scheme of Mining is enclosed as **Annexure – VI**.

The modified mining plan was submitted by the lessee on 02.12.2015 for the next five years plan period. The Submitted modified Mining Plan was returned by IBM, Kolkata on 02.03.2016 as the lease has been cancelled by state Government of Jharkhand Vide memo No. 194, dated 22.01.2016. Copy of returned letter enclosed as **Annexure-XXIV**.

Lessee has no other mining lease or prospecting licence except the present lease hold area and they have not applied for any mining lease or prospecting licence in the State of Jharkhand or anywhere in India.

The Company has obtained forest clearance over an area of 23.233 ha (Broken prior to 1980). Copy of letter of forest Clarence and broken area plan is enclosed as **Annexure - VII**. Further, lessee has submitted Forest Diversion Proposal to the Nodal Officer, Department of Forest & Environment for forest clearance of additional forest land over 162.658 ha (RF = 29.724 ha, PF = 83.036 ha & Jungle-Jhari = 50.898 ha, Total = 162.658 ha). The proposal is under process. Copy of letter is enclosed as **Annexure - VIII**.

The mining project has been accorded Environmental clearance from MoEF for expanded production of Iron Ore from 30000 tons per annum to 2.26 million TPA & Manganese ore from 300 TPA to 4000 TPA on 15th April, 2011 with crushing and screening facility inside

the mine. Copy of letter of Environmental clearance (Previous & Recent) is enclosed as **Annexure – X**.

The violations imposed during the approved scheme period (2011-12 to 2015-16) and the compliance of the violations by the lessee is as follows:

Date of Issued of Violation	Nature of Violation	Date of Compliance
09.05.2012	42(1)(c)(i) A Full time geologist having 10(ten) years experience of working in a supervisory capacity in field of mining have not been employed in the mine.	03.07.2012 &17.08.2012
24.02.2014	Every holder of mining lease shall carry out Mining operation in accordance with the approved mining plan/scheme with such condition as may have been prescribed under sub rule (2) of Rule 9 or with modification, if any permitted under Rule 10. The Mining operation are not carried out as per approved Mining scheme approved vide letter no 314(3)/2011-MCCM (CZ)/MS-3 dated 05.07.2011 to the exten indicated below. (i) During the year 2013-14, it was proposed to wark in Baraiburu area pit no 3, on line X1-Y1 to X5-Y5 but at the time of inspection wark was carried out in quarry no 1A, 2A &2B (ii) In The Titiba quarry it was proposed to carry out work in T1-T1' section whereas work was going on new Tatiba quarry.	22.03.2014

A copy of the violation letters issued by IBM and its reply is enclosed as **Annexure – XVI**.

Before starting the DGPS survey in the area, the entire mining lease area was freshly surveyed by the lessee's own employed Surveyor and it was found that the topography and contour value within the lease area was not matching with the previous plans. Thus, based on the up-dated features and contour value, final maps have been prepared. In this regard, a certificate from the Surveyor and previous approved plan is enclosed as **Annexure – XXI**.

This report is based on the information and data collected by the field investigations carried out by the competent technical persons and from records made available by the lessee. It is supported by tables, calculations and drawings as considered necessary. In the light of Gazette Notification dated 12.01.2015, The Mines and Minerals (Development and Regulation) Amendment Act, 2015, mine period shall be extended up to 31.03.2020.

As such, this Review of Mining Plan has been prepared under Rule 17 (2) of MCR 2016 for the Block Period from 2016-17 to 2019-20. As the year 2016-17 has already passed, Review of Mining Plan of this mine has been prepared for proposed period from 2017-18 to 2019-20.

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As the Progressive Mine Closure plan is a part of mining plan/Review of mining plan and shall be valid up to the year for which mining plan/Review of mining plan is valid, with this view the said Progressive Mine Closure Plan has been prepared along with this Review of mining plan for the next three years from 2017-18 to 2019-20.

Now, the Govt. of Jharkhand has issued a letter regarding extension of Mining Lease based on the MMDR (Amendment) Act 2015 vide letter No 270/M dated 07.03.2017. A copy of letter from DMO to IBM annexed as **Annexure - XXX**. Therefore, based on the letter of State Government, lessee is now submitting this Review of mining plan along with Progressive Mine Closure Plan of "Baraiburu Tatiba Iron & Manganese Ore Mine" over an area of 258.98968 hectares (640 acres) to the Regional Controller of Mines, Indian Bureau of Mines, Ranchi for its approval.

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CONTENTS

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LIST OF ANNEXURE

Sl. No.	Description	Annexure No.
1.0	Copy of Lease Deed.	I
2.0	Copy of Renewal application of Mining lease and its receipt	II
3.0	Copy of List of Board of Directors, document related to "Nominated Owner" and Photo I.D and address proof of "Nominated Owner"	III
4.0	Copy of Land schedule of the area.	IV
5.0	Copy of certificates of qualification and experience as per MCR, 2016 and I.D proof of the Qualified Person	V
6.0	Copy of the approval letters of mining plan/Modified Mining Plan/ Scheme of plan.	VI
7.0	Copy of letter of Forest Clearance & Broken area Plan.	VII
8.0	Copy of application for diversion of additional forest land	VIII
9.0	Copy of application for Surface right area.	IX
10.0	Copy of letter of Environment Clearance (Previous & Recent).	X
11.0	Copy of application letter of consent to operate.	XI
12.0	Copy of AAQ, Water and Noise monitoring Report	XII
13.0	Chemical analysis report of iron ore of this mine.	XIII
14.0	Copy of notice of information of carrying out Boreholes in Form-J	XIV
15.0	Bore hole data carried out in the leasehold and its analysis.(Given Separately)	XV
16.0	Copy of violations pointed out under MCDR and Its compliance.	XVI
17.0	Copy of letter for closure of mines from DMO & DFO and Permission letter from DFO.	XVII
18.0	Notice of Closure of Mine to IBM.	XVIII
19.0	Feasibility report of the lease area.	XIX
20.0	Flow sheet of the processing unit.	XX
21.0	Surveyor certificate with previous approved map.	XXI
22.0	Copy of Bank Guarantee as a financial assurance.	XXII
23.0	Copy of work order for exploration work and payment made to M/s Thriveni Exploration.	XXIII
24.0	Copy of Letter submitted and returned by IBM of modified Mining plan.	XXIV

25.0	Photographs of the lease area.	XXV
26.0	Copy of calculation sheet in support of grade wise reserve and recovery factor (Grade-wise).	XXVI
27.0	Copy of rejection letter from Deptt. Of Mines & Geology, Govt. of Jharkhand and copy of letter issued by D.C. Singhbhum West, Chaibasa.	XXVII
28.0	Copy of final order of Revision application.	XXVIII
29.0	Copy of letter issued from DMO, Singhbhum West, Chaibasa and its compliance.	XXIX
30.0	Copy of letter from DMO to IBM.	XXX
31.0	Copy of the explosive procurement license issued to M/s The Rameshwara Jute Mills Ltd and copy of the blasters license issued by the competent authority for carrying out blasting operations.	XXXI
32.0	The DGPS surveyed map/report along with the document in compliance to CCOMs circular No.2/2010.	XXXII
33.0	Copy of the certificate of incorporation as per the company Act in favor of M/s The Rameshwara Jute Mills Ltd.	XXXIII
34.0	Ground control points (GCP) with co-ordinate.	XXXIV
35.0	Copy of Litho-logs of the drilled Bore Hole data.	XXXV

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LIST OF DRAWINGS

Sl. No.	Description	Scale	Plate no.
1	Location Plan	Not to scale	1
2	Key plan	1: 50000	2
3	Mining Lease Plan (Authenticated)	4":1mile	3A &3B
4	Surface plan	1: 2000	4
5	Surface Geological Plan	1: 2000	5
6	Geological Plan G1 stage	1: 1000	6
7	Geological sections	1: 2000	7
8	Plan showing Borehole Logs.	1:500	8
9	Development plan & Sections	1: 2000	9(A-C)
10	Dump plan & Sections	1: 2000	10
11	Conceptual Plan(Broken area)	1: 2000	11
12	Conceptual Section (Broken area)	1:2000	12
13	Conceptual Plan (Entire area)	1: 2000	13
14	Conceptual Section (Entire area)	1:2000	14
15	Environment plan	1: 5000	15
16	Environment Management plan.	1: 2000	16
17	Financial Assurance Plan	1: 2000	17
18	DGPS Survey map Plan	1: 5000	18

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INTRODUCTION

e) **Mineral(s) which is the applicant / lessee intends to mine**
Iron & Manganese Ore.

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f) **Name of Recognized Person under rule 22 C of MCR, 1960 or a person employed under clause (c) of Sub rule (1) of rule 42 of MCDR, 1988 (Applicable for Scheme of Mining only) preparing Mining Plan.**

Dr Gurupinder Singh Jaiswal
Qualified Person as per Rule 15 of MCR 2016.

Address:

011, Vidyapati Tower,
Road No - 07, Ramnagar,
P.O – Sonari – 831011,
Dist. – Singhbhum East, Jharkhand
Ph. No. 0657 – 2309730. Mobile no.-9431161972.
E-mail I.D – smsmines@gmail.com

Copy of certificates of qualification and experience required as per Rule 15 of MCR, 2016 and I D proof of the Qualified Person is enclosed as **Annexure – V**.

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2.0 LOCATION AND ACCESSIBILITY

(a)	**Lease Details (Existing Mine)**	M/s. The Rameshwara Jute Mills Ltd is a public limited company having wide scale experience in mining activities in its group companies. Baraiburu-Tatiba Iron & Manganese mine spread over an area of 258.98968 ha is located in Baraiburu and Tatiba village, Taluka - Noamundi in West Singhbhum district of Jharkhand. The lease area is connected with Barajamda town at a distance of 10 km through a State Highway (Barajamda - Kiriburu highway) which passes through the lease hold area. The nearest railhead is Barajamda public siding of South-Eastern Railway, which is located at a distance of 12 km from the lease hold area. The lease area falls within Ghatkuri Reserve Forest - Compartment No. G32 & Tatiba Protected Forest-Compartment No. P37B in Saranda Forest Division, West Singhbhum, Jharkhand. The aforesaid lease hold area is located in Topo sheet no 73 F/8 of Survey of India & delineated between the latitude 22^0 07' 38.68646" – 22^0 09' 52.05822" and longitude 85^0 20'02.02762" – 85^0 21' 17.56421" **(Refer Plate – 2).** The mine has been exposed by numerous pits of Iron and Manganese deposits at different locations and the deposits have been established by means of boreholes. The lease area of 258.98968 ha comprises of forest and non-forest land with under mentioned break up:- **Reserve Forest = 38.573 ha; Protected Forest = 96.419 ha; Govt. land = 105.707 ha of which Jungle Jhari is 50.898 Ha and Tenant land is 18.290 Ha.** Copy of Land Schedule of the area is enclosed as **Annexure – IV**.
	Name of the Mine.	Baraiburu-Tatiba Iron & Manganese ore mine (258.98968 ha).

BARAIBURU – TATIBA IRON & MANGANESE MINE (258.98968 HA.)
LESSEE: M/S THE RAMESHWARA JUTE MILLS LTD

Latitude & longitude

Latitude : 22° 07' 38.68646" – 22° 09' 52.05822"
Longitude : 85° 20'02.02762" – 85° 21' 17.56421"

Latitude & longitude of the boundary pillars

POINT	LATITUDE	LONGITUDE	POINT	LATITUDE	LONGITUDE
RJM1	22°07'40.19129"	85°20'02.02762"	RJM53	22°09'20.13094"	85°20'43.47048"
RJM2	22°07'39.13735"	85°20'04.60509"	RJM54	22°09'19.10272"	85°20'47.63786"
RJM3	22°07'38.68646"	85°20'07.76372"	RJM55	22°09'16.44286"	85°20'50.82526"
RJM4	22°07'38.87068"	85°20'09.50872"	RJM56	22°09'12.80880"	85°20'52.23100"
RJM5	22°07'39.58430"	85°20'13.78619"	RJM57	22°09'10.34697"	85°20'52.25989"
RJM6	22°07'39.31678"	85°20'17.95115"	RJM58	22°09'08.22295"	85°20'52.08193"
RJM7	22°07'41.55985"	85°20'20.78108"	RJM59	22°09'03.45327"	85°20'50.14833"
RJM8	22°07'42.20304"	85°20'24.97557"	RJM60	22°08'59.43483"	85°20'47.23811"
RJM9	22°07'41.77649"	85°20'30.03913"	RJM61	22°08'55.66632"	85°20'44.12089"
RJM10	22°07'50.73363"	85°20'32.35182"	RJM62	22°08'51.10272"	85°20'40.43460"
RJM11	22°07'56.35401"	85°20'33.60069"	RJM63	22°08'48.87673"	85°20'38.74586"
RJM12	22°08'04.30005"	85°20'35.34608"	RJM64	22°08'46.90687"	85°20'38.44973"
RJM13	22°08'11.84438"	85°20'36.93024"	RJM65	22°08'44.19090"	85°20'39.63736"
RJM14	22°08'21.45591"	85°20'38.95810"	FP 1101	22°08'42.83948"	85°20'40.42591"
RJM15	22°08'25.17271"	85°20'39.66257"	RJM66	22°08'39.75272"	85°20'41.94946"
RJM16	22°08'25.81008"	85°20'43.52344"	RJM67	22°08'38.55574"	85°20'43.94942"
RJM17	22°08'27.10148"	85°20'47.92565"	RJM68	22°08'38.20834"	85°20'46.17770"
RJM18	22°08'28.21555"	85°20'51.48605"	RJM69	22°08'37.10102"	85°20'48.12590"
RJM19	22°08'30.85010"	85°20'55.07733"	RJM70	22°08'35.56207"	85°20'50.69104"
RJM20	22°08'39.28800"	85°21'00.27956"	RJM71	22°08'33.00894"	85°20'51.80336"
RJM21	22°08'38.65707"	85°21'07.55056"	RJM72	22°08'31.63881"	85°20'52.21871"
RJM22	22°08'49.29157"	85°21'12.92330"	RJM73	22°08'30.68534"	85°20'50.25560"
RJM23	22°08'56.46120"	85°21'17.56421"	RJM74	22°08'28.38737"	85°20'45.79072"
RJM24	22°08'59.95891"	85°21'16.35139"	RJM75	22°08'26.88751"	85°20'42.19524"
RJM25	22°09'04.25363"	85°21'14.72858"	RJM76	22°08'26.82146"	85°20'39.17901"
RJM26	22°09'07.73188"	85°21'13.52566"	RJM77	22°08'28.04310"	85°20'36.47514"
RJM27	22°09'10.23778"	85°21'12.64829"	RJM78	22°08'28.84871"	85°20'32.35827"
RJM28	22°09'12.62281"	85°21'11.71642"	RJM79	22°08'29.30696"	85°20'29.09942"
RJM29	22°09'19.12741"	85°21'09.71797"	RJM80	22°08'30.28699"	85°20'26.39044"
RJM30	22°09'23.28572"	85°21'08.38109"	RJM81	22°08'29.65519"	85°20'23.20680"
RJM31	22°09'26.58394"	85°21'07.42563"	RJM82	22°08'29.77961"	85°20'20.88414"
RJM32	22°09'28.04310"	85°21'04.89625"	RJM83	22°08'29.33858"	85°20'19.23869"
RJM33	22°09'30.55285"	85°21'01.02066"	RJM84	22°08'25.46193"	85°20'17.97405"
RJM34	22°09'32.26100"	85°20'58.00195"	RJM85	22°08'22.98806"	85°20'17.24838"

RJM35	22°09'33.87094"	85°20'53.33416"	RJM86	22°08'19.65536"	85°20'16.41115"
RJM36	22°09'37.34151"	85°20'49.53212"	RJM87	22°08'17.82631"	85°20'15.92141"
RJM37	22°09'39.48158"	85°20'45.54068"	RJM88	22°08'14.26087"	85°20'16.01261"
RJM38	22°09'41.75767"	85°20'41.66036"	RJM89	22°08'10.85929"	85°20'16.40056"
RJM39	22°09'43.34393"	85°20'38.92103"	RJM90	22°08'08.23076"	85°20'15.85214"
RJM40	22°09'45.68402"	85°20'35.17178"	RJM91	22°08'05.54238"	85°20'14.57254"
RJM41	22°09'47.94169"	85°20'31.64990"	RJM92	22°08'02.68493"	85°20'15.13112"
RJM42	22°09'48.97311"	85°20'29.18573"	RJM93	22°07'59.14182"	85°20'16.12072"
RJM43	22°09'52.05822"	85°20'22.79898"	RJM94	22°07'55.38786"	85°20'16.05462"
RJM44	22°09'48.80061"	85°20'23.64888"	RJM95	22°07'53.10319"	85°20'14.82116"
RJM45	22°09'39.21354"	85°20'26.56267"	RJM96	22°07'51.98719"	85°20'14.12230"
RJM46	22°09'36.56523"	85°20'27.38879"	RJM97	22°07'50.24759"	85°20'13.13710"
RJM47	22°09'31.07849"	85°20'28.73245"	RJM98	22°07'48.13069"	85°20'11.96743"
RJM48	22°09'27.99966"	85°20'29.91422"	RJM99	22°07'45.97098"	85°20'10.42681"
RJM49	22°09'22.42642"	85°20'31.35922"	RJM100	22°07'44.55935"	85°20'09.14236"
RJM50	22°09'20.39195"	85°20'31.94414"	RJM101	22°07'42.84833"	85°20'07.17119"
RJM51	22°09'20.32838"	85°20'35.73884"	RJM102	22°07'41.80702"	85°20'05.41063"
RJM52	22°09'20.31093"	85°20'40.50628"	RJM103	22°07'41.25864"	85°20'04.36869"

District & State	West Singhbhum, Jharkhand
Date of grant of Lease	The mining lease "Baraiburu Tatiba Iron & Manganese Mine" spread over an area of 258.98968 hectares (640 acres) was granted to M/s. Birla Gwalior (P) Limited for 20 years from 28/05/1966 to 27/05/1986. Later, Birla Gwalior Pvt. Ltd amalgamated in M/s. The Rameshwara Jute Mills Ltd and then Govt. of Bihar, by order No.9857/M, dated 30/10/1978 accepting the said amalgamation, and passed an order acknowledging M/s The Rameshwara Jute Mills Ltd in place of M/s Birla Gwalior Pvt. Ltd, as the lessee of the said mining lease. The lessee M/s The Rameshwara Jute Mills Ltd applied for renewal of this mining lease over 640 acres, one year prior to expiry of the lease, in Form J as per provision of Mineral Concession Rules, 1960 on 29.04.1985. The application for renewal of the mining lease was allowed vide Order No. 5/47/86-MV dated 10th March 1988 of Government of India, Ministry of Steel and Mines under Section 8(2) of the MMRD Act, 1957 for a period of 10 years. Thereafter, as the period of 10 years of first renewal (as

		approved by Central Government and duly accepted by the State Government) was due for expiry on 28.05.1996. The Rameshwara Jute Mills Limited applied for the second renewal of this mining lease over 640 acres on 09.05.1995 in accordance with Rule 24A (1) of the Mineral Concession Rules, 1960 for a further period of 20 years. The said second renewal application dated 09.05.0995 is pending with the State Government for order which is evident from letter No. 1403/M Ranchi dated 10.08.2010. The second renewal application of the lessee is yet to be disposed of by the State government and the matter is pending before the Department of Mines and Geology, Govt. of Jharkhand, Ranchi. In the light of recent Gazette Notification dated 27.03.2015, The Mines and Minerals (Development and Regulation) Amendment Act, 2015, mine period shall be extended up to 31.03.2020. Now, the Govt. of Jharkhand has issued a letter regarding extension of Mining Lease based on the MMDR (Amendment) Act 2015 vide letter No 270/M dated 07.03.2017 **(Annexure – XXX).**
	Period/Expiry Date	In the light of Gazette Notification dated 27.03.2015. The Mines and Minerals (Development and Regulation) Amendment Act, 2015, mine period shall be extended up to 31.03.2020. The Govt. of Jharkhand has issued a letter regarding extension of Mining Lease based on the MMDR (Amendment) Act 2015 vide letter No 270/M dated 07.03.2017 **(Annexure – XXX).**
	Name of leaseholder	M/s. The Rameshwara Jute Mills Ltd.
	Postal address	**Mine Office:** P.O.:- Barbil, Dist: - Keonjhar (Odisha), Pin: - 758035 Phone: 06767 275240 Fax : 06767 275367 Email : rjm.barbil@rjm.co.in **Site Office:** P.O.:- Baraiburu, Via :- Barajamda Dist: - West Singhbhum (Jharkhand) Pin: - 758035 Email : rjm.barbil@rjm.co.in

(b)	**Details of applied/lease area with location map (fresh area/mine)**	Baraiburu-Tatiba Iron & Manganese mine over an area of 258.98968 ha is located in Baraiburu and Tatiba village, Taluka - Noamundi in West Singhbhum district of Jharkhand. The lease area is connected with Barajamda town at a distance of 10 km through a State Highway (Barajamda – Kiriburu highway) which passes through the lease hold area. The nearest railhead is Barajamda public siding of South-Eastern Railway, which is located at a distance of 12 km from the lease hold area. The lease area falls within Ghatkuri Reserve Forest - Compartment No. G32 & Tatiba Protected Forest-Compartment No. P37B in Saranda Forest Division, West Singhbhum, Jharkhand.
	Land details	The land details of Baraiburu-Tatiba Iron & Manganese mine over an area of 258.98968 ha is given below:

	LAND USE PATTERN OF THE MINING LEASE AREA					TOTAL
	GHAT-KURI R.F.	TATIBA P.F.	JUNGLE-JHARI	GOVT LAND	TENAN-TED LAND	
BARAIBURU	77.275	105.512	29.770	3.790	1.520	217.867
TATIBA	18.040	132.740	95.998	131.645	43.710	422.133
M. L. area in Acres	95.315	238.252	125.768	135.435	45.230	640.000
M. L. area in Hectares	38.573	96.419	50.898	54.809	18.290	258.98968

This is an old mine and at present total 23.233 ha forest area has been broken prior to 25.10.1980 where mining operation has been restricted. The land details are also shown in **Plate – 3B**.

	Total lease area/applied area.	258.98968 ha. Copy of Land Schedule of the area is given in **Annexure – IV**.
	District & State	Singhbhum West District of Jharkhand.
	Taluka	Noamundi
	Village	Baraiburu and Tatiba
	Whether the area falls under Costal Regulation Zone(CRZ)? If yes, details thereof.	Not applicable

	Existence of public road/ Railway line, if any nearby and approximate distance	The lease area is connected with Barajamda town at a distance of 10 km through a State Highway (Barajamda - Kiriburu highway) which passes through the lease hold area. The nearest railhead is Barajamda public siding of South-Eastern Railway, which is located at a distance of 12 km from the lease hold area.
	Toposheet No. with latitude & longitude of all corner boundary point/pillar.	The mine lease area falls between north latitude of 22° 07' 38.68646" – 22° 09' 52.05822" and longitude of 85° 20'02.02762" – 85° 21' 17.56421" of Survey of India Topo-sheet No. 73 F/8. The latitude and longitude of all boundary pillars carried out during DGPS survey is given above under heading of latitude and longitude.
(b)	**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 area available, the area may be shown on an administrative map.**	The lease area is marked on Survey of India Topo-Sheet No. 73 F/8 in a scale of 1: 50000. **(Ref. Plate No. 2).**

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3.0 DETAILS OF APPROVED MINING PLAN/ SCHEME OF MINING.

3.1 Date and reference of earlier approved MP/SOM:

Mining plan and Scheme of mining for this mine were prepared and approved from time to time. Details of approved mining plan and scheme of mining after the lease was executed is given below table:-

Sl. No.	Mining plan/ Scheme of Mining	Period	Status
1.0	Mining Plan under Rule 24A of MCR, 1960	2006-07 to 2010-11	Mining Plan was approved by Controller of mines, IBM Nagpur on 28.09.2007 vide letter no. 314(3)/2007-MCCM(C)/MP-12.
2.0	Modification to the approved Mining Plan under Rule 10 of MCDR 1988.	2009-10 to 2010-11	Modified Mining Plan was approved by Indian Bureau Of Mines, Nagpur on 13.11.2009 vide letter no. 314(3)/2009-MCCM(C)/MP-13.
3.0	Scheme of mining under Rule 12 of MCDR 1988	2011-12 To 2015-16	Scheme of mining was approved by Indian Bureau Of Mines, Nagpur on 05.07.2011 vide letter no. 314(3)/2011-MCCM(CZ)/MS-3. A copy of the approved Scheme of Mining is enclosed as **Annexure – VI.**

The modified mining plan was submitted by the lessee on 02.12.2015 for the next five years plan period. The Submitted modified Mining Plan was returned by IBM, Kolkata on 02.03.2016 as the lease has been cancelled by state Government of Jharkhand Vide memo No. 194, dated 22.01.2016. Copy of letter of returning the document is enclosed as **Annexure - XXIV.**

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

Lessee has submitted the modification to the approved mining plan under Rule 10 of MCDR, 1988 for the period of 2009-10 to 2010-.2011 to the Indian Bureau of Mines, Kolkata which was approved vide letter No. 314(3)/2009-MCCM(C)/MP-13 dated 13.11.2009. A copy of same is enclosed as **Annexure – VI.**

Reason for modification:

After obtaining Stage-I clearance over an area of 23.233 hectares, the lessee wants to carry out mining operation by fully mechanized method as the mining plan is approved for

other than fully mechanized method. Similarly, in the approved mining plan there was no provision for mobile/static crushing and screening plant, deep hole blasting etc. and requirement of mining machinery is modified suitably. Under the above circumstances the lessee intends to modify the mining plan under rule 10 of MCDR 1988.

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

The last scheme of mining was approved on 05.07.2011 vide letter no 314(3)/2011-MCCM(CZ)/MS-3 for a period of five years starting from 2011-12 to 2015-16. A copy of same is enclosed as **Annexure – VI.**

The item-wise compliance position on Exploration, Mine development, Exploitation, Waste management, Afforestation and Mine reclamation, Time scheduling etc. for the five year of the approved scheme period (2011-12 to 2015-16) is given as below:

(a) *Exploration*:

<table>
<tr><th>Exploration work proposed as per scheme of mining approved on 05.07.2011.</th><th>Actual exploration work done by the lessee during scheme of mining period.</th><th>Causes of deviation from the proposed programme.</th></tr>
<tr><td>During the approved scheme period, total 173 bore holes. The year-wise exploration proposed during the approved scheme period is given below:
<table>
<tr><th>Years</th><th>No. of proposed Borehole</th><th>Location</th></tr>
<tr><td>2011-12</td><td>20</td><td>15- broken area & 5- Non-forest</td></tr>
<tr><td>2012-13</td><td>26</td><td>Forest land</td></tr>
<tr><td>2013-14</td><td>66</td><td>un-diverted forest</td></tr>
<tr><td>2014-15</td><td>61</td><td>un-diverted forest</td></tr>
</table></td><td>Out of 173 proposed bore holes, only five numbers of BH have been given during the approved scheme period. The detail of the boreholes are given in Chapter – 1 of Part – A.</td><td>During the approved scheme period, mining operation was carried out only in 2011-12 (July- August), 2013-14 (May-March) and 2014-15 (April–09.08.2014). Also, forest clearance for additional area was lying pending. As such, the targeted exploration could not be achieved.</td></tr>
</table>

(b) Mine Development:

Development work proposed as per scheme of mining approved on 05.07.2011.	Actual development work done by the lessee during scheme of mining period.	Causes of deviation from the proposed programme.
It was mentioned in the approved scheme of mining that development shall be done in the existing benches of quarry will be advanced laterally with a target to make a several quarries up to a depth.	During the approved scheme period, work was carried out in quarry 2A, 2B, 1A, 1B and 5 in Baraiburu zone and New Tatiba quarry (float ore) in Tatiba zone. Also, Lucky pit was worked for manganese ROM production. The development was also proposed in the fresh forest area but no development work was carried out in fresh forest area due to want of forest clearance applied for diversion.	During the approved scheme period, mining operation was carried out only in 2011-12 (July-August), 2013-14 (May-March) and 2014-15 (April – 09.08.2014). Also, forest clearance for additional area was lying pending. As such, the targeted development could not be achieved.

IRON ORE:

Years	Location	TOP mRL	Bottom mRL
2011-12	Baraiburu Area	566.20	495.26
	Tatiba Area	532.00	466.49
2012-13	Baraiburu Area	518.00	454.00
	Tatiba Area	516.25	457.92
2013-14	Baraiburu Area	653.00	486.00
	Tatiba Area	532.00	502.00
2014-15	Baraiburu Area	522.00	450.00
	Tatiba Area	518.00	494.00
2015-16	Baraiburu Area	486.00	420.00
	Tatiba Area	496.92	484.92

Manganese Ore:

Years	Location	TOP mRL	Bottom mRL
2011-12	Lucky Pit	466.89	463.89
2012-13		462.39	457.89
2013-14		470.00	464.00
2014-15		464.00	461.00
2015-16		471.70	465.70

(c) Exploitation:

<table>
<tr><th>Exploitation work proposed as per scheme of mining approved on 05.07.2011.</th><th>Actual development work done by the lessee during scheme of mining period.</th><th>Causes of deviation from the proposed programme.</th></tr>
<tr>
<td>In the approved scheme of mining, production target for iron ore has been planned as follows:
<u>Iron ore</u>
<table>
<tr><th>Year</th><th>Total ROM Ore in tones</th><th>Processed Iron ore in tones</th></tr>
<tr><td>2011-2012</td><td>784035</td><td>666430</td></tr>
<tr><td>2012-2013</td><td>1202850</td><td>1022423</td></tr>
<tr><td>2013-2014</td><td>2259953</td><td>1920957</td></tr>
<tr><td>2014-2015</td><td>2259743</td><td>1920781</td></tr>
<tr><td>2015-2016</td><td>2269850</td><td>1920873</td></tr>
<tr><td>Total :</td><td>8766431</td><td>7451464</td></tr>
</table>
<u>Manganese ore</u>
<table>
<tr><th>Year</th><th>Total ROM Ore in tones</th><th>Processed Manganese ore in tones</th></tr>
<tr><td>2011-2012</td><td>3350</td><td>503</td></tr>
<tr><td>2012-2013</td><td>3366</td><td>505</td></tr>
<tr><td>2013-2014</td><td>3345</td><td>503</td></tr>
<tr><td>2014-2015</td><td>3340</td><td>501</td></tr>
<tr><td>2015-2016</td><td>3988</td><td>599</td></tr>
<tr><td>Total :</td><td>17389</td><td>2611</td></tr>
</table>
</td>
<td>The year-wise production during the approved scheme period is mentioned below:
<u>Iron ore</u>
<table>
<tr><th>Year</th><th>Total ROM Ore in tones</th></tr>
<tr><td>2011-2012</td><td>18888.160</td></tr>
<tr><td>2012-2013</td><td>00</td></tr>
<tr><td>2013-2014</td><td>321865.830</td></tr>
<tr><td>2014-2015</td><td>77345.300</td></tr>
<tr><td>2015-2016</td><td>00</td></tr>
<tr><td>Total :</td><td>418099.29</td></tr>
</table>
<u>Manganese ore</u>
<table>
<tr><th>Year</th><th>Total ROM Ore in tones</th></tr>
<tr><td>2011-2012</td><td>1379.94</td></tr>
<tr><td>2012-2013</td><td>00</td></tr>
<tr><td>2013-2014</td><td>00</td></tr>
<tr><td>2014-2015</td><td>00</td></tr>
<tr><td>2015-2016</td><td>00</td></tr>
<tr><td>Total :</td><td>1379.94</td></tr>
</table>
</td>
<td>During the approved scheme period, mining operation was carried out only in 2011-12 (July- August), 2013-14 (May-March) and 2014-15 (April – 09.08.2014). The production was also proposed in the fresh forest area but no production was done in fresh forest area due to want of forest clearance applied for diversion. As such, the targeted production could not be achieved</td>
</tr>
</table>

(d) Reclamation:

Development work proposed as per scheme of mining approved on 05.07.2011.	Actual development work done by the lessee during scheme of mining period.	Causes of deviation from the proposed programme.
It is proposed that during the next five years of working the quarry voids will be backfilled and reclaimed during the first, fourth and fifth year and second and third year external dump will be created. Parapet wall and garland drain shall be made at the toe of dump with an appropriate size and settling tank shall be made at the discharge point so that clear water may flow.	No reclamation work was carried out as proposed.	Reclamation work was not carried out as proposed due to the reason mentioned above.

(e) Waste Management:

Year wise waste generate as per scheme of mining approved on 05.07.2011.	Actual generation of waste during approved scheme of mining period.	Causes of deviation from the proposed programme.
As per approved scheme of mining: The year-wise generation of waste as proposed in the approved Scheme of Mining is mentioned below: From Iron Ore (see table below)	No waste was generated during the approved scheme period.	As stated above, work was not carried out in full tenure of the approved scheme period due to closure of mines by DFO and DMO order. The work carried out from time to time was from the already broken area where top slice has already been removed. No fresh area was involved. Also, only ROM produced from the mine was sold without any processing of ore.

From Iron Ore

Year	Overburden in m^3	Processed Iron ore in tones
2011-2012	Nil	666430
2012-2013	Nil	1022423
2013-2014	1034761	1920957
2014-2015	582273	1920781
2015-2016	253600	1920873
Total :	**1870634**	**7451464**

From Manganese ore

Year	Overburden in m^3	Wastes from ROM in tones.
2011-2012	750	2847
2012-2013	00	2861
2013-2014	6431	2850
2014-2015	2457	2843
2015-2016	9135	3389
Total :	**18773**	**14790**

(f) Afforestation:

Afforestation work proposed as per scheme of mining approved on 05.07.2011.	Actual afforestation work done by the lessee during scheme of mining period.	Causes of deviation from the proposed programme.
In the approved Scheme of Mining it was that about 5000 saplings will be planted at the rate of 1000 saplings per year and with all possible protective measures by regular supervision of the afforested area, so that the survival rate can be maintained. (see table below)	During the approved scheme period, plantation work was carried out, the detail of which is given below (see table below)	About 14126 numbers of plants were planted during the approved scheme period against proposed target of 10000 plants. This was done keeping in view to develop more greenery as well as eco friendly mining in the area.

Year	Proposed No. of Saplings to be planted
2011-12	2000
2012-13	2000
2013-14	2000
2014-15	2000
2015-16	2000
Total	**10000**

Year	Proposed No. of Saplings to be planted	Area coved (In ha)
2011-12	3361	1.10
2012-13	4051	1.30
2013-14	2590	0.9
2014-15	2342	0.90
2015-16	1872	0.50
Total	**14126**	**4.70**

3.4 Give status of compliance of violation pointed out by IBM

The violations imposed during the approved scheme period (2011-12 to 2015-16) and the compliance of the violations by the lessee is as follows:

Date of Issued of Violation	Nature of Violation	Date of Compliance
09.05.2012	42(1)(c)(i) A Full time geologist having 10(ten) years experience of working in a supervisory capacity in field of mining have not been employed in the mine.	03.07.2012 &17.08.2012
24.02.2014	Every holder of mining lease shall carry out Mining operation in accordance with the approved mining plan/scheme with such condition as may have been prescribed under sub rule (2) of Rule 9 or with modification, if any permitted under Rule 10. The Mining operation are not carried out as per approved Mining scheme approved vide letter no 314(3)/2011-MCCM(CZ)/MS-3 dated 05.07.2011 to the exten indicated below. (i) During the year 2013-14, it was proposed to wark in Baraiburu area pit no 3, on line X1-Y1 to X5-Y5 but at the time of inspection wark was carried out in quarry no 1A, 2A &2B (ii) In The Titiba quarry it was proposed to carry out work in T1-T1' section whereas work was going on new Tatiba quarry.	22.03.2014

A copy of the violation letters issued by IBM and its reply is enclosed as **Annexure – XVI**.

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

Mine was closed by the order of Assistant Mining Officer, Chaibasa mentioning stop of mining activity in the mine, running under deemed extension in case of second and subsequent renewal of mining lease. A copy of letter regarding closure of mine from AMO, Chaibasa is enclosed as **Annexure - XVII**. The mine was also closed by the order of Forest Department and thereafter permission to start the mining operation was accorded. A copy of letter regarding closure of mine from Forest Department, Chaibasa is enclosed as **Annexure - XVII**.

3.6 In case the MP/SOM is submitted under rules 9 &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.

After obtaining Stage-I clearance over an area of 23.233 hectares, the lessee wants to carry out mining operation by fully mechanized method as the mining plan is approved for

other than fully mechanized method. Similarly, in the approved mining plan there is no provision for mobile/static crushing and screening plant, deep hole blasting etc. and requirement of mining machinery is modified suitably. Under the above circumstances the lessee intends to modify the mining plan under rule 10 of MCDR 1988. The said Modified Mining Plan was approved by Indian Bureau of Mines, Nagpur on 13.11.2009 vide letter no. 314(3)/2009-MCCM(C)/MP-13.

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अनुमोदित
APPROVED

PART - A

PART-A	1.0 GEOLOGY AND EXPLORATION

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

Physiography:

M/s The Rameshwara Jute Mills Ltd is a public limited company having wide scale experience in mining activities in its group companies. Baraiburu-Tatiba Iron & Manganese ore mining project spread over an area of 258.98968 ha is located in Baraiburu and Tatiba village, Taluka - Noamundi in West Singhbhum district of Jharkhand. The lease area is connected with Barajamda town at a distance of 10 km through a State Highway (Barajamda - Kiriburu highway) which passes through the lease hold area.

The aforesaid lease hold area is located in Topo sheet no 73 F/8 of Survey of India & delineated between the latitude 22° 07' 38.68646" – 22° 09' 52.05822" and longitude 85° 20'02.02762" – 85° 21' 17.56421" **(Refer Plate – 1).** The nearest railhead is Barajamda public siding of South-Eastern Railway, which is located at a distance of 12 km from the lease hold area. The lease area falls within Ghatkuri Reserve Forest - Compartment No. G32 & Tatiba Protected Forest-Compartment No. P37B in Saranda Forest Division, West Singhbhum, Jharkhand. Within the limits of the leasehold main power line of JSE Board is passing through the lease hold area and Power can be taken when required. A good network of all weather roads exist, which can also otherwise be utilized for affecting the ore supplies by roads.

The lease area of 258.98968 ha comprises of forest and non-forest land with under mentioned break up:-

Reserve Forest = 38.573 ha; Protected Forest = 96.419 ha; Govt land = 105.707 ha of which Jungle Jhari is 50.898 Ha and Tenant land is 18.290 Ha. Details of the land covered under the area.

The area is irregularly shaped and dominated by flat topped hillocks with gentle slopping and plain country at lower level. The mine is situated in an old mining area of Eastern India which is surrounded by following nearby iron mines as follows:-

1. North – Iron Ore Mine of M/s K.J.S. Ahluwalia, M/s. T.P.Sao, M/s Usha Martin, M/s Dewika Bhai Belji Ltd.

2. South- Odisha boundary & Bolani Iron Ore Mines(SAIL)
3. East - M/s. K.J.S. Ahluwalia.
4. West - M/s. Nirmal Kr. Pradip Kumar, M/s Misri Lal Jain., M/s R. Macneal & Co.

There are four distinctive hillocks within the leasehold area. The one in the extreme north western end is trending in N45^{0}E – S45^{0}W, while the second one in western part is trending in WNW-ESE, both these hillock are within Ghatkuri Reserve Forest. The third one within Tatiba protected forest is trending in east-west direction, and the fourth southern one is in North-South. All the hillocks have gently sloping topography. The highest elevation of the hillocks is 695 meters above mean sea level while the lowest R.L. is about 440 meters above M.S.L.

***Drainage Pattern*:**

There is no perennial nala within the leasehold. There are dry seasonal nallas within this lease hold which are flowing in East West, NW-SE, WNW-ESE directions also there are many dry nallas as indicated in the geological & Surface, Plans. The Karo River is located about a kilometer east of lease hold area.

There are two major water streams present in the northern part of the buffer zone i.e. Koina River is flowing from south-west to north and Karo River which flows from south to north. There is Sarakon nala which is flowing in the NW direction from south in the buffer zone. The Koina River is about 5.7 kms away from the core zone whereas Sarakon nala is about 9.5 kms away.

Climate:

Climatically the year in the region may be divided into three seasons; the winter from November to February, the summer from Mar to May, and the rainy season from June-Oct. December-January are the coldest months while April-May are the hottest. The cold season is delightful while it is unpleasantly hot in the summer season with hot westerly winds prevailing. On account of the barrier of hills in the southeast, the atmosphere is generally dry. Monsoon generally breaks in the second week of June. The rainfall is the highest in July and August.

Temperature

The temperature shows a steady increasing trend from the beginning of March till May, the hottest month. The mean daily maximum and minimum temperatures in May are 40.3 °C and 26.4°C respectively. With the onset of the Southwest monsoon by about mid June the day temperature drops appreciably and continues in the same range upto September. With the withdrawal of monsoon the day and night temperatures start falling from October heralding the onset of winter.

The month of November marks the setting in of winter season with both day and night temperatures decreasing till January, which is the coolest month. The mean daily maximum and minimum temperatures in January are 26.4 °C and 11.5 °C respectively. The extreme maximum and minimum temperatures recorded for the region are 46.7°C and 4.4°C respectively.

Rainfall

The rainy season in the area extends from mid June to September. The mean total rainfall during the monsoon period has been recorded as 956 mm out of mean total rainfall of 1192 mm for whole year. The average number of rainy days varies from 9 to 15 in the monsoon months. The rainfall is not spread throughout the year since nearly 87% of the total rainfall occurs during June to October period.

b) <u>Brief descriptions of Regional Geology with reference to location of lease/ applied area.</u>

Geology:

Regional Geology:

The area under review forms parts of Iron ore group in Singhbhum craton falling South of Singhbhum-Shear-zone. The Generalized chrono-stratigraphic succession of the Singhbhum-Orissa iron ore craton (After saha etal, 1988)

Newer dolerite dyke & sills	-	c.1600-950 Ma
Mayurbhanj Granite	-	c.2100 Ma
Gabbro – an orthosite-Ultramafics Kolhan Group	-	c.2100-2200 Ma
Unconformity		
Jagannathpur lava	-	Dhanjori simlipal
Malangtoli lava	-	Lavas (c.2300 Ma)

Dhanjori Group
Quartzite-Conglomerate

Pelitic and arenaceous metasediments with - Singhbhum mafic sills (c.2300-2400 Ma)

..... Unconformity .....

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Singhbhum Granite (S BG-B) (Phase-III) - c. 3.1 Ga

Mafic lava, tuff, acid volcanics

Tuffaceous shale, banded knematite

Jaspar with iron ore, ferruginous

Chert , local dolomite and quartzitic

Sandstone - Iron ore Group.

Singhbhum Granite (SBG-A) - Nilgiri Granite

(phase I& II) C.3.3 Ga - Bonai Granite

Folding & Metamorphism of OMG and OMTG

Older metamorphic tonalite gneiss (OMTG) -C (3.4-3.5 Ga)

Older metamorphic (OMG) : politic schist,

Quartzite , para-amphibolite, ortho-amphibolite -C. 4.0 Ga

As per the above geologic scenario, the Noamundi – Meralgara area is reported to contain the following stratigraphic succession :

Late tertiary – Early quarternary - Soil/ Alluvium
Laterite/canga

- Surface Erosion –

Kolhan Group : Shale,
: Sandstone
: Conglomerate

.....Unconformity.....

Iron ore Group : Upper shale B.H.J/Q(2)
: Hematite rock (2)
: B.H.J/ Q (1)
: Ferric shale
: Hematite rock (1)
: Lava & Tuff .

- Basement not seen -

Local Geology:

The Baraiburu Tatiba Iron & Mn. Mine of the Rameshwara Jute Mills Ltd. is a part of the western limb of the Iron Ore Range of West Singhbhum, Jharkhand. The available field studies conducted indicates that the local structural elements are compatible with the general regional trend of the western limb of the synclinorium.

The presence of the structural crest and trough are possibly the effect of the superimposed fold systems. The B H J is not found within this lease and it, in other parts represents the canoes, while the persistence in depth represents the basins. The massive Iron Ore in the southern part of this lease hold runs in NNE-SSW direction and is dipping to S 30^0 W to S 60^0 W , where as strike of insitu Iron Ore in northern part near forest pillar 1119 to 1121 is in North – South and is dipping at same angle.

In the Baraiburu area the strike of Iron Ore in the North western part changes to NW-SE and is found dipping in between S 35^0 E to S 60^0 E. The "Host rock" i.e. ferruginous laterite/phyllite and the ore body have similar trends.

Litho-logical Succession:

The lithological succession established as observed within Baraiburu lease hold area compatible with other locations on the western limb of the synclinorium. The general lithological succession of this mine is as follows :

Alluvium
Laterite
Upper Shale
Manganese Ore with phyllite/Float Iron Ore
Hematite (Hard-Laminated & lateritic ore)
Quartzite
Lower shales

The hematite Iron Ore found in this mine occurs as Lateritic Ore/Laminated-hard and soft. Ore here soft powdery Iron Ore and Blue dust are not found. The Manganese Ore are associated with cherty quartzite shales and laterite and are mainly pyrolusite and psilomelane.

Control of mineralization :

The possible parameters of controls on mineralization may be attributed to

a) Regional & local tectonics

b) Leaching and metasomatic replacement of B H J. and there by leading to the Iron Ore formations, as evidenced by the presence of unleached portion of the Ore and BHJ within the Ore body.

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Effects of Weathering :

The weathering has lead to the formation of laterite, which is highly erratic in nature, hence irregular/discontinuous pockets of laterite is a common feature in the Iron Ore deposits.

Ore Types :

The different ore types encountered in the Iron Ore deposit have been classified based on the physico-chemical characteristics as follows:

1. Massive Ore (HMO)
2. Hard Laminated Ore (HLO)
3. Lateritic Ore (LO)

1. **HMO** :- is practically pure hematite has a steel grey colour, and cherry red streak are generally fine grained and compact having 4.5 to 5 specific gravity is not present in this area.
2. **HLO** :- Hard laminated, fracture and voids filled with Red/Yellow ochre (limonite)
3. **LO** :- Highly lateralized low in Iron content, rich in alumina occurring erratically

c) Detailed description of geology of the lease area 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).

Not Applicable

d) Name of prospecting / exploration agency

M/s. Thriveni Earth Movers Pvt Ltd
(A unit of Thriveni Earthmovers Pvt Ltd)

Address- Opp - Joda Women's College,
P.O. – Boneikela, Joda
Dist – Keonjhar, Odisha,
Pin – 06767- 272657.

e-mail address and phone No.: syvester@triveni.org
Phone : 9437691660/9937091660
Fax : 06767-272657

e) Details of prospecting/exploration already carried out:

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

The mining operation in the area was commenced in 1978. During the period, few pits were opened at different locations by mining activity. These all old pits were within broken area.

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

Exploration already carried out in the area:-

This mine is being worked since a longtime at first was in the Mining lease of Sri Gopal Ram Pasari who had exposed Iron & Manganese faces by pitting and trenching. Later in 1966, M.L. over 640 Acres out of 960 Acres owned by Sri Pasari was leased out to M/s Birla Gwalior (P) Ltd.

The lessee has all along maintained a separate Geological wing headed by a qualified Geologist .Proving of lease area by giving 12 Nos. of Bore holes was done. In 1978 the M.L. area of M/s Birla Gwalior (P) Ltd. was transferred to M/s The Rameshwara Jute Mills Limited. The work of proving float Iron zone in the southern Tatiba area and in northern Baraiburu area, and Manganese zone in the Central part was undertaken. In all 58 shallow pits/ quarries were given from 1978 to 1985 up to a maximum depth of 4.50 meters. No definite grid pattern was followed due to the scattered occurrence of the ore body. During the year 2000-2005 additional 9 bore holes were given in the area in random way.

The judicious location of these pits/ quarries enabled the lessee to utilize the data revealed by the trial pits for the development of quarries. Most of the trial pits later on were converted into quarries and hence their location as well as designation cannot be furnished at the present stage, not their analysis can be provided now. The quarries had been marked on surface Geological plan. The seven different target areas demarcated are as follows.

1) Quarry No. IA-Insitu Iron Ore
2) Hutting Pit
3) Quarry No.8 & 11-Insitu Iron Ore
4) Tatiba North-Insitu & Float Iron Ore

5) Middle face
6) Orissa boundary pit
7) Lucky pit-Manganese quarry

BORE-HOLES AND TRIAL PITS WITH THEIR LOGGINGS:

It is an old working mine and the area has been prospected from time to time by putting 41 numbers of boreholes. Detailed topographical map including all required features along with geological mapping was carried out in 1:2000 scales. The survey is connected with the nearest bench mark. All the permanent features have been surveyed.

At Baraiburu Tatiba Iron & Mn. Mines in 1966-67, M/s Birla Gwalior (P) Ltd. had drilled Bore holes to a maximum depth of 57 mtrs. While trial pits were driven up to a depth of 6m, maximum. Bore holes and trial pits were systematically logged based on the litho logical characteristics. The sampling interval was about 0.50m to 1.5m. The summary of the trial pits put in Iron Ore sections and Manganese section is as follows.

Exploration carried out in 1966-67

Sl. No.	Description	Iron ore section	Manganese section
1	No. of bore holes	21	Nil
2	Total depth drilled	735 mtrs	Nil
3	Pits/ quarries	47	13
4	Total No. of samples analyzed	530 nos.	26 nos.

The bore holes were basically drilled to determine the ore persistence in depth and to decipher spatial distribution of the Ore types. Further, company explored the area by giving 15 boreholes during 2009-10 & 2010-11 in non forest area of Baraiburu and Tatiba area and it reflects that in Baraiburu there is no ore whereas in Tatiba area. Again, in 2011-12, five bore holes were given in the area.

Table-1.1

Details of Boreholes given in the area before 2011-12
(Ref. Annexure –XV and Plate – 4)

Sl. No.	B.H. No	Location	Depth in Meter
1	RJM-13	Latitude : 22° 09' 38.8" to Longitude: 85° 20'35.40"	60.10
2	RJM-15	Latitude : 22° 09' 34.9" to Longitude: 85° 20'42"	203.00

3	RJM-18	Latitude : 22° 09' 30.9" to Longitude: 85° 20'47.9"	148.60
4	RJM-19	Latitude : 22° 09' 30.4" to Longitude: 85° 20'37.8"	60.10
5	RJM-28	Latitude : 22° 08' 26.5" to Longitude: 85° 20'22.9"	67.10

The detail of the bore hole drilled in the leasehold is enclosed as **Annexure- XV**.

(iii) Details of samples analysis indicating type of sample (surface/sub-surface from pits/trenches/boreholes etc) Complete chemical analysis for entire strata fir 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).

The borehole samples were analyzed and the result is given in **Annexure – XV**.

iv) Expenditure incurred in various prospecting operations.

Year	Exploration cost in Rs
2011-12	5105458.00
Total	**5105458.00**

f) The surface plan of the lease area may be prepared on a scale of 1: 1000 or 1:2000 with contour interval of maximum of 10m 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.

The Surface plan has been prepared on a scale of 1:2000 with contour interval of 2m. All the surface features observed have been incorporated in the Surface Plan. The details of existence have been shown on the Surface Plan (**Plate – 4**).

g) For preparation of geological plan , surface plan prepared on a scale of 1: 1000 or 1:2000 scale specified under para 1.0 (f) of part A of the format may be taken as the base plan. The details of exploration already carried out along with supporting data for existence of mineral, locations proposed exploration, various litho-units along with other features indicated under Rule 28 (1)(b) of MCDR 1988.

Based on the recent survey of the entire lease area, a fresh geological mapping was carried out and Surface Geological plan has been prepared on a scale of 1:2000 with contour interval of 2m. The existing features and borehole locations have been marked.

Based on the exposures, opened working quarries, exploration carried out in the area, attempts has been taken to mark the mineralized zones in the Surface Geological Plan **(Plate – 5)**.

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

Geological sections have been prepared on a scale of 1:2000 at every 100m interval (at some places 50m) from ML to ML **(Refer Plate – 7)**.

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

The leasehold area is explored by putting 41 numbers of Bore holes from time to time during mining operation. The existing quarry and Bore hole carried out in the past proves the extent of mineralization both laterally and depth.

During the last approved scheme of mining, 173 bore holes (93 bore holes in Baraiburu area and 80 bore holes in Tatiba area) were proposed to be given in the entire leasehold area to prove the resources as well as depth continuity by core drilling in the area. But only 05 boreholes were given due to maximum time non-working of the mine.

In this Review of Mining Plan period there are 102 numbers of boreholes will be given in broken forest area, non forest area and in un-diverted forest area after obtaining the diversion of forest land from MoEF. All the boreholes are proposed on a grid 100m x 100m where it will possible. The average depth of each hole will be 30m. In this way about 1500m will be drilled. The locations of boreholes are shown on Geological Plan and exploration schedule is given below:

Table-1.2

PROPOSED BORE HOLE POSITION

SL. No.	Year	Proposed Bore hole no.	Depth (m.)	Grid value	
				Northing	Easting
1	2017-18	Bore hole no. - 1	30	2451786.5714	328896.1434
2	2017-18	Bore hole no. - 2	30	2451386.8596	328996.7251
3	2017-18	Bore hole no. - 3	30	2451387.4975	329496.7247
4	2017-18	Bore hole no. - 4	30	2449386.7738	328899.2765
5	2017-18	Bore hole no. - 5	30	2449386.4785	328699.2767
6	2017-18	Bore hole no. - 6	30	2449286.8614	328999.4041

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7	2017-18	Bore hole no. - 7	30	2449186.7738	328899.4600
8	2017-18	Bore hole no. - 8	30	2449186.4785	328699.4144
9	2017-18	Bore hole no. - 9	30	2448286.3920	328600.6800
10	2017-18	Bore hole no. - 10	30	2447986.0969	328401.0630
11	2018-19	Bore hole no. - 11	30	2451586.8595	328996.4699
12	2018-19	Bore hole no. - 12	30	2451587.0079	329196.4221
13	2018-19	Bore hole no. - 13	30	2451486.8803	329096.5259
14	2018-19	Bore hole no. - 14	30	2451487.1354	329296.5261
15	2018-19	Bore hole no. - 15	30	2451286.8297	329096.7811
16	2018-19	Bore hole no. - 16	30	2451287.2124	329396.7809
17	2018-19	Bore hole no. - 17	30	2451086.9207	329097.0839
18	2018-19	Bore hole no. - 18	30	2451087.1758	329297.0837
19	2018-19	Bore hole no. - 19	30	2451087.3775	329497.0836
20	2018-19	Bore hole no. - 20	30	2451087.6861	329697.1073
21	2018-19	Bore hole no. - 21	30	2449386.7544	328999.2296
22	2018-19	Bore hole no. - 22	30	2449286.5763	328899.3327
23	2018-19	Bore hole no. - 23	30	2449186.4995	328799.4838
24	2018-19	Bore hole no. - 24	30	2449086.3719	328699.6121
25	2018-19	Bore hole no. - 25	30	2449086.6060	328799.4120
26	2018-19	Bore hole no. - 26	30	2448986.6673	328899.7786
27	2018-19	Bore hole no. - 27	30	2448986.4789	328699.7631
28	2018-19	Bore hole no. - 28	30	2448386.4794	328700.5286
29	2018-19	Bore hole no. - 29	30	2448186.2314	328600.4353
30	2018-19	Bore hole no. - 30	30	2447986.2452	328600.9913
31	2019-20	Bore hole no. - 31	30	2451287.7203	329796.7809
32	2019-20	Bore hole no. - 32	30	2451088.1363	329997.3416
33	2019-20	Bore hole no. - 33	30	2450887.8809	329797.5972
34	2019-20	Bore hole no. - 34	30	2450888.1356	329997.2905
35	2019-20	Bore hole no. - 35	30	2450687.8410	329797.8467
36	2019-20	Bore hole no. - 36	30	2450688.1362	329997.5437
37	2019-20	Bore hole no. - 37	30	2450388.0088	329897.9256
38	2019-20	Bore hole no. - 38	30	2450388.2640	330097.9254
39	2019-20	Bore hole no. - 39	30	2450287.8813	329798.0542
40	2019-20	Bore hole no. - 40	30	2450288.1365	329998.0532
41	2019-20	Bore hole no. - 41	30	2450288.3917	330198.0534
42	2019-20	Bore hole no. - 42	30	2450188.8936	330298.1827
43	2019-20	Bore hole no. - 43	30	2450188.2242	330098.4840
44	2019-20	Bore hole no. - 44	30	2450088.1974	329898.3109
45	2019-20	Bore hole no. - 45	30	2449987.3787	329398.4391
46	2019-20	Bore hole no. - 46	30	2449987.5864	329598.7399
47	2019-20	Bore hole no. - 47	30	2449888.0388	329998.6379
48	2019-20	Bore hole no. - 48	30	2449788.0093	329898.6910
49	2019-20	Bore hole no. - 49	30	2448886.6064	328799.8429
50	2019-20	Bore hole no. - 50	30	2448786.3514	328599.9706
51	2019-20	Bore hole no. - 50	30	2447985.9300	328500.8056

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52	2019-20	Bore hole no. - 50	30	2448086.0510	328600.6841
53	2019-20	Bore hole no. - 50	30	2448086.1730	328700.6841
54	2019-20	Bore hole no. - 50	30	2448086.2940	328800.6840
55	2019-20	Bore hole no. - 50	30	2448086.5840	328900.6837
56	2019-20	Bore hole no. - 50	30	2448186.5840	328900.5623
57	2019-20	Bore hole no. - 50	30	2448186.4620	328800.5624
58	2019-20	Bore hole no. - 50	30	2448186.1720	328700.5627
59	2019-20	Bore hole no. - 50	30	2448286.3410	328700.4411
60	2019-20	Bore hole no. - 50	30	2448286.4620	328800.4410
61	2019-20	Bore hole no. - 50	30	2448286.5840	328900.4410
62	2019-20	Bore hole no. - 50	30	2448486.3410	328700.1984
63	2019-20	Bore hole no. - 50	30	2448486.4620	328800.1983
64	2019-20	Bore hole no. - 50	30	2448486.7050	329000.1981
65	2019-20	Bore hole no. - 50	30	2448786.3410	328699.8342
66	2019-20	Bore hole no. - 50	30	2448786.4620	328799.8342
67	2019-20	Bore hole no. - 50	30	2448886.1800	328699.6414
68	2019-20	Bore hole no. - 50	30	2448986.4620	328799.5914
69	2019-20	Bore hole no. - 50	30	2448986.7050	328999.5196
70	2019-20	Bore hole no. - 50	30	2448986.8260	329099.5195
71	2019-20	Bore hole no. - 50	30	2449086.8260	329099.4698
72	2019-20	Bore hole no. - 50	30	2449086.7050	328999.4699
73	2019-20	Bore hole no. - 50	30	2449186.7040	328999.2769
74	2019-20	Bore hole no. - 50	30	2449186.8260	329099.2768
75	2019-20	Bore hole no. - 50	30	2449286.8260	329099.1554
76	2019-20	Bore hole no. - 50	30	2449286.9470	329199.1553
77	2019-20	Bore hole no. - 50	30	2449587.5540	329698.8625
78	2019-20	Bore hole no. - 50	30	2449687.2720	329598.6698
79	2019-20	Bore hole no. - 50	30	2449787.3930	329698.6200
80	2019-20	Bore hole no. - 50	30	2449887.6750	329798.4983
81	2019-20	Bore hole no. - 50	30	2449987.9180	329998.3768
82	2019-20	Bore hole no. - 50	30	2450188.1600	330198.1339
83	2019-20	Bore hole no. - 50	30	2450387.9170	329997.8913
84	2019-20	Bore hole no. - 50	30	2450387.6750	329797.8914
85	2019-20	Bore hole no. - 50	30	2450687.5530	329697.5274
86	2019-20	Bore hole no. - 50	30	2450687.7960	329897.5272
87	2019-20	Bore hole no. - 50	30	2450688.0380	330097.5271
88	2019-20	Bore hole no. - 50	30	2450787.9170	329997.4058
89	2019-20	Bore hole no. - 50	30	2450787.7960	329897.4059
90	2019-20	Bore hole no. - 50	30	2450787.6740	329797.4059
91	2019-20	Bore hole no. - 50	30	2450887.7960	329897.2845
92	2019-20	Bore hole no. - 50	30	2450987.9170	329997.1630
93	2019-20	Bore hole no. - 50	30	2450987.7960	329897.1631
94	2019-20	Bore hole no. - 50	30	2450987.6740	329797.1632
95	2019-20	Bore hole no. - 50	30	2450987.4310	329597.1633
96	2019-20	Bore hole no. - 50	30	2451087.4310	329597.0420

97	2019-20	Bore hole no. - 50	30	2451187.4310	329596.9206
98	2019-20	Bore hole no. - 50	30	2451187.5530	329698.9205
99	2019-20	Bore hole no. - 50	30	2451187.6740	329796.9204
100	2019-20	Bore hole no. - 50	30	2451187.7950	329896.9204
101	2019-20	Bore hole no. - 50	30	2451587.0670	329296.4353
102	2019-20	Bore hole no. - 50	30	2450987.4310	329372.9633

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j) Reserve and Resources as per UNFC with respect 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/prefeasibility study report along with financial analysis for economic viability of the deposit as specified under the UNFC field guidelines may be incorporated.

The threshold value (notified by IBM) for iron ore is given below-

Mineral	Threshold Value	Cut-off Grade
Iron Ore (Hematite)	Fe 45%	Fe 57%

The reserve and resource calculation for Baraiburu-Tatiba Iron & Manganese Ore Mine of M/s The Rameshwara Jute Mills Ltd is based on norms of UNFC guideline and with respect of threshold value notified by IBM. All the parameters and calculation is described below of this text. The level of exploration is given in Geological plan & their UNFC coding is marked on Geological section **(Plate - 7)**. The feasibility report along with financial analysis for economic viability of the Baraiburu-Tatiba Iron & Manganese Ore Mine is enclosed as **Annexure –XIX.**

k) Furnish detailed calculation of reserve/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 per the proposed mining parameters.

Recently, during the year 2009-10, 2010-11 and 2011-12, exploration was carried out in the area by putting total 20 numbers of core drill bore holes. Copy of Form- J is enclosed as **Annexure – XIV**. On the basis of log data and analysis report of above exploration, fresh mineral resources and reserves have been estimated under UNFC system. The depth of the ore body has been ascertained on the basis of availability of +55% Fe grade in each boreholes. Accordingly, mineralized zones have been demarcated as Baraiburu Zone and

Tatiba Zone based on the distribution of quarries in the leasehold and a fresh reserve has been estimated and has been classified as per UNFC norms.

Method of Estimation of Resources / Reserve:

The mineral resources and reserves estimation has been done on the basis of the Iron ore & Manganese ore exposed in the quarry as well as exploration already carried out in the area. In an attempt to estimate the reserve of the area following parameters has been considered:

Parameters considered:

For the estimation of the Mineral resources, the following parameters have been considered:-

a) ***Method of estimation:*** Cross-sectional method has been adapted for calculation of resource and reserve. A cross-sectional area has been calculated which multiplied by the length of influence. The recovery factor has been considered. The volume of ROM iron ore so estimated is then converted into MT or lakh tons.

b) ***Cut-off grade:***

For the iron ore cut off grade is +57% Fe, but in this mine up to +55% Fe is considered as the ore upto this grade has been feed in the crushing & screening unit to get the marketable grade. Hence the cut off grade for this mine is considered at +55% Fe.

c) ***Recovery:***

Total ROM is considered as production because the average grade of ROM comes to 55.68% Fe or 56% Fe. From ROM, the recovery of iron ore from the quarries is considered as follows:

Table-1.3

Sl. No.	Parameters	ROM (Iron)
1	ROM (+55%Fe)	100%
	Recovery	
2	Salable ore (+55%)	85%
3	Sub-grade ore (+45 to -55%)	07%
4	Mineral Rejects with grade (Below 45%)	08%

d) ***Conversion factor:***

For Iron ore: 1 cum = 3 MT

Agrawal

Manganese Ore: 1 cum = 2.5 MT

e) *Thickness of the Ore Body:*

For the estimation of measured resources, following parameters have been considered:

i) **Lateral extension** has been considered as 25 mtrs on both sides of the existing quarry/boreholes for G1 category. G3 has been considered as per lithology. The G1 and G3 zones have been marked on the **Geological Plan (Plate – 5).**

ii) **Depth of the ore body** - as observed in working quarry/boreholes drilled. In last scheme of mining period five bore holes has been done. For the reserve calculation bore hole no, RJM-13 is taken its full depth and others four are not full depth. The depth done and consider for reserve calculation area given below-

Table-1.4

Sl. No.	B.H. No	Location	Depth in Meter	Consider for reserve in Meter
1	RJM-13	Latitude : 22° 09' 38.8" to Longitude: 85° 20'35.40"	60.10	60.10
2	RJM-15	Latitude : 22° 09' 34.9" to Longitude: 85° 20'42"	203.00	140.30
3	RJM-18	Latitude : 22° 09' 30.9" to Longitude: 85° 20'47.9"	148.60	125.00
4	RJM-19	Latitude : 22° 09' 30.4" to Longitude: 85° 20'37.8"	60.10	23.00
5	RJM-28	Latitude : 22° 08' 26.5" to Longitude: 85° 20'22.9"	60.10	50.10

The Proved reserve zones are shown in the Geological Plan as well as in geological Sections (**Plate – 5 & 7**). The detailed calculations for resources and reserves are given in Table separately.

f) Grade of Iron Ore – Based on the new fife core boreholes drilled in 2011 in the lease area and the analysis of lithology, grade of iron ore of this area has been computed as follows:

Table-1.5

Particulars	Fe%
Fe% +45-50	47.47
Fe% +50-55	52.79
Fe% +55-60	57.54
Fe% +60-65	62.23
Fe% +65 Above	65.50
Fe% +45 Below	48.55
Average Fe%	55.68 or 56%

The average grade of the iron ore comes to 55.68 or 56% Fe. For this mine, in the present market scenario, cut-off grade is considered at +55% Fe.

Exploration was carried out by putting boreholes along the haul roads which comes under broken area. The boreholes give positive result but diversion of forest land is still awaited. So, in applied diversion area, the exposure of potential resources of iron ore revealed from surface outcrops, road cutting and boundary of in-situ iron ore, lateritic iron ore are consider G3 category. The inferred resource has been marked, which is under G3 Category.

The zone considered under G1 category has been mapped on 1:1000 scale ***(Ref. Plate – 6)***. Also, the details of boreholes already carried out in the area during the last approved scheme period is given in Table – 1.4. The detailed calculations for estimation of mineral resources and reserves are given in Table Separately.

Consideration of G1 stage in Lateral influence.

The lateral influence is 25 m on both sides of the borehole/ quarry limit has been taken for G1 and no further influence for G2 stage. In this mine the space between broken area quarries and bore hole done is within 100 m. The reserve calculate from Broken area is coding as 121 and out of Brocken area is 221 as forest diversion has not taken at present and mining outside broken area is not possible without getting forest diversion.

MINERAL RESOURCES

UNFC system has been adopted to categorize the different resources. For the estimation of different resources, occurrences of mineral of intrinsic economic interest, location, grade, quantity, geological characteristic etc. has been studied in detailed and are given hereunder.

BROKEN AREA

Table-1.6

ZONE – A (BARAIBURU)
Table showing estimation of Measured Mineral Resources (within Diverted forest Area) Zone – A (Baraiburu area)

Category of Resources	Section line	Sectional area in m^2	Length of influence in m	Total volume cum	Total Mineral Resources in MT(cumx3.0)
QRY NO-3					
Measured (331)	M1-M1'	1210.00	50	60500.00	
	B2-B2'	925.00	30	27750.00	

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Total				88250.00	264750.00
QRY NO-2A					
Measured (331)	B3-B3'	587.00	45	26415.00	
	M3-M3'	196.00	40	7840.00	
Total				**34255.00**	**102765.00**
QRY NO-2B					
Measured (331)	B3-B3'	361.00	30	10830.00	
	M3-M3'	601.00	55	33055.00	
Total				**43885.00**	**131655.00**
Road side qry					
Measured (331)	M4-M4'	1044.00	70	73080.00	219240.00
Total				**73080.00**	**219240.00**
QRY NO-1A					
Measured (331)	B5-B5'	285.00	35	9975.00	
	M5-M5'	3727.00	50	186350.00	
	B6-B6'	1460.00	35	51100.00	
Total				**247425.00**	**742275.00**
QRY NO-1B					
Measured (331)	M5-M5'	5620.00	65	365300.00	
	B6-B6'	2261.00	40	90440.00	
Total				**455740.00**	**1367220.00**
QRY NO-1C					
Measured (331)	B5-B5'	221.00	30	6630.00	
	M5-M5'	3720.00	20	74400.00	
Total				**81030.00**	243090.00
Nala Pit					
Measured (331)	M5-M5'	11729.00	20	234580.00	
Total				**234580.00**	**703740.00**
QRY-4					
Measured (331)	M5-M5'	3196.00	45	143820.00	
	B6-B6'	2020.00	18	36360.00	
Total				**180180.00**	540540.00
SUBGRADE					
Measured (331)	B6-B6'	18094.00	48	868512.00	
Total				**868512.00**	**2605536.00**
QRY-7					
Measured (331)	B7-B7'	1076.00	20	21520.00	
Total				**21520.00**	**64560.00**
QRY-10A					
Measured (331)	M7-M7'	1306.00	40	52240.00	
Total				**52240.00**	**156720.00**
QRY-10B					
Measured (331)	B7-B7'	951.00	45	42795.00	
Total				**42795.00**	**128385.00**
QRY-10D					

Measured (331)	B7-B7'	1074.00	45	48330.00	
Total				48330.00	144990.00
QRY-5					
Measured (331)	B7-B7'	9922.00	100	992200.00	
Total				992200.00	2976600.00
Grand Total				3464022.00	10392066.00
					Or 10.392 million

Table – 1.7

(Zone- B)

Table showing estimation of Measured Mineral Resources (within Diverted forest Area) Zone- B (Tatiba area)

Category of Resources	Section line	Sectional area in m^2	Length of influence in m	Total volume cum	Total Mineral Resources in MT(cumx3.0)
TATIBA FACE No.-1					
Measured (331)	T1-T1'	290.00	45	13050.00	
Total				13050.00	39150.00
TATIBA FACE No.-2					
Measured (331)	S1-S1'	428.00	35	14980.00	
Total				14980.00	44940.00
TATIBA FACE No.-3					
Measured (331)	T2-T2'	535.00	50	26750.00	
	S2-S2'	546.00	30	16380.00	
Total				43130.00	129390.00
TATIBA FACE No.-4					
Measured (331)	T1-T1'	3010.00	50	150500.00	
	S1-S1'	4028.00	50	201400.00	
	T2-T2'	1680.00	50	84000.00	
Total				435900.00	1307700.00
TATIBA FACE No.-5					
Measured (331)	T1-T1'	810.00	30	24300.00	
	S1-S1'	526.00	30	15780.00	
Total				40080.00	120240.00
TATIBA FACE No.-6					
Measured (331)	T2-T2'	317.00	60	19020.00	
Total				19020.00	57060.00
TATIBA FACE No.-7					
Measured (331)	S2-S2'	244.00	35	8540.00	
	T3-T3'	291.00	50	14550.00	
Total				23090.00	69270.00
TATIBA FACE No.-9					
Measured (331)	T3-T3'	1084.00	70	75880.00	
	S3-S3'	1185.00	50	59250.00	
Total				135130.00	405390.00

TATIBA FACE No.-10					
Measured (331)	T4-T4'	420.00	45	18900.00	
Total				18900.00	56700.00
TATIBA FACE No.-11					
Measured (331)	S3-S3'	822.00	45	36990.00	
	T4-T4'	736.00	65	47840.00	
Total				84830.00	254490.00
TATIBA FACE No.-12					
Measured (331)	T5-T5'	305.00	60	18300.00	
Total				18300.00	54900.00
Grand Total				846410.00	2539230.00
					Or 2.539 Million

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ZONE- C (FLOAT AREA)

Category of Resources	Section line	Sectional area in m^2	Length of influence in m	Total volume cum	Total Mineral Resources in MT(cumx3.0)
Measured (331)	S3-S3'	130	75	9750	5850.00

Recovery 60% = 3510.00 MT or 0.004 Million.

Table-1.8

(ZONE C)
Table showing estimation of Measured Mineral Resources (within Diverted forest Area) Zone- C (Tatiba area)

Category of Resources	Section line	Sectional area in m^2	Length of influence in m	Total volume cum	Total Mineral Resources in MT(cumx3.0)
ORRISA BOUNDARY PIT-1					
Measured (331)	T12-T12'	440.00	65	28600.00	85800.00
	T13-T13'	437.00	100	43700.00	131100.00
Total				72300.00	216900.00
ORRISA BOUNDARY PIT-2					
Measured (331)	T14-T14'	345.00	40	13800.00	41400.00
Total				13800.00	41400.00
ORRISA BOUNDARY PIT-3					
Measured	S14-S14'	524.00	50	26200.00	78600.00
(331)	T15-T15'	362.00	50	18100.00	54300.00
Total				44300.00	132900.00
ORRISA BOUNDARY PIT-4					
Measured (331)	S15-S15'	397.00	55	21835.00	65505.00
Total				21835.00	65505.00
G.Total				152235.00	456705.00
					OR 0.457 Million

UN-DIVERTED AREA

Table-1.9

Table showing estimation of Mineral Resources undiverted Zone –A (Baraiburu Area)

Category of Resources	Section line	Sectional area in m^2	Length of influence in m	Total volume cum	Total Mineral Resources in MT(cumx3)	Million
Measured (331)	M1-M1'	913	65	59345.00		
	B2-B2'	970	75	72750.00		
	B3-B3'	972	75	72900.00		
	M3-M3'	622	50	31100.00		
	B4-B4'	1493.00	50	74650.00		
	M4-M4'	1182.00	50	59100.00		
	B5-B5'	2072.00	50	103600.00		
	M5-M5'	18239.00	50	911950.00		
	B6-B6'	20626.00	75	1546950.00		
	B7-B7'	12383.00	100	1238300.00		
Total				4170645.00	12511935.00	12.511

Table-1.10

Table showing estimation of Mineral Resources (undiverted land Zone - B (Tatiba area)

Category of Resources	Section line	Sectional area in m^2	Length of influence in m	Total volume cum	Total Mineral Resources in MT(cumx3)	Million
Measured (331)	T1-T1'	4763.00	45	214335.00		
	S1-S1'	3197.00	50	159850.00		
	T2-T2'	5370.00	50	268500.00		
	S2-S2'	2980.00	50	149000.00		
	T3-T3'	2014.00	50	100700.00		
	S3-S3'	1265.00	50	63250.00		
	T4-T4'	2300.00	75	172500.00		
	T5-T5'	625.00	65	40625.00		
Total				1168760.00	3506280.00	3.506

Table-1.11

Table showing estimation of Mineral Resources (undiverted land Zone –C (Tatiba area)

Category of Resources	Section line	Sectional area in m^2	Length of influence in m	Total volume cum	Total Mineral Resources in MT(cumx3)	Million
Measured	T12-T12'	458.00	100	45800.00		

(331)	T13-T13'	460.00	100	46000.00		
	T14-T14'	657.00	75	49275.00		
	S14-S14'	465.00	50	23250.00		
	T15-T15'	855.00	50	42750.00		
	S15-S15'	732.00	75	54900.00		
Total				261975	785925.00	0.786

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Table-1.12

Estimation of inferred mineral Resources (333)

Category of Resources	Section line	Sectional area in m^2	Length of influence in m	Total volume cum	Total Mineral Resources in MT(cumx3)	Million
Inferred (333)	B2-B2'	512	30	15360.00		
	B3-B3'	1109	45	49905.00		
	M3-M3'	2050	50	102500.00		
	B4-B4'	2414	50	120700.00		
	M4-M4'	1992	50	99600.00		
	B5-B5'	443	50	22150.00		
	M5-M5'	767	50	38350.00		
	B6-B6'	1540	50	77000.00		
	B7-B7'	1965	50	98250.00		
	B8-B8'	3730	50	186500.00		
	B9-B9'	3175	50	158750.00		
	B10-B10'	1524	50	76200.00		
	B11-B11'	1510	50	75500.00		
	B12-B12'	515	50	25750.00		
	B13-B13'	512	30	15360.00		
TOTAL				1161875.00	3485625.00	3.485

Table-1.13

Gist of Mineral Resources

BROKEN AREA			
Category of Mineral Resources	Location	Within lease area	
		MT	Million ton
Measured Mineral Resources (331)	Zone-A (Baraiburu)	10392066.00	10.392
	Zone-B(Tatiba)	2539230.00	2.539
	Zone-C (Tatiba float)	3510.00	0.004
	Zone-C(Tatiba)	456705.00	0.457
Sub Total		13391511.00	13.392
UN DIVERTED AREA			
Measured Mineral Resources (331)	Zone-A (Baraiburu)	12511935.00	12.512
	Zone-B (Tatiba-A)	3506280.00	3.506
	Zone-C (Tatiba-B)	785925.00	0.786
Sub Total	-	16804140.00	16.804

Total	-	30195651.00	30.195
Inferred (333)	-	3485625.00	3.485
Grand Total	-	33681276.00	33.680

Gist of Total Mineral Resources of Entire Area

Category of Mineral Resources	Location	Within lease area	
		MT	Million ton
Measured Mineral Resources (331)	Zone - A (Baraiburu)	22904001.00	22.904
	Zone - B (Tatiba)	6045510.00	6.045
	Zone - C Tatiba float)	3510.00	0.004
	Zone - C (Tatiba)	1242630.00	1.243
Total		30195651.00	30.196
Inferred (333)	-	3485625.00	3.485
Grand Total	-	33681276.00	33.680

Table-1.13B

Table showing estimation of Mineral Resources (undiverted land Manganese Zone)

Category of Resources	Section line	Sectional area in m^2	Length of influence in m	Total volume cum	Total Mineral Resources in MT(cumx2.5)	Million
Measured (331)	817.00	481.00	138	66378.00		
	818.00	800.00	111	88800.00		
	819.00	1299.00	100	129900.00		
	820.00	1333.00	100	133300.00		
	821.00	1144.00	69	78936.00		
	823.00	638.00	109	69542.00		
	825.00	415.00	103	42745.00		
Total				609601.00	1524002.50	1.524

(B) MINERAL RESERVES:

Mineral reserve is that part of reserve which can be calculated based on taking ultimate pit slope of the working from the broken area. While assessing the mineral reserves of the deposit, measured and indicated categories of resources have been considered and accordingly the mineral reserves are calculated assuming loss due to pit slope and its proximity with the as broken area boundary. Same method has been considered here as

considered for calculating the mineral resources. The mineral reserve of iron ore for the broken area has been estimated and given in **Table – 1.14.**

ZONE – A (BARAIBURU)

Table-1.14

Table showing estimation of Mineral Reserve (within Diverted forest Area) Zone - A (Baraiburu area)

Category of Reserve	Section line	Sectional area in m^2	Length of influence in m	Total volume cum	Total Mineral Resources in MT(cumx3.0)
			QRY NO-3		
Proved	M1-M1'	836.00	50.00	41800.00	
	B2-B2'	376.00	30.00	11280.00	
Total				**53080.00**	**159240.00**
			QRY NO-2A		
Proved	B3-B3'	479.00	45.00	21555.00	
	M3-M3'	87.00	40.00	3480.00	
Total				**25035.00**	**75105.00**
			QRY NO-2B		
Proved	B3-B3'	73.00	30.00	2190.00	
	M3-M3'	533.00	55.00	29315.00	
Total				**31505.00**	**94515.00**
			Road side qry		
Proved	M4-M4'	643.00	70.00	45010.00	135030.00
Total				**45010.00**	**135030.00**
			QRY NO-1A		
Proved	B5-B5'	0.00	35.00	0.00	
	M5-M5'	705.00	50.00	35250.00	
	B6-B6'	951.00	35.00	33285.00	
Total				**68535.00**	**205605.00**
			QRY NO-1B		
Proved	M5-M5'	1250.00	65.00	81250.00	
	B6-B6'	208.00	40.00	8320.00	
Total				**89570.00**	**268710.00**
			QRY NO-1C		
Proved	B5-B5'	61.00	30.00	1830.00	
	M5-M5'	303.00	20.00	6060.00	
Total				**7890.00**	**23670.00**
			Nala Pit		
Proved	M5-M5'	288.00	20.00	5760.00	
Total				**5760.00**	**17280.00**
			QRY-4		
Proved	M5-M5'	1216.00	45.00	54720.00	
	B6-B6'	825.00	18.00	14850.00	
Total				**69570.00**	**208710.00**

SUBGRADE					
Proved	B6-B6'	1503.00	48.00	72144.00	
Total				72144.00	216432.00
QRY-7					
Proved	B7-B7'	185.00	20.00	3700.00	
Total				3700.00	11100.00
QRY-10A					
Proved	M7-M7'	1058.00	40.00	42320.00	
Total				42320.00	126960.00
QRY-10B					
Proved	B7-B7'	167.00	45.00	7515.00	
Total				**7515.00**	**22545.00**
QRY-10D					
Proved	B7-B7'	104.00	45.00	4680.00	
Total				**4680.00**	**14040.00**
QRY-5					
Proved	B7-B7'	1016.00	100.00	101600.00	
Total				**101600.00**	**304800.00**
Grand Total				**627914.00**	**1883742.00**
					Or 1.884 million

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ZONE- B (TATIBA)

Table – 1.15

Table showing estimation of Mineral Reserve(within Diverted forest Area) Zone- B (Tatiba area)

Category of Resserve	Section line	Sectional area in m^2	Length of influence in m	Total volume cum	Total Mineral Resources in MT(cumx3.0)
TATIBA FACE No.-1					
Proved	T1-T1'	178.00	45.00	8010.00	
Total				**8010.00**	**24030.00**
TATIBA FACE No.-2					
Proved	S1-S1'	353.00	35.00	12355.00	
Total				**12355.00**	**37065.00**
TATIBA FACE No.-3					
Proved	T2-T2'	427.00	50.00	21350.00	
	S2-S2'	364.00	30.00	10920.00	
Total				**32270.00**	**96810.00**
TATIBA FACE No.-4					
Proved	T1-T1'	328.00	50.00	16400.00	
	S1-S1'	1128.00	50.00	56400.00	
	T2-T2'	314.00	50.00	15700.00	
Total				**88500.00**	**265500.00**
TATIBA FACE No.-5					

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Proved	T1-T1'	42.00	30.00	1260.00	
	S1-S1'	27.00	30.00	810.00	
Total				**2070.00**	6210.00
			TATIBA FACE No.-6		
Proved	T2-T2'	235.00	60.00	14100.00	
Total				**14100.00**	42300.00
			TATIBA FACE No.-7		
Proved	S2-S2'	125.00	35.00	4375.00	
	T3-T3'	196.00	50.00	9800.00	
Total				**14175.00**	**42525.00**
			TATIBA FACE No.-9		
Proved	T3-T3'	1004.00	70.00	70280.00	
	S3-S3'	1100.00	50.00	55000.00	
Total				**125280.00**	**375840.00**
			TATIBA FACE No.-10		
Proved	T4-T4'	147.00	45.00	6615.00	
Total				**6615.00**	**19845.00**
			TATIBA FACE No.-11		
Proved	S3-S3'	718.00	45.00	32310.00	
	T4-T4'	610.00	65.00	39650.00	
Total				**71960.00**	**215880.00**
			TATIBA FACE No.-12		
Proved	T5-T5'	156.00	60.00	9360.00	
Total				**9360.00**	**28080.00**
			ORRISA BOUNDARY PIT-1		
Proved	T12-T12'	340.00	65.00	22100.00	
	T13-T13'	357.00	100.00	35700.00	
Total				**57800.00**	**173400.00**
			ORRISA BOUNDARY PIT-2		
Proved	T14-T14'	235.00	40.00	9400.00	
Total				**9400.00**	**28200.00**
			ORRISA BOUNDARY PIT-3		
Proved	S14-S14'	458.00	50.00	22900.00	
	T15-T15'	289.00	50.00	14450.00	
Total				**37350.00**	**112050.00**
			ORRISA BOUNDARY PIT-4		
Proved	S15-S15'	321.00	55.00	17655.00	
Total				**17655.00**	**52965.00**
Grand Total				**384695**	**1154085.00**
					1.154 Million

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ZONE – C (FLOAT AREA)

Category of Reserve	Section line	Sectional area in m^2	Length of influence in m	Total volume cum	Total Mineral Resources in MT(cumx3.0)
Proved	S3-S3'	130.00	75.00	9750.00	6850.00

Recovery 60% = 3510.00 MT or 0.004 Million.

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(ZONE- C)

Table-1.16

Table showing estimation of Mineral Reserve (within Diverted forest Area) Zone- C (Tatiba area)

Category of Reserve	Section line	Sectional area in m^2	Length of influence in m	Total volume cum	Total Mineral Resources in MT(cumx3.0)
ORRISA BOUNDARY PIT-1					
Proved	T12-T12'	340.00	65.00	22100.00	66300.00
	T13-T13'	357.00	100.00	35700.00	107100.00
Total				**57800.00**	**173400.00**
ORRISA BOUNDARY PIT-2					
Proved	T14-T14'	235.00	40.00	9400.00	28200.00
Total				9400.00	28200.00
ORRISA BOUNDARY PIT-3					
Proved	S14-S14'	458.00	50.00	22900.00	68700.00
	T15-T15'	289.00	50.00	14450.00	43350.00
Total				**37350.00**	**112050.00**
ORRISA BOUNDARY PIT-4					
Proved	S15-S15'	321.00	55.00	17655.00	52965.00
Total				17655.00	52965.00
G.Total				**122205.00**	**366615.00**
					Or 0.367 Million

Table-1.17

GIST OF THE MINERAL RESERVES

Category of Mineral Reserve	Location	MINERAL RESERVE	
		MT	million tons
Proved (111)	Within diverted forest land **Zone – A** (Baraiburu area)	1883742.00	1.884
	Within diverted forest land **Zone – B** (Tatiba area)	1154085.00	1.154
	Within diverted forest land **Zone – C** (Tatiba area)	366615.00	0.367
	Zone – C (Tatiba float area)	3510.00	0.004
TOTAL		3407952.00	3.409

Table-1.17B

Table showing estimation of Mineral Reserve (Manganese Ore)

Category of Resources	Section line	Sectional area in m^2	Length of influence in m	Total volume cum	Total Mineral Resources in MT (cum x 2.5)	Million
Proved (111)	B17	481.00	138.00	66378.00		
	B18	800.00	111.00	88800.00		
	B19	518.00	100.00	51800.00		
	B20	546.00	100.00	54600.00		
	B21	1144.00	69.00	78936.00		
	B23	638.00	109.00	69542.00		
	B25	415.00	103.00	42745.00		
Total				452801.00	1132083.06	1.132

The Total ROM of Manganese Ore was Approved Scheme of mine Plan = 1133463.00 MT

The Production was done during Approved Scheme of mine Plan = 1379.94

Remaining Reserve = 1132083.06 MT

Feasibility Mineral Resources:

It has been found that at ultimate pit limit drawn from broken area, some ore will be blocked due to slope and these resources can only be feasible after getting further Forest land applied for forest diversion, which has been estimated below

ZONE – A (BARAIBURU)
(BROCKEN AREA)

Table-1.18

Converted to reserve after getting forest clearance.

Category of Resources	Section line	Sectional area in m^2	Length of influence in m	Total volume cum	Total Mineral Resources in MT(cumx3.0)
QRY NO-3					
Feasibility Resources (221)	M1-M1'	374.00	50.00	18700.00	
	B2-B2'	549.00	30.00	16470.00	
Total				16470.00	105510.00
QRY NO-2A					
Feasibility Resources (221)	B3-B3'	108.00	45.00	4860.00	

BARAIBURU – TATIBA IRON & MANGANESE MINE (258.98968 HA.)
LESSEE: M/S THE RAMESHWARA JUTE MILLS LTD

	M3-M3'	109.00	40.00	4360.00	
Total				9220.00	27660.00
			QRY NO-2B		
Feasibility Resources (221)	B3-B3'	288.00	30.00	8640.00	
	M3-M3'	68.00	55.00	3740.00	
Total				12380.00	37140.00
			Road side qry		
Feasibility Resources (221)	M4-M4'	401.00	70.00	28070.00	
Total				28070.00	84210.00
			QRY NO-1A		
Feasibility Resources (221)	B5-B5'	285.00	35.00	9975.00	
	M5-M5'	3022.00	50.00	151100.00	
	B6-B6'	509.00	35.00	17815.00	
Total				178890.00	536670.00
			QRY NO-1B		
Feasibility Resources (221)	M5-M5'	4370.00	65.00	284050.00	
	B6-B6'	2053.00	40.00	82120.00	
Total				366170.00	1098510.00
			QRY NO-1C		
Feasibility Resources (221)	B5-B5'	160.00	30.00	4800.00	
	M5-M5'	3417.00	20.00	68340.00	
Total				73140.00	219420.00
			Nala Pit		
Feasibility Resources (221)	M5-M5'	11441.00	20.00	228820.00	
Total				228820.00	686460.00
			QRY-4		
Feasibility Resources (221)	M5-M5'	1980.00	45.00	89100.00	
	B6-B6'	1195.00	18.00	21510.00	
Total				110610.00	331830.00
			SUBGRADE		
Feasibility Resources (221)	B6-B6'	16591.00	48.00	796368.00	
Total				796368.00	2389104.00
			QRY-7		
Feasibility Resources (221)	B7-B7'	891.00	20.00	17820.00	
Total				17820.00	53460.00

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QRY-10A					
Feasibility Resources (221)	M7-M7'	248.00	40.00	9920.00	
Total				9920.00	29760.00
QRY-10B					
Feasibility Resources (221)	B7-B7'	784.00	45.00	35280.00	
Total				35280.00	105840.00
QRY-10D					
Feasibility Resources (221)	B7-B7'	970.00	45.00	43650.00	
Total				43650.00	130950.00
QRY-5					
Feasibility Resources (221)	B7-B7'	8906.00	100.00	890600.00	2671800.00
Total				890600.00	2671800.00
Grand Total				2836108.00	8508324.00
					Or 8.506 Million

ZONE –A BARAIBURU (UNDIVERTED AREA)

Table-1.19

Converted to reserve after getting forest clearance.

Category of Resources	Section line	Sectional area in m^2	Length of influence in m	Total volume cum	Total Mineral Resources in MT(cumx3)	Million
Feasibility Resources (221)	M1-M1'	537.00	65.00	34905.00		
	B2-B2'	860.00	75.00	64500.00		
	B3-B3'	972.00	75.00	72900.00		
	M3-M3'	622.00	50.00	31100.00		
	B4-B4'	1493.00	50.00	74650.00		
	M4-M4'	1182.00	50.00	59100.00		
	B5-B5'	2072.00	50.00	103600.00		
	M5-M5'	13124.00	50.00	656200.00		
	B6-B6'	15501.00	75.00	1162575.00		
	B7-B7'	3023.00	100.00	302300.00		
Total				**2561830.00**	**7685490.00**	**7.685**

ZONE –A BARAIBURU
(UNDIVERTED AREA)

Table-1.20

Will not Converted to reserve after getting forest clearance(7.5m).

Category of Resources	Section line	Sectional area in m^2	Length of influence in m	Total volume cum	Total Mineral Resources in MT(cumx3)	Million
Feasibility Resources (221)	M1-M1'	376.00	65.00	24440.00		
	B2-B2'	110.00	75.00	8250.00		
	B3-B3'	0.00	75.00	0.00		
	M3-M3'	0.00	50.00	0.00		
	B4-B4'	0.00	50.00	0.00		
	M4-M4'	0.00	50.00	0.00		
	B5-B5'	0.00	50.00	0.00		
	M5-M5'	5115.00	50.00	255750.00		
	B6-B6'	5125.00	75.00	384375.00		
	B7-B7'	9360.00	100.00	936000.00		
Total				**1608815.00**	**4826445.00**	**4.826**

Table-1.21

GIST OF THE FEASIBILITY MINERAL RESOURCES ZONE –A (BARAIBURU)

Category of Mineral Resources	Ore Blocked due to	FEASIBILITY & PRE-FEASIBILITY MINERAL RESOURCES	
		MT	Million ton
Feasibility (221)	Pit slope of broken area(converted into reserve after getting Forest clearance)	8508324.00	8.508
	Un diverted area (converted into reserve after getting Forest clearance)	7685490.00	7.686
	7.5 m safety zone Un diverted area(will not converted into reserve after getting Forest clearance)	4826445.00	4.826
Total		**21020259.00**	**21.020**

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ZONE –B (Tatiba)

Table-1.22

Estimation of feasibility mineral resources (within Broken Area) due to pit slope of broken area)(after getting forest clearance of additional area it converted reserve) zone –B (Tatiba)

Category of Resources	Section line	Sectional area in m^2	Length of influence in m	Total Volume cum	Total Mineral Resources in MT(cumx3.0)
		TATIBA FACE No.-1			
Feasibility Mineral Resources (221)	T1-T1'	112.00	45.00	5040.00	
Total				**5040.00**	**15120.00**
		TATIBA FACE No.-2			
Feasibility Mineral Resources (221)	S1-S1'	75.00	35.00	2625.00	
Total				**2625.00**	**7875.00**
		TATIBA FACE No.-3			
Feasibility Mineral Resources (221)	T2-T2'	108.00	50.00	5400.00	
	S2-S2'	182.00	30.00	5460.00	
Total				**10860.00**	**32580.00**
		TATIBA FACE No.-4			
Feasibility Mineral Resources (221)	T1-T1'	2682.00	50.00	134100.00	
	S1-S1'	2900.00	50.00	145000.00	
	T2-T2'	1366.00	50.00	68300.00	
Total				**347400.00**	**1042200.00**
		TATIBA FACE No.-5			
Feasibility Mineral Resources (221)	T1-T1'	768.00	30.00	23040.00	
	S1-S1'	499.00	30.00	14970.00	
Total				**38010.00**	**114030.00**
		TATIBA FACE No.-6			
Feasibility Mineral Resources (221)	T2-T2'	82.00	60.00	4920.00	
Total				**4920.00**	**14760.00**
		TATIBA FACE No.-7			
Feasibility Mineral Resources (221)	S2-S2'	119.00	35.00	4165.00	
	T3-T3'	95.00	50.00	4750.00	
Total				**8915.00**	**26745.00**
		TATIBA FACE No.-9			
Feasibility Mineral Resources (221)	T3-T3'	80.00	70.00	5600.00	
	S3-S3'	85.00	50.00	4250.00	
Total				**9850.00**	**29550.00**
		TATIBA FACE No.-10			
Feasibility Mineral Resources (221)	T4-T4'	273.00	45.00	12285.00	
Total				**12285.00**	**36855.00**

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TATIBA FACE No.-11					
Feasibility Mineral Resources (221)	S3-S3'	104.00	45.00	4680.00	
	T4-T4'	126.00	65.00	8190.00	
Total				84830.00	254490.00
TATIBA FACE No.-12					
Feasibility Mineral Resources (221)	T5-T5'	149.00	60.00	8940.00	
Total				8940.00	26820.00
ORRISA BOUNDARY PIT-1					
Feasibility Mineral Resources (221)	T12-T12'	100.00	65.00	6500.00	
	T13-T13'	80.00	100.00	8000.00	
Total				14500.00	43500.00
ORRISA BOUNDARY PIT-2					
Feasibility Mineral Resources (221)	T14-T14'	110.00	40.00	4400.00	
Total				4400.00	13200
ORRISA BOUNDARY PIT-3					
Feasibility Mineral Resources (221)	S14-S14'	66.00	50.00	3300.00	
	T15-T15'	73.00	50.00	3650.00	
Total				6950.00	20940.00
ORRISA BOUNDARY PIT-4					
Feasibility Mineral Resources (221)	S15-S15'	76.00	55.00	4180.00	
Total				4180.00	12540.00
Grand Total				461715	1385145.00
					1.385 Million

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Table-1.23

Table showing estimation of Feasible Mineral Resources (undiverted land) Feasible after forest diversion zone –B (Tatiba)

Category of Resources	Section line	Sectional area in m^2	Length of influence in m	Total volume cum	Total Mineral Resources in MT(cumx3)	Million
Feasibility Mineral Resources (221)	T1-T1'	70.00	45.00	3150.00		
	S1-S1'	60.00	50.00	3000.00		
	T2-T2'	50.00	50.00	2500.00		
	S2-S2'	0.00	50.00	0.00		
	T3-T3'	0.00	50.00	0.00		
	S3-S3'	0.00	50.00	0.00		
	T4-T4'	147.00	75.00	11025.00		
	T5-T5'	102.00	65.00	6630.00		
Total				26305.00	78915.00	0.079

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Table-1.24

Table showing estimation of Feasible Mineral Resources (undiverted land) non mineable after diversion Zone –B (Tatiba)

Category of Resources	Section line	Sectional area in m^2	Length of influence in m	Total volume cum	Total Mineral Resources in MT(cumx3)	Million
Feasibility Mineral Resources (221)	T1-T1'	4693.00	45.00	211185.00		
	S1-S1'	3137.00	50.00	156850.00		
	T2-T2'	5370.00	50.00	268500.00		
	S2-S2'	2980.00	50.00	149000.00		
	T3-T3'	2014.00	50.00	100700.00		
	S3-S3'	1265.00	50.00	63250.00		
	T4-T4'	2153.00	75.00	161475.00		
	T5-T5'	523.00	65.00	33995.00		
Total				**1144955.00**	**3434865.00**	**3.435**

Table-1.25

GIST OF THE FEASIBILITY & PRE-FEASIBILITY MINERAL RESOURCES ZONE –B (TATIBA)

Category of Mineral Resources	Ore Blocked due to	FEASIBILITY & PRE-FEASIBILITY MINERAL RESOURCES	
		MT	Million ton
Feasibility (221)	Pit slope of broken area(converted into reserve after getting Forest clearance)	1385145.00	1.385
	Un diverted area (converted into reserve after getting Forest clearance)	78915.00	0.079
	7.5 m safety zone Un diverted area(will not converted into reserve after getting Forest clearance)	3434865.00	3.435
Total		**4898925.00**	**4.899**

ZONE –C (TATIBA)
(BROCKEN AREA)

Table-1.26

Converted to reserve after getting forest clearance.

Category of Resources	Section line	Sectional area in m^2	Length of influence in m	Total volume cum	Total Mineral Resources in MT(cumx3.0)
ORRISA BOUNDARY PIT-1					
Feasibility (221)	T12-T12'	100.00	65.00	6500.00	19500.00
	T13-T13'	80.00	100.00	8000.00	24000.00

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Total				**14500.00**	**43500.00**
		ORRISA BOUNDARY PIT-2			
Feasibility (221)	T14-T14'	110.00	40.00	4400.00	13200.00
Total				**4400.00**	13200.00
		ORRISA BOUNDARY PIT-3			
Feasibility (221)	S14-S14'	66.00	50.00	3300.00	9900.00
	T15-T15'	73.00	50.00	3650.00	10950.00
Total				**6950.00**	**20850.00**
		ORRISA BOUNDARY PIT-4			
Feasibility (221)	S15-S15'	76.00	55.00	4180.00	12540.00
Total				**4180.00**	**12540.00**
G.Total				**30030.00**	**90090.00**
					Or 0.090 Million

Table-1.27

Table showing estimation of Feasible Mineral Resources (undiverted land) non mineable after diversion Zone –C (Tatiba)

Category of Resources	Section line	Sectional area in m^2	Length of influence in m	Total volume cum	Total Mineral Resources in MT(cumx3)	Million
Feasibility Mineral Resources (221)	T12-T12'	458.00	100.00	45800.00		
	T13-T13'	460.00	100.00	46000.00		
	T14-T14'	657.00	75.00	49275.00		
	S14-S14'	465.00	50.00	23250.00		
	T15-T15'	855.00	50.00	42750.00		
	S15-S15'	732.00	75.00	54900.00		
Total				**261975.00**	**785925.00**	**0.786**

Table-1.28

GIST OF THE FEASIBILITY & PRE-FEASIBILITY MINERAL RESOURCES ZONE –C (TATIBA)

Category of Mineral Resources	Ore Blocked due to	FEASIBILITY & PRE-FEASIBILITY MINERAL RESOURCES	
		MT	Million ton
Feasibility (221)	Pit slope of broken area(converted into reserve after getting Forest clearance)	**90090.00**	**0.090**
	Un diverted area (converted into reserve after getting Forest clearance)	**785925.00**	**0.786**
	7.5 m safety zone Un diverted area(will not converted into	-	-

	reserve after getting Forest clearance)		
Total		876015.00	0.876

Table-1.28B

Table showing estimation of Feasible Mineral Resources:

Category of Resources	Section line	Sectional area in m^2	Length of influence in m	Total volume cum	Total Mineral Resources in MT(cumx2.5)	Million
Feasibility Mineral Resources (221)	B19	781.00	100.00	78100.00		
	B20	787.00	100.00	78700.00		
Total				156800.00	392000.00	0.392

GIST OF THE FEASIBILITY & PRE-FEASIBILITY MINERAL RESOURCES ZONE –B (TATIBA)

Category of Mineral Resources	Ore Blocked due to	FEASIBILITY & PRE-FEASIBILITY MINERAL RESOURCES	
		MT	Million ton
	Crossing High Tension	392000.00	0.392
Total		392000.00	0.392

CLASSIFICATION OF RESERVE AS PER UNFC SYSTEM:

UNFC system has been adopted to categorize the mineral resources and reserves. For the estimation of different mineral reserves, occurrences of mineral of intrinsic economic interest, location, grade, quantity, geological characteristic etc. has been studied in detailed and are given hereunder.

Table – 1.29

For G1 category (111):

UNFC axis and code	Guideline		Studies Done
G1 (Detailed Exploration)	1	**Geological survey** (i) Mapping for coal, mapping 1:5000for other minerals1:1000 (ii) Preparation of detailed topographical-cum-geological map including all the surface geological features, extent of deposit, structure, location of boreholes, assay plan and section of exploratory mine	Detailed geological survey has been done on 1:1000 scale. Detailed topographical-cum-geological map including all required features has been prepared. The area considered under G1 has been mapped on 1:1000 scale (Plate – 6). Total 26 BH (21- non-core & 5 core) were drilled in the area. The lithology and analysis of all the 5

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		development and borehole data. (iii) Topo-grid/triangulation stations/identified fiducially linking in the map.	boreholes are given in Annexure – XV. Spacing of boreholes from quarry and other borehole is given within 100m which shows that all the spacing are within 100m (confirming the UNFC guideline for G1). **Lateral extension** has been considered as 25 mtrs on both sides of the existing quarry/boreholes for G1 category. Based on the ore exposed in the existing quarries and boreholes drilled, mineralized zone has been marked quarry wise in the broken area. It is revealed from the quarry and pit data that Iron ore is continuing maximum up to the depth of 203 meters in bore holes no RJM-15Nala pit having bottom RL of 322m, but upto 140.30m or 394.7 RL taking reserve. The depth of ore is variable in pit to pit. Also, the walls of existing quarries indicate the presences of Iron ore. The proved depth has been considered the maximum depth encountered by the quarry and bore hole drilled there.
	2	**Geochemical survey:** Detailed grid pattern sampling and analysis.	Not Done
	3	**Geophysical survey**: Detailed and specific borehole geophysical survey	As the geological study was carried out by studying the open quarries and exploration carried out in the area, Geophysical survey is not necessary.
	4	**Technological** 1. Pitting-2.5per square Km. For sample deposit 2. Trenching-At spacing of 200-300m 3. Drilling-closer spaced (with definite grid pattern)then that for G2 category);(a)For coal density of boreholes to be 12-15 per sq.KM depending on the complexities for geo-structural proving.(b)For opencast project grid spacing may be 100X50m depending on the geology, weather mantle cover, burning nature of coal seams. **4.** Exploratory mining and check drilling results if possible;	The leasehold area consists of 12 numbers of quarries. During last scheme period, exploration was carried out by putting 5 numbers boreholes (Core). The working quarry shows presence of Iron ore up to a max depth of 203.00m and the depth of the ore is variable in quarry to quarry. Also the mineralized zones have been demarcated based on the ore exposed in different quarries and data generated from bore hole
	5.	Sampling- systematic pit and trench sampling core and sludge sampling for laboratory scale and bulk samples for the pilot plant scale beneficiation studies.	Sampling and analysis of samples is being done. The old 21 number of boreholes drilled was also explained in the approved mining scheme with lithology and analysis. The lithology of 5 (core) bore hole are given in Annexure – XV. Analysis of log of these boreholes were also done from the NABL Laboratory and enclosed in **Annexure – XV.** Since the production is planned for ROM, the average analysis of all the iron ores from

			grade distribution considering the core boreholes is given above in tabular form.
	6.	Petrographic and mineragraphic study: Refining of data on the petrographic characters of rocks of the deposits and its surroundings, alternations (if any),including study of grain size texture gangue and its liberation characteristics for further refining of data.	Not required.
	7.	Geo-statistically analysis of borehole data. Thickness of ore, waste encountered in holes assays values of samples if considered necessary.	Note done
F1 (Feasibility Study)	1.	**Geology:** Geology of area and project, detailed exploration, closed spaced drilling, ore body modeling, bulk samples for beneficiation, geotechnical and ground water & surface water studies to be carried out depending upon coal qualities.	Detailed geological studies have been carried out on the basis of exposure of ore body in the quarries and exploration carried out. Total 26 BH (21- non-core & 5 core) were drilled in the area. **Annexure – XV.** Spacing of boreholes from quarry and other borehole is given in Geological plan which shows that all the spacing are within 100m (confirming the UNFC guideline for G1). Sampling and analysis of samples is being done. The lithology of 5 (core) bore hole are given in Annexure – XV. Analysis of log of these boreholes were also done from the NABL Laboratory and enclosed in Annexure – XV. Since the production is planned for ROM, the average analysis of all the log data has been chalked out which comes to 55.68 or 56%. Fe. The mine is planned for +55% Fe. The grade distribution considering the core boreholes is given above in tabular form. Topographically, this mine represents almost undulated hilly terrain with some hillocks and valleys. The maximum elevation of the area is 681mRL located towards north boundary of the area whereas minimum elevation is 443 mRL on the east of leasehold area. General sloping is towards east side 3 to 4 mounds are present in the western side of the lease area with intervening valleys. A dendritic type of drainage pattern is generally displayed by the area. easterly flowing dry streams are present in the lease area.
	2	**Mining:** Mining plan, mine recoveries and efficiencies, equipment selection, manpower requirement.	47 numbers of quarries were opened for the production of Iron ore and 13 for manganese. At present mining operation is stopped.
	3.	**Environment:** EIA studies and EMP including	EIA/EMP studies of the mine have been done. MOEF accorded Environmental

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		socioeconomic impact, rehabilitation of project affected persons, waste disposal/reclamation, and detailed land use data.	Clearance (EC) for production of 2.26 million for Iron ore and 4000MT. Mining Operation is presently restricted within lease area.
	4	**Processing:** Pilot scale/industrial scale investigation data ,list of equipment, manpower and environmental considerations like waste disposal tailing etc.	The mine produces both iron ore lumps and fines. To make the ore marketable as per the consumer's specifications, the entire excavation (ROM) produced from existing quarries is treated in crushing &screening unit, which is within leasehold area.
	5	**Infrastructure and services, construction activities : Full details.**	Full details have been incorporated in chapter 2.0 of the Review of mining plan.
	6.	**Costing:** Detailed breakup of capital cost, operating cost, detailed working capital.	Detailed breakup of capital cost, operating cost, working capital etc. are regularly done by the chartered accountant which is described in the Feasibility study.
	7.	**Marketing:** Overview, specific market aspects	The finished product will be sold to sponge plant of the consuming parties.
	8.	**Economic viability:** Cash flow forecast, inflation affects sensitivity studies.	It is done by the chartered accountant.
	9.	**Other factors:** Statutory provisions relating to labour, land, mining, taxation etc.	All statutory provisions have been taken care of in the mining plan, subsequent Scheme of Mining and will be regularly compiled with. Lease in under Renewal.
E1 (Economic)	1.	**Detailed exploration**	Detailed exploration was carried out in the area by wagon drill as well as by core drilling from time to time. Total 26 BH (21- non-core & 5 core) were drilled in the area. **Annexure – XV.** Spacing of boreholes from quarry and other borehole is given in Geological plan which shows that all the spacing are within 100m (confirming the UNFC guideline for G1). Sampling and analysis of samples is being done. The lithology of 5 (core) bore hole are given in Annexure – XV. Analysis of log of these boreholes were also done from the NABL Laboratory and enclosed in Annexure – XV. Since the production is planned for ROM, the average analysis of all the log data has been chalked out which comes to 55.68 or 56%. Fe. The mine is planned for +55% Fe. The grade distribution considering the core boreholes is given above in tabular form.
	2	**Mining report /Mining Plan/Working Mines**	Presently mining is going on in the area. Mining Plan and Scheme of Mining was prepared and approved from time to time. This REVIEW OF Mining Plan has been prepared for next four years of extended lease period as per MMDR Act 2015.
	3	**specific end use grades of reserves (above economic cutoff grade)**	The mine produces both iron ore lumps and fines. The Analysis of log of boreholes were also

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			done from the NABL Laboratory and enclosed in Annexure – XV. Since the production is planned for ROM, the average analysis of all the log data has been chalked out which comes to 55.68 or 56% Fe. The mine is planned for +50% Fe. The grade distribution considering the core boreholes is given above in tabular form. To make the ore marketable as per the consumer's specifications, the entire excavation (ROM) produced from MINE is subjected to treat in crushing &screening unit within leasehold area from where 10-40mm, 5-18mm and 0-5mm finished products produces. Out of the total feed, 92% finished product is saleable. The grade is varying from +55 to 62%Fe. Details of mineral processing and its end use is given in chapter – 7 and 8.
	4	**Specific knowledge of forest/non-forest and other land use data.**	The lease area also falls under Ghatkuri Reserved forest, Tatiba Protective Forest of Division, Chaibasa. Lessee has obtained forest clearance for broken-up area. Further, lessee has applied for additional forest area which is under process. The future production is planned from the broken-up as well as undiverted area. Land use of the area and the area likely to be degraded at conceptual period has been calculated and given in chapter- 4.

The estimated mineral reserve and resources has been presented below in **Table – 1.30.**

g) 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	**13.392 (Brocken area)**	+55% Fe
	16.803 (Un Diverted area)	+55% Fe
G2- General Exploration	-	-
G3- Prospecting	3.485	+55% Fe
G4-Reconnassance	-	-

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

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a) Mining method, Recovery factor, mining losses, processing loss etc.

b) Cut off grade, Ultimate pit depth proposed.

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

Table – 1.31

PRESENTATION OF MINERAL RESOURCES & RESERVES OF IRON ORE AS PER UNFC

	UNFC Code	Quantity in Million tons	Grade
A. Total Mineral Reserve		**3.409**	
Proved Mineral Reserve	111	3.409	+55% Fe
Probable mineral Reserve	121	-	+55% Fe
	122	-	+55% Fe
B. Total Remaining Resource		**30.279**	-
Feasibility mineral Resource	211	-	+55% Fe
Prefeasibility mineral resource	221	**1.385** **0.079** **3.435** **0.090** **0.786** **0.000** **8.508** **7.685** **4.826**	+55% Fe
	222		+55% Fe
Measured	331	-	-
Indicated	332	-	-
Inferred	333	**3.485**	-
Reconnaissance	334	-	-
Total Reserves + resources		**33.688**	-

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Estimation of life of the mine:

The total mineral reserve estimated for this mine is to the tune of 3.409 million tons. The production proposal is 2.26 million tons as EC for the same has been accorded by MOEF. So, considering maximum production proposal of 2.26 million tons per annum, the life of the mine is 3.409/2.26 = 1.50 years.

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Case-ii (after getting Forest Clearance)

After getting the Forest clearance the mineral block due to pit slope of Brocken area and additional forest area comes under reserve in this case the life of the mine will be enhanced.

Table – 1.32

PRESENTATION OF MINERAL RESOURCES & RESERVES OF IRON ORE AS PER UNFC

	UNFC Code	Quantity in Million tons	Grade
A. Total Mineral Reserve		**21.942**	
Proved Mineral Reserve	111	-	+55% Fe
Probable mineral Reserve	121	3.409 1.385 0.079 0.090 0.786 8.508 7.685	+55% Fe
	122		+55% Fe
B. Total Remaining Resource		**11.745**	
Feasibility mineral Resource	211	-	+55% Fe
Prefeasibility mineral resource	221	**3.435** **0.00** **4.826**	+55% Fe
	222		+55% Fe

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Measured	331	-	-
Indicated	332	-	-
Inferred	333	3.485	-
Reconnaissance	334	-	-
Total Reserves + resources		30.203	-

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Table – 1.32B

PRESENTATION OF MINERAL RESOURCES & RESERVES OF MANGANESE ORE AS PER UNFC

	UNFC Code	Quantity in Million tons	Grade
A. Total Mineral Reserve		1.132	
Proved Mineral Reserve	111	1.132	+20% Mn
Probable mineral Reserve	121	-	-
	122	-	+20% Mn
B. Total Remaining Resource		0.392	-
Feasibility mineral Resource	211	-	-
Prefeasibility mineral resource	221	0.392	+20% Mn
	222		-
Measured	331	-	-
Indicated	332	-	-
Inferred	333	-	-
Reconnaissance	334	-	-
Total Reserves + resources		1.524	-

Estimation of life of the mine:

The total mineral reserve estimated for this mine is to the tune of 21.942 million tons. The production proposal is 2.26 million tons as EC for the same has been accorded by MOEF. So, considering maximum production proposal of 2.26 million tons per annum, the life of the mine is 21.942/2.26 = 9.708 years.

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MANGANESE ORE

Reserve of Mn ROM:-

As per last approved scheme of mining the reserve of Manganese ore is 1133463 MT. No further exploration was done in last approved scheme of mining, so the reserve of Manganese ROM is remaining intact. On the other hand, the production of Manganese ROM in last approved scheme of mining period is 1379.94MT ROM. The depleted reserve of Mn ROM is 1133463MT-1379.94 =1132083.06 MT.

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PART-A	2.0 MINING

A. OPEN CAST MINING:

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

Existing Method of Working

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The mining operation in this area was carried out by adopting the fully mechanized opencast mining method with Excavator, Pay Loader, wagon drill, Jackhammer, Tippers etc for the excavation work. Height & width of the benches were kept at 6m & 10m. The individual slope of benches kept at 31° from vertical. The massive hard lateritic bed excavated mechanically after breaking through drilling & blasting. Drilling was done by Compressed air with Jack hammer/wagon drill machine. Power Gel large diameter cartridge and cordex fuse were being used. The blasted material loaded mechanically into tipper for transportation. The haul roads are developed simultaneously to facilitate the movement of loaded and unloaded tippers with a width of 10m.

Bench Parameters:

Since the mine operation is proposed in iron ore by fully mechanized method during this Review of plan period, bench height will be maintained at 6m height and width 10m. The face width varies at places but in no case it is less than the three times the largest vehicle plying on the road.

In manganese ore section, no mining operation was carried out since long. In the past, mining operation in this section was carried out by manual method due to low production level and the bench height and width was maintained 1.5m X 1.5m in overburden and also bench height and width was maintained 1.5m X 1.5m in ore.

The haulage roads of 10m width and 1 in 16 gradient and ramp of 12m width and 1 in 10 gradients have been made and maintained to reach the quarry floor.

Proposed Method of Working:

The period of this review of mining plan is from 2016-17 to 2019-20 whereas first year i.e. 2016-17 is already passed. As such, proposal has been given for rest of the three years i.e. from 2017-18 to 2019-20. During the rest three years of this review of plan period, same method has been proposed in total four zones to be developed with a production capacity

of 2.26 million tons per annum. Total excavation (ROM) is considered under production. The Faces shall be drilled by wagon drill in hard patches and blasted with explosives. 20% of the total production of ROM shall be sold directly to the local consumers and the rest 80% shall be treated in the mobile screening & crushing unit to make it sized as per the requirement of the consumers (10-40mm & 5-18mm and 0-5mm size).

In 2017-18 financial year, the development of the quarries has been proposed in broken area only. Further, lessee had applied for Diversion of forest land of un-diverted forest land to the forest authority which is in process. It is expected that lessee will get the forest clearance over that land.

The proposed quarries of this mine considered for future development during this review of mining plan period is given in **Table- 2.1** shows the total pits within the lease area broken prior to 1980.

Table 2.1

Financial year (During Review of Plan period)	**Name of Quarries** (Proposed Quarry During Review of Plan period)
2017-18	**IRON ORE:** **Zone – A** (Baraiburu Broken forest area) Quarry Nos. 3, 5, 7,10B, Road Side, 1B, 1C & 10A. **Zone – B** (Tatiba) Tatiba Face – 4, 9, 11, 2, 5 & 7. **MANGANESE ORE** Luck Pit.
2018-19	**Within Broken Area:** **Zone – B (Tatiba)** Face – 9,10,11 **Zone – C (Tatiba)** ORISSA BOUNDARY PIT – 1,3,4 **Outside Broken Area** **Zone – A** (Baraiburu) **Zone – B (Tatiba)** **MANGANESE ORE** Luck Pit.
2019-20	**Zone – A** (Baraiburu) **Zone – B** (Tatiba) **Zone - C** (Tatiba) **MANGANESE ORE** Luck Pit.

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The future production is planned from the existing pits only with little bit lateral extension within the broken area due to restriction of granted forest area and also from the un-diverted forest land after getting the forest clearance. The mining operation shall be carried out by fully mechanized open cast mining method. The height & width of benches are proposed to be made and maintained at 6m & 10m respectively. Massive iron ore deposit will be excavated by mechanized method after breaking through drilling and blasting. Blasted rocks in each bench will be loaded in the tippers by loader. Haul road will be developed to each bench separately for facilitating the movement of loaded and unloaded.

A properly maintained haul road of width ranging from 8.0m to 10m exists and will be maintained for transportation of ROM. Details of year-wise layout of mine working have been illustrated in **Plate – 9 (A-C).**

Bench Parameters:

Since the mine operation has proposed in iron ore by fully mechanized method during this Review of mining plan period, bench height will be maintained at 6m height and width 10m The face width varies at places but in no case it is less than the three times the largest vehicle plying on the road.

In manganese ore section, no mining operation was carried out since long. In the past mining operation was carried out by manual method due to low production level and the bench height and width was maintained 1.5m X 1.5m in both overburden and ore. Same method of mining with same bench parameters is proposed in manganese section during this review of plan period.

Gradient of ramps will be not more than 1 in 12 at a stretch, keeping in view the statutory provisions, however at places while connecting two benches steeper ramps over short stretches is unavoidable. Roads & ramps will be sufficiently wide equal to three times the width of the dumper plus 5m.

Parameters considered for Iron Ore:

a)	ROM (+55% Fe)	=	100% of excavation.
b)	Tonnage factor	=	1 cum = 3 MT (Insitu)

During the Review of mining plan period, planning has been made in such a way that Baraiburu, and Tatiba zone shall be worked part by part and a total ten numbers of quarries

is considered for the production of ROM. The reason for considering ten numbers of quarries is only due to the restriction of work within the broken area. So, the development of benches in the 2017-18 year shall be within the broken area and mainly in depth whereas, from 2018-19 to 2019-20 work shall be within the broken area as well as in the diverted forest land (after getting forest clearance). Out of the total ROM production, 20% is direct saleable ore and rest 80% shall be treated into the mobile crushing/screening unit within the lease area from where the finished product of 10-40 mm & 5-18 mm and fines shall be produced. The recovery of the finished product is considered @ 85% , 7% Sub grade and rest 8% is waste.

The yearly pit-wise development of the quarries for the next (2017-18 to 2019-20) of the Review of mining plan period is detailed below:

Proposed (Iron Ore) development programme for the Year (2017-18):

In the year 2017-18 of Review of mining plan period, it is planned to develop in two zone i.e. Baraiburu i.e consider as Zone: A & Tatiba B i.e consider as Zone: B. Here the quarry is scattered form reason for considering scattered quarries is only due to the restriction of work within the broken area. The existing benches shall be pushed further up to the limit of broken area where ever possible and some new benches shall be developed in depth to make the quarry benches properly as 6m high and 10m wide. In this year, development of the above said quarries are proposed as follows:

Zone A (Baraiburu) – In Baraiburu **Zone - A**, work shall be carried out in the sections B7-B7' of Quarry no -5, RL from R.L. 508.43m to R.L. 487.00m, in the sections B7-B7' of Quarry no -7 RL from R.L. 549.64m to R.L. 541.00m, in the sections B7-B7' of Quarry no -10B RL from R.L. 542.27m to R.L. 535.00m, in the sections M1-M1' of Quarry No -3 RL from R.L. 620.00m to R.L. 601.00m, in the sections M4-M4' of road side Quarry RL from R.L. 568.10m to R.L. 547.00m, in the sections M5-M5' of Quarry no-1B RL from R.L. 566.28m to R.L. 541.00m, in the sections M5-M5' of Quarry no-1C RL from R.L. 552.72m to R.L. 541.00m, and in the sections M7-M7' of Quarry no-10A RL from R.L. 548.40m to R.L. 535.00m. The development proposed shall be restricted which is given below **Table-2.3A.**

Zone B (Tatiba) – In Tatiba **Zone-B**, work shall be carried out in the Tatiba face-4 of sections T1-T1' RL from R.L. 561.90m to R.L. 550.00m, S1-S1' RL from R.L. 559.87m to R.L. 544.00m, T2-T2' RL from R.L. 553.37m to R.L. 544.00m,
in the Tatiba face-9 of sections T3-T3' RL from R.L. 540.60m to R.L. 523.00m, S3-S3' RL from R.L. 542.00m to R.L. 529.00m.
in the Tatiba face-11 of sections S3-S3' RL from R.L. 516.60m to R.L. 508.00m, T4-T4' RL from R.L. 511.00m to R.L. 505.00m.
in the Tatiba face-2 of sections T2-T2' RL from R.L. 526.70m to R.L. 515.00m., in the Tatiba face-5 of sections T1-T1' RL from R.L. 570.56m to R.L. 565.00m, S1-S1' RL from R.L. 569.28m to R.L. 565.00m.
in the Tatiba face-7 of sections T3-T3' RL from R.L. 551.00m to R.L. 545.00m. The development proposed shall be restricted which is given below **Table- 2.3B.**

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Thus, in the year 2017-18, due to development of all these quarries, total 333333.36 cum or 1000000.08 MT ROM shall be produced. The detailed calculation of development of each quarry for the year 2017-18 is given in Table-2.3A & 2.3B and shown in **Plate – 9A**. The benches to be undertaken for development of different pits are given below:

Zone: - A: (BARAIBURU):

Table-2.3A

Table showing Excavation of Production of 2nd year Excavation (2017-18)

Quarry	Section	Working R.L.	Cross-sectional Area (m^2)	Length of influence (m)	Volume (m^3)	Volume 1 cum= (3.0 MT)
Qry No.-5	B7-B7'	508.43-505.00	38.00	110.00	4180.00	
	B7-B7'	505.00-499.00	20.00	100.00	2000.00	
	B7-B7'	499.00-493.00	95.52	70.00	6686.40	
	B7-B7'	499.00-493.00	149.50	80.00	11960.00	
	B7-B7'	493.00-487.00	198.00	50.00	9900.00	
Total					**34726.40**	**104179.20**
Qry No.-7	B7-B7'	549.64-547.00	28.00	70.00	1960.00	
	B7-B7'	547.00-541.00	160.00	60.00	9600.00	
Total					**11560.00**	**34680.00**
Qry No.-10B	B7-B7'	542.27-541.00	10.00	55.00	550.00	
		541.00-535.00	122.00	45.00	5490.00	
Total					**6040.00**	**18120.00**
Qry No.-3	M1-M1'	620.00-613.00	225.00	50.00	11250.00	
	M1-M1'	613.00-607.00	203.00	40.00	8120.00	

	M1-M1'	607.00-601.00	380.00	30.00	11400.00	
Total					**30770.00**	**92310.00**
Road side Qry	M4-M4'	568.10-565.00	18.00	80.00	1440.00	
	M4-M4'	565.00-559.00	68.00	70.00	4760.00	
	M4-M4'	559.00-553.00	134.00	60.00	8040.00	
	M4-M4'	553.00-547.00	143.00	50.00	7150.00	
Total					**21390.00**	**64170.00**
Qry No.-1B	M5-M5'	566.28-559.00	38.00	100.00	3800.00	
	M5-M5'	559.00-553.00	228.00	90.00	20520.00	
	M5-M5'	553.00-547.00	233.00	70.00	16310.00	
	M5-M5'	547.00-541.00	137.00	50.00	6850.00	
Total					**47480.00**	**142440.00**
Qry No.-1C	M5-M5'	552.72-547.00	98.00	80.00	7840.00	
	M5-M5'	547.00-541.00	182.00	80.00	14560.00	
Total					**22400.00**	**67200.00**
Qry No.-10A	M7-M7'	548.40-547.00	15.00	40.00	600.00	
	M7-M7'	547.00-541.00	316.00	40.00	12640.00	
	M7-M7'	541.00-535.00	243.00	15.00	3645.00	
Total					**16885.00**	**50655.00**
Grand Total					**191251.40**	**573754.20**

Zone – B: (Tatiba)

Table-2.3B.

Quarry	Section	Working R.L.	Cross-sectional Area (m^2)	Length of influence (m)	Volume (m^3)	Volume 1 cum= (3.0 MT)
Tatiba Face-4	T1-T1'	561.90-556.00	80.00	50.00	4000.00	
	S1-S1'	559.87-556.00	19.00	65.00	1235.00	
	T1-T1'	556.00-550.00	116.00	50.00	5800.00	
	S1-S1'	556.00-550.00	140.00	50.00	7000.00	
	T2-T2'	553.37-550.00	30.00	45.00	1350.00	
	S1-S1'	550.00-544.00	300.00	65.00	19500.00	
	T2-T2'	550.00-544.00	128.00	50.00	6400.00	
Total					**45285.00**	**135855.00**
Tatiba Face-9	T3-T3'	540.60-535.00	103.00	80.00	8240.00	
	S3-S3'	542.00-535.00	153.00	70.00	10710.00	
	T3-T3'	535.00-529.00	210.00	70.00	14700.00	
	S3-S3'	535.00-529.00	305.00	60.00	18300.00	
	T3-T3'	529.00-523.00	400.44	44.00	17619.36	
Total					**69569.36**	**208708.08**
Tatiba Face-11	S3-S3'	516.60-511.00	122.00	50.00	6100.00	
	S3-S3'	511.00-505.00	404.00	50.00	20200.00	
	T4-T4'	511.00-505.00	64.00	50.00	3200.00	

BARAIBURU – TATIBA IRON & MANGANESE MINE (258.98968 HA.)
LESSEE: M/S THE RAMESHWARA JUTE MILLS LTD

Total					**29500.00**	**88500.00**
Tatiba Face-2	T2-T2'	526.70-521.00	112.00	50.00	5600.00	
	T2-T2'	521.00-515.00	113.00	30.00	3390.00	
Total					**8990.00**	**26970.00**
Tatiba Face-5	T1-T1'	570.56-565.00	42.00	35.00	1470.00	
	S1-S1'	569.28-565.00	28.00	28.00	784.00	
Total					**2254.00**	**6762.00**
Tatiba Face-7	T3-T3'	551.00-545.00	63.00	50.00	3150.00	
Total					**3150.00**	**9450.00**
Grand Total					**158748.36**	**476245.08**

Summary: Total ROM = 573754.20 MT (From Zone A Baraiburu)
= 476245.00 MT (From Zone B Tatiba)
GRAND TOTAL = 1049999.20 MT
Stripping ratio (t/m3) = 1:0.00

Table showing production of Finished product & generation of waste during

Zone	Total ROM Excavation (MT)	Total ROM Excavation (MT) 80% of A	Production of different sized iron ore				
			Lump (10-40 mm) (Grades ranges from 58-62% Fe) (MT)	Sized ore (5-18 mm) (Grades ranges from 58-62% Fe) (MT)	Fines ore (0-5mm) (55-58% Fe) (MT)	S/G (0-5mm) (45-55% Fe) (MT)	Waste (0-5mm) (<45% Fe) (MT)
			30% of B	25% of B	30% of B	7% of B	8% of B
	A	B	C	D	E	F	G
A BAIBURARU	**573754.20**	459003.36	137701.01	114750.84	137701.01	32130.24	36720.27
B TATIBA	**476245.08**	380996.00	114298.80	95249.00	114298.80	26669.72	30479.68
Grand Total	**1049999.28**	**839999.36**	**251999.81**	**209999.84**	**251999.81**	**58799.96**	**67199.95**

Finished product = 713999.46 MT
Sub-grade = 58799.96 MT
Waste = 67199.95 MT

Balance sheet of Mineral Reserve after (2017-18)

ROM Iron ore in MT		
Opening Balance	**Production**	**Closing Balance**
21942000.00	**1049999.28**	**20892000.72**

Proposed (Manganese Ore) development programme for the year (2017-18):

During the year (2017-18) of the Review of mining plan period, it is proposed to develop the existing pit laterally as well as in depth. The Mn in this area is available up to a depth of 483.10mRL. First of all, lateral development of the existing face of this quarry will be done towards western side upto 483.10 m RL. The lateral development of the pit will generate overburden 6810.68 cum. Thereafter, the pit shall be developed for the production of Mn. The development of these benches shall yield total excavation of 9232.14 cum. Out of this, 2421.46 cum or 6053.65 MT Mn shall be produced. The (2017-18) year development of Lucky pit is given in **Table – 2.4** below and shown in **Plate – 9A.**

Table-2.4.

Table showing Excavation of Production and Waste of 2nd year Excavation (2017-18)

Quarry	Section Line	Proposed working R.L.	Sectional Area m^2		Length of influence	Total Excavation cum	
			OB	Mn.		OB	Mn.
Lucky Pit	B18-B18'	489.56-487.60	24.00	-	85.00	2040.00	-
	B18-B18'	487.60-486.10	23.00	-	95.00	2185.00	-
	B18-B18'	486.10-484.60	19.00	-	100.00	1900.00	-
	B18-B18'	484.60-483.10	6.00	14.00	114.28	685.68	1600.00
Total						6810.68	1600.00

Summary:

Year	Production in Manganese (Mn)		Generation of waste (cum)	Stripping ratio
	cum	(Cumx 2.5=MT)		
2017-18	1600.00	4000.00	6810.68	1:1.70
Total	1600.00	4000.00	6810.68	

Balance sheet of Mineral Reserve after (2017-18)

Mn ore in MT		
Opening Balance	Production	Closing Balance
1132083.06	4000.00	1128083.06

Proposed (Iron Ore) development programme for the Year Development (2018-19):

It is necessary to mention here that lessee had applied for Diversion of forest land of un-diverted forest land to the forest authority which is in process. It is expected that lessee will get the forest clearance over that land. So, after getting the forest clearance from the forest department, work will carry out in that forest area.

Keeping in view that lessee will get the forest clearance by the end of 2017-18, development plan has been chalked out during this year from broken and outside broken area of Baraiburu and Tatiba Zone to achieve the proposed production target. Like previous year, existing benches shall be pushed further laterally and some new benches shall be developed in depth to make the quarry benches properly. In this way the scattered pits will be merge and become zone-wise single quarry. In this year, development of the quarries is proposed as follows:

WITHIN BROKEN AREA.

Zone B (Tatiba) – In Tatiba **Zone-B**, work shall be carried out in the Tatiba

face-9 of sections S3-S3' RL from R.L. 529.00m to R.L. 517.00m.

face-10 of sections T4-T4' RL from R.L. 526.16m to R.L. 520.00m.

face-11 of sections T4-T4' RL from R.L. 526.10m to R.L. 499.00m,

In S3-S3' RL from R.L. 505.00m to R.L. 499.00m.

The development proposed shall be restricted which is given below **Table- 2.5A**

BROKEN AREA

Zone – B: (Tatiba)

Table-2.5A.

Quarry	Section	Working R.L.	Cross-sectional Area (m^2)	Length of Influence (m)	Volume (m^3)	Volume 1 cum= (3.0 MT)
Tatiba Face-9	S3-S3'	529.00-523.00	417.00	50.00	20850.00	
	T3-T3'	523.00-517.00	151.00	45.00	6795.00	
	S3-S3'	523.00-517.00	89.00	70.00	6230.00	
Total					**33875.00**	**101625.00**
Tatiba Face-10	T4-T4'	526.10-520.00	148.00	55.00	8140.00	
Total					**8140.00**	**24420.00**
Tatiba Face-	T4-T4'	515.00-511.00	32.00	60.00	1920.00	

11	T4-T4'	511.00-505.00	73.00	80.00	5840.00	
	T4-T4'	505.00-499.00	301.00	50.00	15050.00	
	S3-S3'	505.00-499.00	105.00	35.00	3675.00	
Total					**26485.00**	**79455.00**
Grand Total					**68500.00**	**205500.00**

Zone C (Tatiba) – In Tatiba **Zone-C**, work shall be carried out in the Tatiba-C Orissa boundary pit-1 of sections T12-T12' RL from R.L. 509.45m to R.L. 500.00m.
in the Pit-3 of sections T15-T15' RL from R.L. 509.45m to R.L. 520.00m and sections S14-S14' RL from R.L. 510.00m to R.L. 500.00m.
in the Pit-4 of sections S15-S15' RL from R.L. 517.20m to R.L. 508.00m.
The development proposed shall be restricted which is given below **Table- 2.5B**.

Zone – C: (Tatiba)

Table-2.5B.

Quarry	Section	Working R.L.	Cross-sectional Area (m^2)	Length of Influence (m)	Volume (m^3)	Volume 1 cum= (3.0 MT)
ORISSA BOUDARY PIT- 1	T12-T12'	509.45-504.00	118.00	70.00	8260.00	
	T12-T12'	504.00-500.00	150.00	70.00	10500.00	
	T13-T13'	505.37-500	63.00	110.00	6930.00	
	-	-	135.00	110.00	14850.00	
	TOTAL				**40540.00**	**121620.00**
ORISSA BOUDARY PIT-3	T15-T15'	509.45-504.00	95.00	35.00	3325.00	
	T15-T15'	504.00-500.00	170.00	35.00	5950.00	
	S14-S14'	510.00-504.00	95.00	43.00	4085.00	
	S14-S14'	504.00-500.00	119.00	43.00	5117.00	
	TOTAL				**18477.00**	**55431.00**
ORISSA BOUND. PIT 4	S15-S15'	517.20-512.00	47.00	38.00	1786.00	
	S15-S15'	512.00-508.00	93.00	38.00	3534.00	
	TOTAL				**5320.00**	**15960.00**
GRAND TOTAL					**64337.00**	**193011.00**

OUTSIDE BROKEN AREA

Zone A (Baraiburu) – In Baraiburu **Zone -A**, work shall be carried out after getting forest clearance from Forest authority, the proposed production in the sections M5-M5' RL from R.L. 583.00m to R.L. 535.00m, in the sections B6-B6' RL from R.L. 537.75m to R.L.

529.00m, in the sections B7-B7' RL from R.L. 539.50m to R.L. 529.00m. The development proposed shall be restricted which is given below **Table-2.5C**.

Table-2.5C

ZONE – A (BARAIBURU)

Table showing Excavation of year (2018-19)

Quarry	Section	Working R.L.	Cross-sectional Area (m^2)	Length of Influence (m)	Volume (m^3)	Volume 1 cum= (3.0 MT)
ZONE - A	M5-M5'	538.40-535.00	43.00	45.00	1935.00	
	B6-B6'	537.75-535.00	45.00	75.00	3375.00	
	B7-B7'	539.50-535.00	115.00	115.00	13225.00	
	M5-M5'	535.00-529.00	192.00	50.00	9600.00	
	B6-B6'	535.00-529.00	315.00	75.00	23625.00	
	B7-B7'	535.00-529.00	520.00	100.00	52000.00	
	TOTAL				**103760.00**	**311280.00**
	M5-M5'	583.00-577.00	195.00	70.00	13650.00	
		577.00-571.00	300.00	90.00	27000.00	
		571.00-565.00	396.00	80.00	31680.00	
		565.00-559.00	371.00	60.00	22260.00	
	TOTAL				**94590.00**	**283770.00**
Grand Total					**198350.00**	**595050.00**

Zone B (Tatiba) – In Tatiba **Zone-B**, also work shall be carried out after getting forest clearance from Forest authority, the proposed production in the sections

T1-T1' RL from R.L. 564.20 m to R.L. 529.00m.

T2-T2' RL from R.L. 564.23 m to R.L. 535.00m.

T3-T3' RL from R.L. 559.00 m to R.L. 535.00m,

S1-S1' RL from R.L. 564.20 m to R.L. 529.00m.

The development proposed shall be restricted which is given below **Table- 2.5D**.

Zone – B: (Tatiba)

Table-2.5D.

Section	Working R.L.	Cross-sectional Area (m^2)	Length of Influence (m)	Volume (m^3)	Volume Cum= (3.0 MT)
T1-T1'	564.20-559.00	204.00	65.00	13260.00	
S1-S1'	565.00-559.00	128.00	50.00	6400.00	
T2-T2'	564.23-559.00	54.00	75.00	4050.00	
T1-T1'	559.00-553.00	218.00	65.00	14170.00	
S1-S1'	559.00-553.00	156.00	50.00	7800.00	
T2-T2'	559.00-553.00	181.00	75.00	13575.00	
T3-T3'	559.00-553.00	53.00	75.00	3975.00	
T1-T1'	553.00-547.00	383.00	70.00	26810.00	
S1-S1'	553.00-547.00	131.00	50.00	6550.00	
T2-T2'	553.00-547.00	223.00	75.00	16725.00	
T3-T3'	553.00-547.00	80.00	100.00	8000.00	
T1-T1'	547.00-541.00	464.00	70.00	32480.00	
S1-S1'	547.00-541.00	344.00	50.00	17200.00	
T2-T2'	547.00-541.00	325.00	75.00	24375.00	
T3-T3'	547.00-541.00	164.00	150.00	24600.00	
T1-T1'	541.00-535.00	472.00	60.00	28320.00	
S1-S1'	541.00-535.00	695.00	50.00	34750.00	
T2-T2'	541.00-535.00	601.00	75.00	45075.00	
T3-T3'	541.00-535.00	250.00	100.00	25000.00	
T1-T1'	535.00-529.00	618.00	55.00	33990.00	
S1-S1'	535.00-529.00	898.49	39.00	35041.11	
TOTAL				422146.11	1266438.33

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Thus, in the year 2018-19, due to development of all these quarries, total 753333.11cum or 2259999.33 MT ROM shall be produced. The detailed calculation of development of each quarry for the year 2018-19 is given in **Table-2.5A, 2.5B, 2.5C & 2.5D** and shown in **Plate – 9B.**

Summary: Total ROM = 205500.00 MT(From Zone B Tatiba broken area)
= 193011.00 MT(From Zone B Tatiba broken area)
= 595050.00 MT(From Zone A Baraiburu out of broken area)
= 1266438.33 MT(From Zone B Tatiba out of broken area)

GRAND TOTAL = 2259999.33 MT

Stripping ratio (t/m3)= 1:0.00

Table showing production of Finished product & generation of waste during

Zone	Total ROM Excavation (MT)	Total ROM Excavation (MT) 80% of A	Production of different sized iron ore				
			Lump (10-40 mm) (Grades ranges from 58-62% Fe) (MT)	Sized ore (5-18 mm) (Grades ranges from 58-62% Fe) (MT)	Fines ore (0-5mm) (55-58% Fe) (MT)	S/G (0-5mm) (45-55% Fe) (MT)	Waste (0-5mm) (<45% Fe) (MT)
			30% of B	25% of B	30% of B	7% of B	8% of B
	A	B	C	D	E	F	G
B (tatiba) B boken	205500.00	164400.00	49320.00	41100.00	49320.00	11508.00	13152.00
C (tatiba) B boken	193011.00	154408.80	46322.64	38602.20	46322.64	10808.62	12352.70
A(Baraiburu) out broken	595050.00	476040.00	142812.00	119010.00	142812.00	33322.80	38083.20
B(Tatiba) out broken	1266438.33	1013150.66	303945.20	253287.67	303945.21	70920.55	81052.02
Grand Total	**2259999.33**	**1807999.46**	**542399.84**	**451999.87**	**542399.85**	**126559.97**	**144639.92**

Finished product = 1536799.57 MT
Sub-grade = 126559.97 MT
Waste = 144639.92 MT

Balance sheet of Mineral Reserve after year (2018-19)

ROM Iron ore in MT		
Opening Balance	**Production**	**Closing Balance**
20892000.80	**2259999.33**	**18632001.47**

Proposed (Manganese Ore) development programme for the year (2018-19):

This quarry has been planned to work during this year is only one section B-18 to meet the production target. The proposed working RL is in B18-B18' section from 483.10 mRL to 481.60 mRL to get the targeted production of Mn. The development of these benches shall yield total excavation of 1600.00 cum. Out of this, 1600.00 cum or 4000.00 MT Mn shall be produced. The development of this block is given in **Table – 2.6** below and shown in **Plate – 9B.**

Table – 2.6

Table showing Excavation of Manganese and Waste of Excavation (2018-19)

Quarry	Section Line	Proposed working R.L.	Sectional Area m^2		Length of influence	Total Excavation in cum	
			OB	Mn.		OB	Mn.
Lucky Pit	B18-B18'	483.10-481.60	-	16	100.00	-	1600.00
Total						00.00	1600.00

Summary :

Year	Production of Manganese (Mn)		Generation of waste (cum)	Stripping ratio
	cum	(Cumx 2.5=MT)		
2018-19	1600.00	4000.00	00.00	1:0.00
Total	1600.00	4000.00	00.00	

Balance sheet of Mineral Reserve after year (2018-19)

Mn ore in MT		
Opening Balance	Production	Closing Balance
1128083.06	4000.00	1124083.06

Proposed (Iron Ore) development programme for the Year (2019-20)

In the year 2019-20 of the Review of plan period, it is plan to develop the outside broken area, the development shall be possible after getting permission from forest authority. Like previous year, existing benches shall be pushed further up to the broken area limit and some new benches shall be developed in depth to make the quarry benches properly. In this way the scattered pits will be merge and become zone-wise single quarry. In this year, development of the above said quarries are proposed as follows:

Zone A (Baraiburu) – In Baraiburu **Zone -A**, work shall be carried out after getting forest clearance from Forest authority, the proposed production in the sections M5-M5' RL from R.L. 529.00m to R.L. 517.00m, in the sections B6-B6' RL from R.L. 529.00m to R.L. 517.00m, in the sections B7-B7' RL from R.L. 529.00m to R.L. 523.00m. The development proposed shall be restricted which is given below **Table - 2.7A.**

ZONE – A (BARAIBURU)

Table-2.7A

Table showing Excavation of Sub-grade and Waste of Excavation (2019-20)

Quarry	Section	Working R.L.	Cross-sectional Area (m^2)	Length of Influence (m)	Volume (m^3)	Volume 1 cum= (3.0 MT)
ZONE - A	M5-M5'	529.00-523.00	356.00	50.00	17800.00	
	B6-B6'	529.00-523.00	598.00	75.00	44850.00	
	B7-B7'	529.00-523.00	890.00	85.00	75650.00	
	M5-M5'	523.00-517.00	521.00	35.00	18235.00	
	B6-B6'	523.00-517.00	656.00	75.00	49200.00	
	TOTAL				205735.00	617205.00

Zone B (Tatiba) – In Tatiba **Zone-B**, also work shall be carried out after getting forest clearance from Forest authority, the proposed production in the sections T3-T3' RL from R.L. 535.00m to R.L. 517.00m.

in the sections T2-T2' RL from R.L. 535.00m to R.L. 517.00m.

in the sections S1-S1' RL from R.L. 523.00m to R.L. 517.00m, In S3-S3' RL from R.L. 523.00m to R.L. 517.00m. The development proposed shall be restricted which is given below **Table-2.7B.**

Zone – B: (Tatiba)

Table-2.7B.

Section	Working R.L.	Cross-sectional Area (m^2)	Length of Influence (m)	Volume (m^3)	Volume 1 cum= (3.0 MT)
T3-T3'	535.00-529.00	145.00	75.00	10875.00	
T2-T2'	535.00-529.00	842.00	60.0	50520.00	
T1-T1'	529.00-523.00	397.00	40.00	15880.00	
S1-S1'	529.00-523.00	1010.00	50.00	50500.00	
T2-T2'	529.00-523.00	1073.00	75.00	80475.00	
T3-T3'	529.00-523.00	415.00	75.00	31125.00	
S1-S1'	523.00-517.00	440.00	75.00	33000.00	
T2-T2'	523.00-517.00	1345.00	75.00	100875.00	
T3-T3'	523.00-517.00	588.00	75.00	44100.00	
S3-S3'	523.00-517.00	334.31	110.00	36774.10	
TOTAL				454124.10	1362372.30

Zone C (Tatiba) – In Tatiba **Zone-C**, also work shall be carried out after getting forest clearance from Forest authority, the proposed production in the sections T12-T12' RL from R.L. 512.00m to R.L. 504.00m, in the sections T13-T13' RL from R.L. 512.00m to R.L. 504.00m, in the sections T14-T14' RL from R.L. 516.00m to R.L. 504.00m, in the sections T14-T14' RL from R.L. 516.00m to R.L. 504.00m, in the sections T15-T15' RL from R.L. 520.00m to R.L. 504.00m, In S14-S14' RL from R.L. 516.00m to R.L. 504.00m, and in S15-S15' RL from R.L. 520.00m to R.L. 504.00m. The development proposed shall be restricted which is given below **Table - 2.7C.**

Zone – C; (Tatiba)

Table-2.7C.

Section	Working R.L.	Cross-sectional Area (m^2)	Length of Influence (m)	Volume (m^3)	Volume 1 cum= (3.0 MT)
T12-T12'	512.00-508.00	55.00	116.00	6380.00	
	508.00-504.00	40.00	88.00	3520.00	
T13-T13'	512.00-508.00	14.00	116.00	1624.00	
	508.00-504.00	36.00	116.00	4176.00	
T14-T14'	516.00-512.00	28.00	30.00	840.00	
	512.00-508.00	65.00	85.00	5525.00	
	508.00-504.00	69.00	85.00	5865.00	
S14-S14'	516.00-512.00	28.00	56.00	1568.00	
	512.00-508.00	63.00	56.00	3528.00	
	508.00-504.00	32.00	56.00	1792.00	
T15-T15'	520.00-516.00	58.00	75.00	4350.00	
	516.00-512.00	97.00	56.00	5432.00	
	512.00-508.00	134.00	56.00	7504.00	
	508.00-504.00	120.00	56.00	6720.00	
S15-S15'	520.00-516.00	76.00	75.00	5700.00	
	516.00-512.00	68.00	75.00	5100.00	
	512.00-508.00	60.00	75.00	4500.00	
	508.00-504.00	258.00	75.00	19350.00	
TOTAL				**93474.00**	**280422.00**

Thus, in the year 2019-20, due to development of all these quarries, total 7533333.10cum or **2259999**.30 MT ROM shall be produced. The detailed calculation of development of each quarry for the year 2019-20 is given in **Table-2.7A, 2.7B & 2.7C** and shown in **Plate – 9C**. The benches to be undertaken for development of different pits are given below:

Summary: Total ROM = **617205.00** MT (From Zone A)
= **1362372.30** MT (From Zone B)

	=	280422.00 MT (From Zone)
GRAND TOTAL	=	**2259999.30 MT**
Stripping ratio (t/m3)	=	1:0.00

Table showing production of Finished product & generation of waste during year (2019-20)

Zone	Total ROM Excavation (MT)	Total ROM Excavation (MT) 80% of A	Production of different sized iron ore				
			Lump (10-40 mm) (Grades ranges from 58-62% Fe) (MT)	Sized ore (5-18 mm) (Grades ranges from 58-62% Fe) (MT)	Fines ore (0-5mm) (55-58% Fe) (MT)	S/G (0-5mm) (45-55% Fe) (MT)	Waste (0-5mm) (<45% Fe) (MT)
			30% of B	25% of B	30% of B	7% of B	8% of B
	A	B	C	D	E	F	G
A (Baraiburu)	617205.00	493764.00	148129.20	123441.00	148129.20	34563.48	39501.12
B (Tatiba)	1362372.30	1089897.84	326969.35	272474.46	326969.35	76292.84	87191.84
C (Tatiba)	280422.00	224337.60	67301.28	56084.40	67301.28	15703.64	17947.00
Grand Total	**2259999.30**	**1807999.44**	**542399.83**	**451999.86**	**542399.83**	**126559.96**	**144639.96**

Finished product	=	1536799.52MT
Sub-grade	=	126559.96 MT
Waste	=	144639.96 MT

Balance sheet of Mineral Reserve after year (2019-20)

ROM Iron ore in MT		
Opening Balance	**Production**	**Closing Balance**
18632001.47	**2259999.30**	**16372002.17**

Proposed (Manganese Ore) development programme for the year (2019-20):

In the year 2019-20, work shall be carried out in only one section B18-B18'. New benches shall be formed in between two previous benches to produce the Mn this quarry in depth. This quarry will be done towards western side upto 480.10 m RL. Thereafter, the pit shall be deepened for the production of Mn The development in this year will be generate overburden 6810.68 cum

The development of these benches shall yield total excavation of 1600.00 cum. Out of this, 1600.00 cum or 4000.00 MT Mn shall be produced. The development of this block is given in **Table – 2.8** below and shown in **Plate – 9C.**

Table – 2.8

Table showing Excavation of Production and Waste of Excavation (2019-20)

Quarry	Section Line	Proposed working R.L.	Sectional Area m^2		Length of influence	Total Excavation (cum)	
			OB	Mn.		OB	Mn.
Lucky Pit	B18-B18'	483.10-481.60	-	5.00	100.00	-	500.00
	B18-B18'	481.60-480.10	-	11.00	100.00	-	1100.00
Total						-	1600.00cum

Summary :

Year	Production in Manganese (Mn)		Generation of waste (cum)	Stripping ratio
	cum	(Cumx 2.5=MT)		
2019-20	1600.00	4000.00	-	1:0.00
Total	1600.00	4000.00	-	

Balance sheet of Mineral Reserve after year (2019-20)

Mn ore in MT		
Opening Balance	Production	Closing Balance
1128083.06	4000.00	1124083.06

b) Indicate year-wise tentative excavation in cubic meters indicating development, ROM, pit wise as in table below.

The year-wise production of Iron and Manganese ore from the during this Review of plan period is given in **Table – 2.9.**

I. Insitu Tentative Excavation

Table No. 2.9

Iron ore

Year	Pit no.	Total tentative excavation (cum)	Top soil (cum)	OB/SB/IB/ (cum)	ROM (cum)		Mineral reject	ROM / waste Ratio
					Ore (cum)	Mineral reject (cum)		
1	2	3	4	5	6	7	8	9
2017-18	Baraiburu and Tatiba	349999.76	-	-	349999.76	-	-	-

BARAIBURU – TATIBA IRON & MANGANESE MINE (258.98968 HA.)
LESSEE: M/S THE RAMESHWARA JUTE MILLS LTD

2018-19	Baraiburu and Tatiba	753333.11	-	-	753333.11	-	-	
2019-20	Baraiburu and Tatiba	753333.10	-	-	753333.10	-	-	

Generation of Sub-grade and Waste after Beneficiation.

Year	Total ROM Excavation (MT)	Total ROM Excavation (MT) 80% of A	Production of different sized iron ore				
			Lump (10-40 mm) (Grades ranges from 58-62% Fe) (MT)	Sized ore (5-18 mm) (Grades ranges from 58-62% Fe) (MT)	Fines ore (0-5mm) (55-58% Fe) (MT)	S/G (45-55% Fe) (MT)	Waste (<45% Fe) (MT)
			30% of B	**25% of B**	**30% of B**	**7% of B**	**8% of B**
	A	**B**	**C**	**D**	**E**	**F**	**G**
2017-18	1049999.28	839999.36	251999.81	209999.84	251999.81	58799.96	67199.95
2018-19	2259999.33	1807999.46	542399.84	451999.87	542399.85	126559.97	144639.92
2019-20	2259999.30	1807999.44	542399.83	451999.86	542399.83	126559.96	144639.96
Total	**5569997.91**	**4455998.26**	**1336799.47**	**1113999.57**	**1336799.49**	**311919.89**	**356479.83**

Zone wise generation of waste in MT.

Year	Baraiburu Zone in MT			Total		Tatiba Zone in MT			Total	
	A	B	C	MT	cum	A	B	C	MT	cum
2017-18	36720.27	-	-	36720.27	12240.09		30479.68	0.00	30479.68	10159.89
2018-19	30003.20	-	-	30003.20	12094.40	-	94204.02	12052.70	106550.72	35510.91
2019-20	39501.12	-	-	39501.12	13167.04	-	87191.84	17947.00	105138.84	35046.28
G. Total	**114304.59**	-	-	**114304.59**	**38101.53**	-	**211875.54**	**30299.70**	**242175.24**	**80725.08**

Zone wise generation of Sub-grade in MT.

Year	Baraiburu Zone in MT			Total		Tatiba Zone in MT			Total	
	A	B	C	MT	cum	A	B	C	MT	cum
2017-18	32130.24	-	-	32130.24	10710.08		26669.72	0.00	26669.72	8889.90
2018-19	33322.80	-	-	33322.80	11107.60	-	82428.55	10808.62	93237.17	31079.05
2019-20	34563.48	-	-	34563.48	11521.16	-	76292.84	15703.64	91996.48	30665.50
G. Total	100016.52	-	-	100016.52	33338.84	-	185391.11	26512.26	211903.37	70634.45

19/03/2017

Table No. 2.10

Manganese

Year	Pit no.	Total tentative excavation (cum)	Top soil (cum)	OB/SB/IB/ (cum)	ROM (cum)		Mineral reject	ROM / waste Ratio
					Ore (cum)	Mineral reject (cum)		
1	2	3	4	5	6	7	8	9
2017-18	Lucky Pit	8410.68	-	6810.68	1600.00	अनुमोदित APPROVED		1:0.4
2018-19	Lucky Pit	1600.00	-	-	1600.00	-	-	-
2019-20	Lucky Pit	1600.00	-	-	1600.00	-	-	-

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

Not applicable.

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

Pit layout, existing dumps, etc. has been shown clearly in the development plans & sections (**Plate - 9A to 9C**) and a detail of three-year dumping has been shown in dump Plan and section (**Refer Plate 10**).

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

There is no change in the method of mining, drilling, blasting and deployment of machineries, as mentioned in the approved scheme of mining.

The mining operation shall be carried out by fully mechanized open cast mining method with Excavator, Pay Loader, wagon drill, Tippers etc. The height & width of benches are proposed to be made and maintained at 6 m & 10 m respectively. Massive iron ore strata will be excavated by mechanized method after breaking through drilling and blasting. Blasted ore in each bench will be loaded in the tippers by loader. Haul road will be developed to each bench separately for facilitating the movement of loaded and unloaded tippers. The year-wise development of these pits is shown in Plate – **9A–9C.**

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

The mining operation in this area has been carried out by adopting the fully mechanized opencast mining method with Excavator, Pay Loader, wagon drill, Tippers etc for the excavation work and the same method is proposed to be continued during this Review of plan period. Height & width of the bench are proposed to be kept 6m & 10m. The individual slope of benches is kept at 31° from vertical. The massive hard lateritic bed is being excavated mechanically after breaking through drilling & blasting. Drilling would be done by Compressed air with Jack hammer/wagon drill machine. Power Gel large diameter cartridge and cortex fuse are being used. The blasted material would be loaded mechanically into hyva for transportation. The haul roads are developed simultaneously to facilitate the movement of loaded and unloaded hyva with a width of 10m. The Layout of year wise workings, proposed road, proposed site services are shown in **Plate – 9A to 9C.**

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

The total mineral reserve estimated for this mine is to the tune of 21.942 million tons. The production proposal is 2.26 million tons as EC for the same has been accorded by MOEF. So, considering maximum production proposal of 2.26 million tons per annum, the life of the mine is 21.942/2.26 = 9.708 years.

i) ***Pit Limit***

Existing Land use:

Mining operation in this area is being carried out since long resulting development of numbers of quarries, roads, infrastructures, dumps etc. At present, total 38.581ha area has been degraded due to mining and allied activities out of which, 28.070 ha is due to excavation. The existing quarries of dimension is given below:

Table No. 2.11

Existing Broken land in Reserve Forest:

Name of the Quarry	Length (M)	Width (M)	Depth (M)
Quarry no 1A	156.00	44.00	15·70
Quarry no 1B	103.00	53.61	07·05

BARAIBURU – TATIBA IRON & MANGANESE MINE (258.98968 HA.)
LESSEE: M/S THE RAMESHWARA JUTE MILLS LTD

Quarry no 1C	103.00	22.54	0·05
Quarry no 2A	71.00	38.45	13·20
Quarry no 2B	119.00	26.32	04·20
Quarry no 3	160.00	46.89	04·70
Quarry no 4	112.00	16.91	21·25
Quarry no 7	98.00	16.32	00·20
Quarry no 9	70.00	18.40	00·33
Quarry no 10A	92.00	34.01	00·41
Quarry no 10B	76.00	26.22	00·45
Quarry no 10C	26.00	18.19	00·25
Quarry no 10D	52.00	13.81	00·30
Road Side Quarry	97.00	37.41	01·30
Nala Pit	120.00	17.15	02·00
Orissa Boundary Pit No 2	38.00	23.79	01·20
Orissa Boundary Pit No 3	112.00	51.79	01·18
Orissa Boundary Pit No 4	58.00	23.74	01·50

Broken land in Protected Forest:

Name of the Quarry	Length (M)	Width(M)	Depth(M)
Quarry no 4(Part)	76.00	50.07	01·25
Quarry no 5	172.00	37.17	30·11
Quarry no 6	95.00	12.04	01·30
Hutting Pit	164.00	17.98	00·20
Road Side Pit no 1	97.00	4.10	01·30
Road Side Pit no 2	25.00	5.68	00·89
Tatiba Face no 1	62.00	23.74	01·40
Tatiba Face no 2	93.00	15.39	03·00
Tatiba Face no 3	44.00	113.61	01·10
Tatiba Face no 4	176.00	36.32	04·20
Tatiba Face no 5	40.00	42.25	03·98
Tatiba Face no 6	22.00	76.59	02·30
Tatiba Face no 7	37.00	38.51	01·37
Tatiba Face no 8	23.00	60.26	00·40
Tatiba Face no 9	240.00	41.31	09·89
Tatiba Face no 10	75.00	26.04	00·70
Tatiba Face no 11	177.00	38.26	04·60
Tatiba Face no 12	93.00	29.88	01·00
Middle Face no 1	92.00	25.91	05·25
Middle Face no 2	84.00	18.87	04·70
Orissa Boundary Pit No 1	196.00	29.20	01·00

Non – Forest Land :			
Quarry	Length (M)	Width (M)	Depth (M)
MN PIT-1	12	5	03.64
MN PIT-2	23	9	02.20
MN PIT-3	32	9	03.40
OLD PIT-1	54	30	10.63
OLD PIT-2	50	26	04.12
OLD PIT-3	52	21	09.26
NEW Q	40	20	04.60
LUCKY PIT	205	73	21.64
Baria sahi pit top	82	64	10.55
Singha pit behind	21	88	06.98
Baria sahi pit top BTM	60	27	10.67
Adit PIT	34	23	03.51
LAVA PIT	93	18	14.26
GITTY PIT	79	33	22.33
BAMIA MERUM	115	41	11.45
TATIBA East	78	26	00.62
NEW TATIBA Q	221	191	09.43
QARRY-8	218	51	08.45
QUARRY-11	163	65	14.56
QUARRY-10	29	64	15.54
BOUNDARY -PIT-1	196.00	34	00.52
BOUNDARY -PIT-2	38.00	29	00.85

ii) Land use at the end of Review of plan period:

At this stage, due to development of quarries, road etc total 54.566ha area shall be in use due to mining and allied activities out of which, 41.895 ha is due to quarry by the end of the Review of mining plan period.

iii) Land use at conceptual stage:

As per Gazette notification, the period of lease will be extended upto 31.03.2020. The lease period and Review of plan period is same so the total degraded land at the end of Review of plan period is same with the conceptual period. The existing land use, Land to be degraded at the end of Review of plan period and at Conceptual period is given in Table 2.12.

Table: 2.12

PRESENT AND FUTURE LAND USE PATTERN

Purpose wise break - up	Total land used within lease (Forest + Non Forest) (Ha.)	At the end of Review of Plan Period	At Conceptual Stage
Excavated area	28.070	41.895	41.895
O/B Dumps	0.389	0.389	0.389
Sub grade stack (Previous O/B dump)	1.492	1.492	1.492
Infrastructure	0.30	0.30	0.30
Road	5.60	5.60	5.60
Reclaimed area	0.23	0.23	0.23
Green belt	2.5	4.5	4.5
Crushing and screening plant	-	-	-
Garland drain and parapet wall	-	0.16	0.16
Total Land Use	**38.581**	**54.566**	**54.566**
Unused Land	**220.408**	**204.423**	**204.423**
Total land in lease area	**258.989**	**258.989**	**258.989**

ii) *Disposal of waste*

Existing dump:

There are some scatted waste dumps within the lease area covering 0.389 ha.

Table No. 2.13

Name of Dump	Location / Co-ordinates	Dimension		Area in sqm	Height (m)	Volume in MT	Status of dump
		Length	Width				
Near Quarry 8a	ZONE- A 22° 9' 3.25" 85°20' 53.14"	79	12	911	-	-	Removed
Lucky Pit Near	ZONE- A 22° 8' 55.14" 85° 21' 20"	83	14	1150	-	-	Removed
Near Barlasai Pit / Lucky Pit	ZONE- A 22° 8' 49.53" 85°20' 59.69"	31	23	717	-	-	Removed
Near Gitty Pit	ZONE- A 22° 8' 43.34" 85°20' 58.96"	13	12	156	-	-	Removed
Near Quarry - 10	ZONE- A 22° 8' 47.55" 85°20' 44.07"	37	20	736	-	-	Removed

Near Quarry - 10	ZONE- A 22° 8'46.60" 85°20' 43.21"	11	6	65	-	-	Removed
Near Quarry - 10	ZONE- A 22° 8' 46.21" 85°20' 43.60"	20	8	156	-		Removed
Near Sub-grade – Nala Pit	ZONE- A 22° 9' 33.40" 85°20' 42.04"	121	48	5840	-		Removed
Sub grade – 52	ZONE- A 22° 9' 24.99" 85°20' 42.34"	150	58.52	8778	-	-	Removed

The waste generated in the past is used for making and maintaining the haul roads. So, practically, there is no waste material in the waste dumps.

During this Review of mining plan period:

The production of Iron Ore is totally ROM. After beneficiation total 356479.83 MT or 118826.61 cum insitu waste will be generated from both Baraiburu and Tatiba zone. The waste generated after beneficiation from Baraiburu zone is proposed to dump at Quarry-11 of Baraiburu zone and waste generated after beneficiation from Tatiba zone shall be dump in New Tatiba Quarry.

At conceptual stage:

Keeping in view the present mineral reserve, it has been calculated that at conceptual stage, about 574664.85 cum waste shall be generated. At this stage, the available waste shall be dumped over the quarry -11 & new Tatiba quarry, the material of which has already been removed.

iii) Reclamation/rehabilitation

Based on the present condition, in forest area all the excavated area will be planted and handed over to the Forest authority. But the lessee has applied for diversion of fresh forest land for additional area and if the same shall be granted by the forest authority, then the life of the mine shall be 9.708 years based on mineralized area marked with a production capacity of 2.26 mtpa. In this case, 41.895 ha area shall come under excavation. Reclamation and rehabilitation by plantation of all dead benches and floor shall be done at this stage.

iv) Post mining reclamation and land use plan:

At ultimate stage, reclamation and post mining land use pattern of the area shall emerge as follows:

within diverted forest land:

i) Total 41.895 ha area shall be degraded due to excavation at ultimate stage. The excavated area shall be rehabilitated by way of plantation at this stage.

ii) Mine roads shall be kept as it is and handed over to the forest authority for their use.

iii) Finally, the entire degraded area shall be reclaimed & rehabilitated and handed over to the forest authority in a useful manner.

APPROVED

The existing and proposed land use pattern in this case is given below:

Table – 2.14

PRESENT AND FUTURE LAND USE PATTERN

Purpose wise break - up	Total land used within lease (Forest + Non Forest) (Ha.)	At the end of Review of Plan Period	At Conceptual Stage
Excavated area	28.070	41.895(2.560 ha backfilling)	41.895(2.560 ha backfilling)
O/B Dumps	0.389	0.389	0.389
Sub grade stack (Previous O/Bdump)	1.492	1.49	1.49
Infrastructure	0.30	0.30	0.30
Road	5.60	5.60	5.60
Reclaimed area	0.23	0.23	0.23
Green belt	2.50	4.50	4.50
Crushing and screening plant	-	-	-
Garland drain and parapet wall	-	0.16	0.16
Total Land Use	**38.581**	**54.566**	**54.566**
Unused Land	**220.408**	**204.423**	**204.423**
Total land in lease area	**258.989**	**258.989**	**258.989**

B. UNDERGROUND MINING: Not applicable.

EXTENT OF MECHANIZATION:

PROPOSED REQUIREMENT OF MACHINERY

i) CALCULATION FOR REQUIREMENT OF EXCAVATOR

The Excavator will be backhoe type with 2.1cum bucket capacity with combination of tippers of 15MT (5.00cum) capacity.

a) Bucket fill Capacity = 2.1 cum

b) Effective capacity of the Bucket = 1.89 cum

c) Capacity of the tipper = 5.00 cum

d) Effective capacity of the tipper of 0.9 factor = 4.5 cum

e) No. of bucket require to fill one Tipper = (4.5/1.89) – 2.38 or 4

f) Average cycle time for excavation, loading of material to a tipper = 3 minutes.

g) Average utilization of time per shift with 80% utilization factor = 384 minutes

h) Number of cycle per shift = (384/3) = 128

i) Average excavation, loading capacity of Excavator per shift = (128 x 4.5) = 576 cum

j) Total working day in a year = 300 days

K) Total Excavation and Loading capacity per annum = 172800.00 cum

Table – 2.15

Table showing number of excavator to be required

Year ⟶	2017-18	2018-19	2019-20
Year-wise quantity of material to be excavated and loaded. (cum)	349999.76	753333.11	753333.10
Year-wise quantity of material to be excavated and loaded. (with swelling factor 1.25) (cum)	437499.70	941666.38	941666.37
Excavating Capacity of Excavator	172800	172800	172800
No. of working excavator required	03	06	06

So, from the above table it is clear that minimum six excavators (2.1 cum capacity) is required for this Review of plan period.

ii) *CALCULATION FOR REQUIREMENT OF HYVA (15 MT) FOR REMOVAL OF ROM, SUB-GRADE & WASTE*.

The ROM produced from the mine will be dispatched to the crushing & screening unit which is about 1.0 km (avg.) from the working quarries. The sub-grade and waste to be generated from the screening unit shall be transported to the earmarked site i.e. dump no. -11 and New Tatiba Quarry respectively within the lease area.

For ROM Transportation from quarry to screening unit (15 Tonner Tipper)

a) Average Hauling distance both way (1 km x 2) = 2 Kms.

b) Average traveling time both ways @ 10 kmph = 12 minutes

c) Average Loading time = 3 minutes

d) Average un-loading time = 2 minutes

e) Average cycle per trip = 17 minutes

f) Effective working time per shift with 80% Utilization factor = 288 minutes

g) Average no. of trips per shift per dumper = 288/17= 17 no

h) Capacity of the Dumper = 5.00 cum

i) Hauling capacity of dumper per shift = 85.00 cum

j) Hauling capacity of dumper per shift per annum = 25500.00 cum

Table – 2.16

Year ⟶	2017-18	2018-19	2019-20
Year-wise quantity of material to be excavated and loaded (cum)	349999.76	753333.11	753333.10
80% of total excavation is treated as beneficiation (cum)	279999.8	602666.48	602666.48
Year-wise quantity of material to be transported (with swelling factor 1.25) (cum)	349999.76	753333.11	753333.10
Houling Capacity of Hyva	25500.00	25500.00	25500.00
No. of working hyva required	13	30	30

So, from the above table it is clear that minimum 30 (15 tonner capacity) is required for this Review of plan period.

iv) Drilling:

The ore will be excavated by blasting. Drilling of blast holes will be done by wagon drills. About 60% of the total excavation is considered as a hard patch which requires drilling & blasting. The quantity of boulders will be to the tune of 5 – 10%. Jack hammer is also considered for shallow hole blasting, if required.

a) Wagon Drills

Specification of Wagon Drills:

Diameter of drill	-	85mm
Consumption of the compressed air	-	9 cum/min
Pressure of the air supplied to	-	10.5 kgf/sq.m

Estimation of wagon drill requirement:

Height of the bench	=	varies from 5.0m to 6.0m
Dia of hole	=	4" or 110 mm
Average depth of the hole	=	5m including subgrade drilling
Burden x spacing	=	2.5m x 3.0m

Volume of rock to be broken per hole= 37.5 cum

Average no. of hole that can be Drilled per shift. = 10 nos.

Volume of rock that can be drilled/ Broken per shift per machine = 375 cum

Total working day per year = 300 days

Total volume of rock that can be drilled/ Broken per year, per machine with 80% Utilization factor. = 90000 cum

Table – 2.17

Estimation of year-wise requirement of Wagon drill

Years	2017-18	2018-19	2019-20
Year-wise quantity of excavation to be made.	349999.76	753333.11	753333.10
Considering 60% hard patch, year-wise excavation to be drilled/broken.	209999.85	451999.86	451999.86
Capacity of drill.	90000.00	90000.00	90000.00
No. of Wagon drill required	03	05	05

For deep hole drilling and blasting, max. Five wagon drills is proposed.

Table – 2.18

Extent of Mechanization:

It is a running mine and following machineries are at site.

Type	Nos.	Dia of Holes (mm)	Size/ Capacity	Make	H.P
PC 200 Komastu Back Hoe Excavator	1	–	0.93cum	L & T	128
PC 300 Komastu Back Hoe Excavator	1	–	2.10 cum	L & T	242
Tata-Hitachi 210 LCHV	1	–	1.0 cum	Telcon	
TWL 3036 LOADER	1	–	1.8 CUM	Telcon	94
Tata JD 315V	1	–	1.0cum/0.3 cum	Telcon	98
Tata EX – 70 Excavator	1	–	0.25 cum	Telcon	
Portable Compressor (Tractor mounted)	3	–	110 C.f.m.	Holman & Atlas Copco	50 7.00 Kg /Cm^2
Jack Hammer	2	–	–	Atlas Copco-2 SL-30-2	–
Drill Rod	2	34mm	2',4' & 5'	Sandvik	–
Truck mounted water Tanker.	1		4000 Ltrs		131.82
Dumpers	8	–	10 MT	TATA	131.82

Additional requirement of Machines during this Review of plan period

Excavator (2.1 cum) capacity	-	03
Hyva	-	22 (15 tons)
Wagon Drill	-	02
Mobile Crusher (250TPH)	-	01
Mobile Screen (200TPH)	-	01

v) ***Loading equipment***:

Machine loading shall be practiced in the mine. ROM, finished ore and waste shall be loaded by machine during (2017-18 to 2019-20) of the Review of mining plan period. Year-wise detail of requirement of machineries is given in Table above.

vi) ***Haulage and Transport equipment***:

Haulage will be within the mining leasehold. The ROM shall be transported through 10 & 15 tonner dumpers to the nearby mobile crushing / screening unit situated at a distance of about 1.0 km from the mine face. From the crushing / screening unit, the waste material shall be transported to the earmarked site (Sub-grade Yard & new Tatiba Quarry) by dumpers. Dumpers shall be fitted with exhaust conditioner. The detail calculation of year-wise requirement of dumpers is given in Table above.

vii) ***Transport from mine-head to the destination. Describe briefly the transport system (Please specify)***:

Finished product shall be transported by hired dumpers /hyva or if necessary by railway.

viii) ***Miscellaneous***:

Describe briefly and allied operations and machineries related to the mining of the deposit not covered earlier:

There is no allied operation. All machinery related to the future mining has been covered above.

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PART-A	3.0 MINE DRAINAGE

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

Topographically, Baraiburu –Tatiba Iron and Manganese Mine represents undulated hilly terrain. There is three seasonal Nala in the mine. The Karo river flows 1Km way in east side from south to northeast direction control the drainage pattern. The highest elevation of the hillocks is 681 meters above mean sea level on northern side while the lowest R.L. is about 445 meters above M.S.L on the eastern side near pillar no. RJM 23.

The entire study area in and around the proposed project site is occupied by compact and hard rock belonging to Archaean period which are devoid of any primary porosity. The ground water in such formation occurs within the secondary porosity such as joints, fractures and bedding plains. Groundwater occurs in the weathered residuum under unconfined condition and circulates through fractures and fissures below. The weathering has lead to the formation of laterite, which is highly erratic in nature, hence irregular/discontinuous pockets of laterite is a common feature in the Iron Ore deposits. Predominantly Laterites are found as capping rock in the leasehold. Hydrogeologically, the laterites are good for holding and transmitting ground water due to its porosity and permeability.

It has been observed from the nearby wells and tube wells that the water touches at about 418mRL as such, there is no intersection of water table during mining and as such there will not be any impact on the water regime.

b) Indicate maximum and minimum depth of Workings.

This is an old working mine and numbers of quarries existing within the lease area. Based on the mineralized zone, the entire area is divided into three zones i.e. zone –A, Zone – B and Zone – C. The top, Bottom and Ultimate working depth of the three zones are as follows:-

Location of the Quarry	Existing		Position at the end of Review of mining plan period		Position at ultimate stage.	
	Top RL (m)	Bottom RL (m)	Top RL (m)	Bottom RL (m)	Top RL (m)	Bottom RL (m)
Zone - A	637.00	495.22	637.00	487.00	637.00	421.00
Zone - B	568.18	505.00	577.00	511.00	577.00	493.00
Zone - C	521.00	500.00	521.00	496.00	521.00	486.00

The quarries of zone - A has gone up to a maximum depth of 496.00 mRL , zone – B, 505 mRL and zone – c, 500 mRL. From the Table given above, it is clear that the maximum depth to be attained at ultimate stage will be at 421 mRL in zone - A. As such, there is no chance of seepage of water and the quarry depth will not touch the water table within the lease.

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

Quantity and quality of water likely to be encountered:

Tatiba Iron and Manganese Mine represent undulated hilly terrain. The mining operation carried out in this area has gone up to a depth of 495.22 mRL (max) and there is no percolation of water in the quarry. During monsoon, after heavy rainfall, all rail water flows away to the lower as the area is hilly train and no accumulation of rain water in open pit or quarries.

Permanent water table in the immediate vicinity of mine pit is reported to be below the working pit and quarry. Hence whatever water is collected in pit sump is contributed by seepage through cracks & fissures in rocks iron ore & due to direct precipitation. Catchment area for the pit corresponds only to the excavation area of pit because the water coming from higher grounds is diverted through garland drain. Considering 2588398.85 m^2 catchment area of pit & maximum rain fall/day = 1000 mm approximately 2588398850 m3 of water will be collected in a day (maximum) but water accumulation not arises.

Quality of water :

No adverse effect on water regime has been observed due to the mining of Iron and Manganese in this area as yet. No treatment of drainage water from pit is required as it is mostly rain water & no toxic material is present in the litho units & Iron constitutes inert &

chemically non-reactive ingredients. Further, this water is not joining any natural stream outside the lease. There is no likelihood of ground water or surface water pollution or depletion due to mining activity because ground water body is largely untouched by mining activity & waste rock & overburden dumps do not contain leaching substances. As the same method of mining will be continued in the modified plan period, it is expected that the surface as well as ground water quality will remain undisturbed.

d) <u>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</u>.

The surrounding of lease area is traversed by various three seasonal Nala that form a subdentritic and parallel pattern. The important stream draining the mine and surrounding area is Karo River with south to NE flowing trend. It flows within 1 km towards the east of the mine.

There are few dry Nala flowing in west to east direction and join the eastern side of Karo River. Surface runoff during rainy season follows the gradient of the terrain and passes through the seasonal Nala. Catchment area for the pit corresponds only to the excavation area of pit because the water coming from higher grounds is diverted through garland drain. Hence whatever water is collected in pit sump is contributed by seepage through cracks & fissures in rocks iron ore & due to direct precipitation. Catchment area for the pit corresponds only to the excavation area of pit because the water coming from higher grounds is diverted through garland drain. Considering 2588398.85 m^2 catchment area of pit & maximum rain fall/day = 1000 mm approximately 2588398850 m3 of water will be collected in a day (maximum) but water accumulation not arises.

There is no likelihood of ground water or surface water pollution or depletion due to mining activity because ground water body is largely untouched by mining activity & waste rock do not contain leaching substances. It is a general practice to dug deep drains at the top contour of the quarry before monsoon to prevent the flow of rainwater from the higher contour to the quarry. With these precautions the water regime of this area will not be affected by mining activities.

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PART- A	4.0 STACKING OF MINERAL REJECT / SUB GRADE MATERIAL AND DISPOSAL OF WASTE

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

Nature of waste:

Nature of waste at Baraiburu- Tatiba Iron and Manganese mine are as under:

i) Laterite/BHQ :

Its thickness varies from 1.82m to 3.10 m.

ii) Waste after Sorting of Iron Ore (ROM) :

This is the balance portion after crushing and screening from run-of-mine ore in Crusher after sorting out the saleable Iron Ore. In this area, a part (approx. 8% from in situ ore after beneficiation and 60% from float ore) of this waste contains low grade Iron Ore having below 45% Fe and high in silica.

During the next three years, it is plan to develop the quarries both laterally and at depth within the broken area as well as un-diverted forest (after getting FC) area. There will not be any generation of topsoil as the +55% Fe ROM is available from top. The mine produces +55% Fe ROM iron ore with 100% recovery. After beneficiation of ROM, there will be generation of material having Fe content below 45%, which is only 8% of the volume. This material having Fe content below 45% is considered as waste. The generation of waste from excavation during the next three years period has been calculated and given in Table below. The generation of waste during the Review of plan period is given in **Table – 4.1**.

Table – 4.1

Generation of Sub-grade and Waste after Beneficiation

Year	Total ROM Excavation (MT)	Total ROM Excavation (MT) 80% of A	Production of different sized iron ore				
			Lump (10-40 mm) (Grades ranges from 58-62% Fe) (MT)	Sized ore (5-18 mm) (Grades ranges from 58-62% Fe) (MT)	Fines ore (0-5mm) (55-58% Fe) (MT)	S/G (45-55% Fe) (MT)	Waste (<45% Fe) (MT)
			30% of B	25% of B	30% of B	7% of B	8% of B
	A	B	C	D	E	F	G
2017-18	1049999.28	839999.36	251999.81	209999.84	251999.81	58799.96	67199.95
2018-19	2259999.33	1807999.46	542399.84	451999.87	542399.85	126559.97	144639.92
2019-20	2259999.30	1807999.44	542399.83	451999.86	542399.83	126559.96	144639.96
Total	**5569997.91**	**4455998.26**	**1336799.47**	**1113999.57**	**1336799.49**	**311919.89**	**356479.83**

Zone wise generation of waste

Year	Baraiburu Zone in MT			Total		Tatiba Zone in MT			Total	
	A	B	C	MT	cum	A	B	C	MT	cum
2017-18	36720.27	-	-	36720.27	12240.09		30479.66	0.00	30479.66	10159.89
2018-19	38063.20	-	-	38063.20	12694.40	-	94204.02	12352.70	106556.72	35518.91
2019-20	39501.12	-	-	39501.12	13167.04	-	87191.84	17947.00	105138.84	35046.28
G. Total	114304.59	-	-	114304.59	38101.53	-	211875.54	30299.70	242175.24	80725.08

Zone wise Generation of S/G

Year	Baraiburu Zone in MT			Total		Tatiba Zone in MT			Total	
	A	B	C	MT	cum	A	B	C	MT	cum
2017-18	32130.24	-	-	32130.24	10710.08		26669.72	0.00	26669.72	8889.90
2018-19	33322.80	-	-	33322.80	11107.60	-	82428.55	10808.62	93237.17	31079.05
2019-20	34563.48	-	-	34563.48	11521.16	-	76292.84	15703.64	91996.48	30665.50
G. Total	100016.52	-	-	100016.52	33338.84	-	185391.11	26512.26	211903.37	70634.45

Top-Soil:

The thickness of the top soil is very meager at places that are not possible to scrap out separately

O/B Waste:

There is no O/B waste as ROM is taken for production. The waste will be generated only during beneficiation process.

Existing old dumps:

There are some scatted waste dumps in the area covering 0.389 ha.

Table – 4.2

Table showing Location & Dimension of Existing Dumps

Name of Dump	Location / Co-ordinates	Dimension		Area in sqm	Height (m)	Volume in MT	Status of dump
		Length	Width				
Near Quarry 8a	ZONE- A 22° 9' 3.25" 85°20' 53.14"	79	12	911	-	-	Removed
Near Lucky Pit	ZONE- A 22° 8' 55.14" 85° 21' 20"	83	14	1150	-	-	Removed
Near Bariasai Pit / Lucky Pit	ZONE- A 22° 8' 49.53" 85°20' 59.69"	31	23	717	-	-	Removed

Near Gitty Pit	ZONE- A 22° 8' 43.34" 85°20' 58.96"	13	12	156	-	-	Removed
Near Quarry - 10	ZONE- A 22° 8' 47.55" 85°20' 44.07"	37	20	736	-	-	Removed
Near Quarry - 10	ZONE- A 22° 8'46.60" 85°20' 43.21"	11	6	65	-	-	Removed
Near Quarry - 10	ZONE- A 22° 8' 46.21" 85°20' 43.60"	20	8	156	-	-	Removed
Near Sub-grade – Nala Pit	ZONE- A 22° 9' 33.40" 85°20' 42.04"	121	48	5840	-	-	Removed
Sub grade – 52	ZONE- A 22° 9' 24.99" 85°20' 42.34"	150	58.52	8778	-	-	Removed

The waste generated in the past is used for making and maintaining the haul roads. So, practically, there is no waste material in the waste dumps.

Proposal for disposal of waste:

The entire ROM excavation is considered as production. After beneficiation total 356479.83 MT or 118826.61 cum insitu waste will be generated from both Baraiburu and Tatiba zone. The waste generated after beneficiation from Baraiburu zone is proposed to dump at Quarry-11 of Baraiburu zone and waste generated after beneficiation from Tatiba zone shall be dumped in New Tatiba Quarry.

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

As stated above, total 356479.83 MT or 118826.61 cum insitu waste will be generated from both Baraiburu and Tatiba zone. The waste generated after beneficiation from Baraiburu zone is proposed to dump at previous sub-grade stack of Baraiburu zone and waste generated after beneficiation from Tatiba zone shall be dumped in New Tatiba Quarry. The year wise details of dumping proposal are given in **Table - 4.3** and shown in **Plate - 10.** The details of year wise dumping are shown in **Table-4.3.**

Table – 4.3

Spread & Height of proposed dumping (Baraiburu zone)

Year	Location	Insitu in cum	Loose (insitux1.25)	Compact (85% of loose)	Spread Area m^2	Avg. height in M.	Top R.L. M.	Bottom R.L. M.
2017-18	Sub-grade Yard	12240.09	15300.11	13005.09	3715.74	3.50	533.91	529.00
2018-19		12694.4	15868	13487.8	4995.48	2.70	539.25	536.61
2019-20		13167.04	16458.8	13989.98	5300.00	2.64	539.25	536.61
Total		38101.53	47626.9125	40482.88	-	-	-	-

Spread & Height of proposed backfilling (New Tatiba quarry)

Year	Location	Insitu in cum	Loose (insitux1.25)	Compact (85% of loose)	Spread Area m^2	Avg. height in M.	Top R.L. M.	Bottom R.L. M.
2017-18	Q- new Tatiba quarry	10159.89	12699.8625	10794.88	15112.00	0.71	486.28	485.57
2018-19		35518.91	44398.6375	37738.84	5278.16	7.15	493.24	486.09
2019-20		35046.28	43807.85	37236.67	5207.93	7.15	493.24	486.09
Total		**80725.08**	-	-	-	-	-	-

Precautionary measures for waste dump:

a) The slope of the proposed dump shall be made and maintain at 28^0.

b) The Hyva shall be used for hauling of waste material from quarry head to earmarked sites.

c) The waste material shall be spread over and over in systematically.

d) The position of proposed dumping so formed in year-wise manner is illustrated in **Plate – 10**.

S/G STACK

After beneficiation total 311919.89 MT or 103973.29 cum insitu S/G will be generate from both Baraiburu and Tatiba zone. The S/G generated after beneficiation from Baraiburu zone is proposed to stack at Quarry-11 of Baraiburu zone and S/G generated after beneficiation from Tatiba zone is stack in New Tatiba Quarry. The detail of year wise stacking of S/G is shown in **Table - 4.4.**

Table – 4.4

Spread & Height of proposed stock (Baraiburu zone)

Year	Location	Insitu in cum	Loose (insitux1.25)	Compact (85% of loose)	Spread Area m^2	Avg. height in M.	Top R.L. M.	Bottom R.L. M.
2017-18	Q-11	10710.08	13387.60	11379.46	3376.69	3.37	488.17	483.00
2018-19		11107.60	13884.50	11801.83	2282.75	5.41	488.17	483.00
2019-20		11521.16	14401.45	12241.23	2604.52	4.59	492.87	488.17
Total		**33338.84**	**41673.55**	**35422.52**	-	-	-	-

Spread & Height of proposed stack (Tatiba zone)

Year	Location	Insitu in cum	Loose (insitux1.25)	Compact (85% of loose)	Spread Area m^2	Avg. height in M.	Top R.L. M.	Bottom R.L. M.
2017-18	Q- new Tatiba quarry	8889.90	11112.37	9445.51	2181.41	4.33	493.79	489.46
2018-19		31079.05	38848.81	33021.49	5080.23	6.5	493.79	486.09
2019-20		30665.50	38331.87	32582.09	4231.44	7.7	493.79	486.09
Total		**70634.45**	88293.05	75049.09	-	-	-	-

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PART- A	5.0 USE OF MINERAL AND MINERAL REJECT

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

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Iron ores of Baraiburu-Tatiba Iron & manganese mine is of hard as well as soft laminated in nature. The iron ore of Baraiburu zone is slightly soft in nature where as that of Tatiba area is hard and massive. The average grade of ROM iron ore of this mine is +55%Fe.

Earlier, ROM produced from the mine is directly sold to the consuming industries. Also, entire sub-grade mineral as per the CCOM Circular No. 3/2010 is blended with high grade ore and dispatched to the consumer. The average grade of **ROM at present is +55%** Fe content and the entire ROM is dispatched to the buyer. In this way the entire +45% to -55% ore after blending is dispatched to the buyer.

Now, there is a proposal for mobile crushing unit of 600 TPH capacity and 400 TPH capacity and two mobile screening unit of 200 TPH capacity within the lease area. The average grade of ROM iron ore of this mine is +55%Fe. So, some portion (about 20%) of the ROM produced from the mine is directly sold to the consuming industries. Rest 80% of ROM iron ore production shall be treated in the crushing & screening unit situated within the lease area. In this crushing & screening unit, different sizes of iron ore i.e. 10-40mm, 5-18mm and 0-5mm shall be separated out. The sized products 10-40mm and 5-18mm will be of 58 to 62% Fe whereas 0-5mm will be of 55 to 58%Fe which has good market.

The recovery of these finished products will be 85% of the feed. Besides above, during the screening process, 0-5mm products of +45 -55% Fe (mineral Reject) and <45%Fe (waste) shall also produced. This mineral reject amounts to 7% of the total feed whereas about 8% of the total feed is generation of waste.

Year	Total ROM Excavation (MT)	Total ROM Excavation (MT) 80% of A	Production of different sized iron ore				
			Lump (10-40 mm) (Grades ranges from 58-62% Fe) (MT)	Sized ore (5-18 mm) (Grades ranges from 58-62% Fe) (MT)	Fines ore (0-5mm) (55-58% Fe) (MT)	S/G (45-55% Fe) (MT)	Waste (<45% Fe) (MT)
			30% of B	25% of B	30% of B	7% of B	8% of B
	A	B	C	D	E	F	G
2017-18	1049999.28	839999.36	251999.81	209999.84	251999.81	58799.96	67199.95
2018-19	2259999.33	1807999.46	542399.84	451999.87	542399.85	126559.97	144639.92
2019-20	2259999.30	1807999.44	542399.83	451999.86	542399.83	126559.96	144639.96
Total	**5569997.91**	**4455998.26**	**1336799.47**	**1113999.57**	**1336799.49**	**311919.89**	**356479.83**

The iron ore from this mine was sold to the following industries:

Name of some of the Iron ore buyers from Baraiburu-Tatiba Iron & manganese mine

1) M/s PRACHI MINERALS
2) M/s JAI BALAJI INDUSTRIES LIMITED
3) M/s ANJANI STEELS LIMITED
4) M/s JAMSHED IRON & STEEL PVT. LTD.
5) M/s Monnet Ispat & Energy Limited
6) SRI BALAJEE MINERALS

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

The ore available in the area will meet the specifications of the consuming industries of Steel Plant, Sponge Plant etc. The iron ore supplied to these industries is as follows:

Name of the main iron ore consumer			
Below 55% Fe	**55 to 58% Fe**	**58 to 60% Fe**	**60 to 62% Fe**
Salasar Minerals	Parameswari Minerals	M/S PRACHI MINERALS	M/s ANJANI STEELS LIMITED
			M/S JAI BALAJI INDUSTRIES LIMITED
			M/s JAMSHED IRON & STEEL PVT. LTD.
			M/s Monnet Ispat & Energy Limited
			SRI BALAJEE MINERALS

Analysis of iron ore of this mine from NABL accredited Lab is enclosed as **Annexure – XIII.**

d) Give detail requirement for other industries, captive consumption, export, associated industrial use etc.

As stated earlier, the average grade of ROM iron ore of this mine is +55%Fe. So, some portion (about 20%) of the ROM produced from the mine is directly sold to the consuming industries. Rest 80% of ROM iron ore production shall be treated in the crushing & screening unit situated within the lease area.

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ROM produced from the lease area shall be transported by the regular consumers for their various purposes to the different consumers. 80% of ROM iron ore production shall be treated in the crushing & screening unit situated within the lease area. In this crushing & screening unit, different sizes of iron ore i.e. 10-40mm, 5-18mm and 0-5mm shall be separated out. The sized products 10-40mm and 5-18mm will be of 58 to 62% Fe whereas 0-5mm will be of 55 to 58%Fe which has good market. The recovery of these finished products will be 85% of the feed. Besides above, during the screening process, 0-5mm products of +45 -55% Fe (mineral Reject) and <45%Fe (waste) shall also produced. This mineral reject amounts to 7% of the total feed whereas about 8% of the total feed is generation of waste. Iron ore produced (finished product), after processing in crushing & screening unit shall be sold to various consuming industries like Steel Plant, Sponge Plant and Blast Furnace industry.

e) Indicate precise physical and chemical specification stipulated by buyers

Stipulated specifications are as under:

i) **Steel Mills:**

Physical Specification:

Size	:	+10mm to –50mm
Tolerance	:	-10mm: 5% Max. +50mm: 5% Max. (With a maximum size of 75mm)

Chemical Specification:

Fe	:	65% Min. (Rejection below 63%)
Al_2O_3/SiO_2	:	6.00 Max.
Al_2O_3: SiO_2 (Ratio)	:	1.50% Max.
Phosphorus	:	0.05% Max.
Sulphur	:	0.02% max.
Moisture	:	5% Max.
Copper, Lead, Zinc (Tramp element)	:	0.04% Max.

ii) **Cement plant:**

Physical Specification:

Size : - 12 mm.

Chemical specification

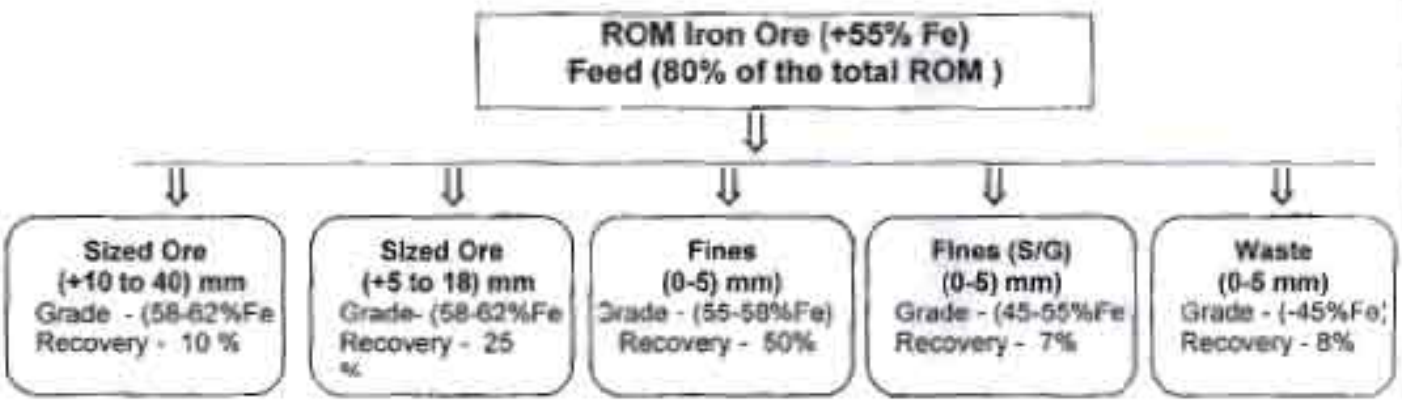
Fe : 60 –62 %.

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

Process adopted to upgrade the ROM

The mine produces ROM iron ore. The recovery of +55% Fe ROM iron ore from the total excavation is 100%. Hence, future planning is based on +55% Fe ROM iron ore.

Now, there is a proposal for mobile crushing unit of 600 TPH capacity and 400 TPH capacity and two mobile screening unit of 200 TPH capacity within the lease area. About 20% of the ROM produced from the mine is directly sold to the consuming industries. Rest 80% of ROM iron ore production shall be treated in the crushing & screening unit situated within the lease area. In this crushing & screening unit, different sizes of iron ore will be produced i.e. 10-40mm and 5-18mm will be of 58 to 62% Fe whereas 0-5mm will be of 55 to 58%Fe which has good market. The recovery of these finished products will be 85% of the feed. Besides above, during the screening process, 0-5mm products of +45 -55% Fe (mineral Reject) and <45%Fe (waste) shall also produced. This mineral reject amounts to 7% of the total feed whereas about 8% of the total feed is generation of waste. The recovery by volume and grade of different finished products from the screening unit is as below:



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PART-A	6.0 PROCESSING OF ROM AND MINERAL REJECT

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

Iron ores of Baraiburu-Tatiba Iron & manganese mine is of hard as well as soft laminated in nature. The iron ore of Baraiburu zone is slightly soft in nature where as that of Tatiba area is hard and massive. The average grade of ROM iron ore of this mine is +55%Fe. Earlier, ROM produced from the mine is directly sold to the consuming industries.

Now, there is a proposal for mobile crushing unit of 600 TPH capacity and 400 TPH capacity and two mobile screening unit of 200 TPH capacity within the lease area. The average grade of ROM iron ore of this mine is +55%Fe.

So, some portion (about 20%) of the ROM produced from the mine is directly sold to the consuming industries. Rest 80% of ROM iron ore production shall be treated in the crushing & screening unit situated within the lease area. In this crushing & screening unit, different sizes of iron ore i.e. 10-40mm, 5-18mm and 0-5mm shall be separated out. The sized products 10-40mm and 5-18mm will be of 58 to 62% Fe whereas 0-5mm will be of 55 to 58%Fe which has good market. The recovery of these finished products will be 85% of the feed. Besides above, during the screening process, 0-5mm products of +45 -55% Fe (mineral Reject) and <45%Fe (waste) shall also produced. This mineral reject amounts to 7% of the total feed whereas about 8% of the total feed is generation of waste. The finished products are being sold to consumers as per their requirement.

ROM ore will be subjected to crushing and dry screening at the site. The crusher will be equipped with dust suppression system, with this sizing and dry screening there will be enhancement in the grade of the ore by a minimum of 1 % - 1.5 %. The dispatch grade of ore will be maintained as per the requirement of the consumers.

Beneficiation process:

ROM excavated from the mine (80%) will be transported to mobile crushing and screening plant during this modified plan period. The crushing and screening plant will be located near working site within the lease hold area.

(Dr. G. S. Jaiswal)
Qualified Person

First of all, ROM of soft ore will be fed directly in the screening unit from where 10-40mm, 5-18mm and 0-5mm material will be separated out. The hard and massive ROM shall be fed into the crushing & screening unit where big size boulders will be crushed and screened into 10-40 and 5-18mm sizes. Here, 0-5mm size fines shall also be generating.

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Processing

ROM which is soft in nature will be fed to Mobile screens of 200 TPH capacity. Saleable ore and waste/sub grade mineral generated will be stacked separately. The hard and massive ROM shall be fed into the crushing & screening unit where big size boulders will be crushed and screened into 10-40 and 5-18mm sizes. Here, 0-5mm size fine shall also be generating. Fines 0-5mm, sized ore 5-18 mm & 10-40 mm lumps generated from crushing & screening plant will be stacked separately and dispatched as per requirement of customers

The waste generated after processing shall be @ 8% of the total feed. Before disposal, waste shall be analyzed for Fe content.

Hence, the following finished products shall be obtained after processing:

(a) Sized ore of 10-40mm, 5-18mm (with 58% to 62%Fe)

(b) Fines ore of 0-5mm size (with 55% to 58%Fe)

(c) Fines ore of 0-5mm size (with 45% to 55%Fe)

(d) Fines ore of 0-5mm size (with <45% Fe)

The recovery by volume and grade from the ROM is given in Table – 6.1.

Table - 6.1

Table showing recovery of different finished product by volume and grade from the ROM

Finished product after Screening	Recovery by volume (%)	Average Grade
10-40mm (Size ore)	30	(58-62%Fe)
(5-18)mm (Size ore)	25 - 30	(58-62%Fe)
0-5 mm (Fines)	25 - 30	(55-58%Fe)
0-5mm(fines) - S/G	7	(45-55%Fe)
0-5mm(fines)	8	(-45%Fe)

(Dr. G. S. Jaiswal)
Qualified Person

The year-wise production of finished product as well as generation of waste after processing in screening unit has been chalked out and given in below table.

Table showing year wise finished product after *beneficiation process:*

Year	Total ROM Excavation (MT)	Total ROM Excavation (MT) 80% of A	Production of different sized iron ore				
			Lump (10-40 mm) (Grades ranges from 58-62% Fe) (MT)	Sized ore (5-18 mm) (Grades ranges from 58-62% Fe) (MT)	Fines ore (0-5mm) (55-58% Fe) (MT)	S/G (45-55% Fe) (MT)	Waste (<45% Fe) (MT)
			30% of B	25% of B	30% of B	7% of B	8% of B
	A	B	C	D	E	F	G
2017-18	1049999.28	839999.36	251999.81	209999.84	251999.81	58799.96	67199.95
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2019-20	2259999.30	1807999.44	542399.83	451999.86	542399.83	126559.96	144639.96
Total	**5569997.91**	**4455998.26**	**1336799.47**	**1113999.57**	**1336799.49**	**311919.89**	**356479.83**

During crushing & screening operations, following precautions will be taken:-

i) Unloading of ROM by Dumper shall be carried out with proper care avoiding dropping of the materials from height. The material will be moist by sprinkling of water while unloading.

ii) Crushing & screening operation shall be carried out with a provision to control fugitive particulate matter emissions. Water & sprinkling arrangement shall be provided at raw material stocks and on land around the crushing & screening units.

iii) Work area including the roads surrounding the plant shall be black top or concreted.

iv) Enclosures shall be provided for belt conveyors & transfer points of belt conveyors. Flexible covers shall be installed at entry and exit of the conveyor to the enclosures, minimizing the gaps around the conveyors.

v) Water spray/ sprinklers shall be provided at the strategic locations for dust suppression during raw material transfer. The product material size of 5mm to 40mm shall be dispatched to consumers directly. Flow sheet for crushing and screening plant is annexed as **Annexure - XX)**.

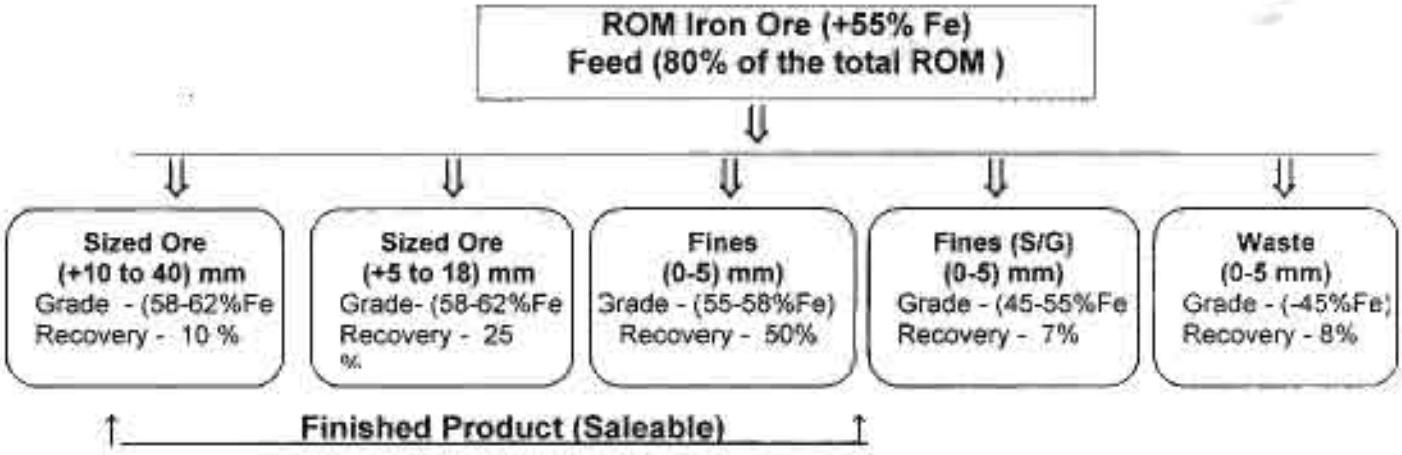
Jaiswal

(Dr. G. S. Jaiswal)
Qualified Person

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

The ROM iron ore produced from the mine shall be treated in the screening unit to get the sized iron ore. The recovery of finished product is 85% of the total feed. The recovery by volume and grade of different finished products from the screening unit is as below:

Material Balance Chart



The year-wise generation of finished product from screening unit during this Review of plan period has been chalked out and given in **Chapter – 2.**

From the Table, it is clear that there will be generation of waste @ about 8% of the total feed. This waste shall be dumped separately. The year wise details of dumping proposal is given in Chapter - 4 and shown in **Plate - 10.**

c) **Explain the disposal method for tailing or reject from the prospecting plant.**

Tailing Disposal:

Not applicable as the crushing and screening process is dry. After processing, about 8% of waste will be generated which shall be dumped in the earmarked site. The year wise details of dumping proposal are given in Chapter - 4 and shown in **Plate - 10.**

(Dr. G. S. Jaiswal)
Qualified Person

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

Not applicable as there is no generation of tailings.

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

There is no any type of chemical to be used in the processing unit.

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

Not applicable as there is no use of chemicals.

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

The requirement of water is for drinking, for machinery, dust suppression and afforestation work. The water requirement in mine is 114 KLD, (dust suppression 60 KLD, afforestation work 40 KLD, for machinery 10 KLD and domestic consumption 4 KLD). A well and tube wells near mines office fulfills the requirements of water for different uses.

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(Dr. G. S. Jaiswal)
Qualified Person

PART-A	7.0 OTHER

DESCRIBE BRIEFLY THE FOLLOWING:

a) SITE SERVICES

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Baraiburu Tatiba Iron & Mn. Mine is one of the oldest Mine in the area which in past had been worked by Sri Gopal Pasari and then by M/s Birla Gwalior Private Ltd. and now by present owner viz. M/s The Rameshwara Jute Mills Ltd. The major services available have been shown on the surface plan (Plate no. 4). Following site services are available at the mine to cater the need of workers.

MINES OFFICE AND RESIDENTAL COMPLEX:

The Mine office and store is situated outside the M.L. Area on a Private land. Labour Kacha hutting with double accommodation will be provided to accommodate 100 workers within M.L. Area.

WORKSHOP:

Repairing is being done at private workshop at Barajamda and Barbil. Minor repairs are done at mine.

FIRST AID STATIONS AND REST SHELTERS:

These are provided near working quarries. First Aid stations are provided as per the statutory provisions.

CANTEEN & CRECHE:

Canteen & crèche at present is not available for which necessary permission under Mine Act 1951 & Mines Rules 1955 will be obtained from D.G.M.S.

Latrines and urinals at mine are provided.

MEDICAL FACILITIES

A dispensary under a compounder is maintained by Iron ore welfare case Department in the camp of Karampada Iron Mine M/s Misrilall Jain & Sons, where workers with minor illness are treated. Cess Medical team visits the mine once a week. Emergency cases are shifted to Cess hospital at Barajamda by Cess Ambulance.

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WATER SUPPLY

There are natural springs within M.L. area. Water for drinking purpose is kept in mud pots at Rest shelter which are supplied manually from springs.

EDUCATIONAL FACILITIES:

There are L.P. School in village Baraiburu and Tatiba of state Government. High School and College is at Barajamda which is about 10 Kms. from mines. At present power supply is not available. But it can be procured when required from JSEB power line which is passing through the M. L. area.

Rest Shelter:

Separate rest shelters at the quarry are provided with drinking water, etc.

b) EMPLOYMENT POTENTIAL:

This mine was working with adequate number of management and technical persons with the anticipated production. There is scope of further increase in the managerial and supervisory manpower. Also unskilled labour force will increase. Presently the working of mines lease has expired.

MANAGEMENT AND SUPERVISORY PERSONNEL

Designation	Nos.	Qualification
Manager	1	Graduate in Mining Engineering with 1st Class Manager's Certificate of Competency
Mining Engineer	2	Graduate in Mining Engineering
Asst. Manager	1	Diploma in Mining Engineering with 2nd Class Manager's Certificate of Competency
Geologist	1	M.Sc. Geology.
Mines Foremen	2	Diploma in Mining Engineering or Foreman's Certificate of Competency.
Surveyor	1	Surveyor's certificate of competency.
Mines Mate cum Blaster	5	Holder of Mate certificate of competency.
Clerks	2	
Operator/Driver	2	

During last working period, number of local resident employed in this mine was 101.

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LABOUR SKILLED, UNSKILLED AND SEMISKILLED

Trade	Nos.	Category
Workers	26	Skilled
Workers	25	Semiskilled
Workers	50	Unskilled

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PART-A	8.0 PROGRESSIVE MINE CLOSURE PLAN

8.1 ENVIRONMENT BASE LINE INFORMATION:

Attach a note on the status of baseline information with regard to the following.

Baseline data on environment is important to understand the region's existing physical, biological, cultural and social environmental characteristics. This information forms the basis to analyze the probable impacts of the proposed mining activity vis-à-vis the background environment quality of the region.

A Key Plan as per Rule 28(5)(a) on a scale of 1:50000 has been prepared incorporating boundary of the mining lease and adjoining area lying within five kilometers showing contours, natural drainage system, roadways, forests, village boundary, predominant wind direction **(Plate - 2).**

An Environment Plan of the area of mining lease inclusive of the adjoining area within five hundred meters of the boundary of the lease area on 1:5000 scale incorporating the boundary of the mining lease, contour lines, roadways, forests, predominant wind direction, air sampling point has been prepared. **(Ref. Plate No. 15).**

Base line data has been generated during the preparation of EIA & EMP and the out comings on different environmental issues are dealt hereunder:

Existing Land Use Pattern:

The area occupies an undulating and hilly terrain having elevation varying between 440m – 695 m RL and surrounded by a similar terrain. Within the lease, the area occupied by quarries, dumps, roads and structures etc. are as follows:-

Table-8.1

Details of Existing Land Use pattern

Purpose wise break - up	Total land used within lease (Forest + Non Forest) (Ha.)
Excavated area	28.070
O/B Dumps	0.389
Sub grade stack (Previous O/B dump)	1.492
Infrastructure	0.30

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Road	5.60
Reclaimed area	0.23
Green belt	2.5.
Crushing and screening plant	-
Garland drain and parapet wall	-
Total Land Use	38.581
Unused Land	220.408
Total land in lease area	258.989

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Also, the land use pattern of the lease hold area is summarized as below:-

VILLAGES	GOVERNMENT LAND	GHATKURI R.F.	TATIBA P.F.	TENANTED PLOTS	TOTAL
BARAIBURU	33.560	77.275	105.512	1.520	217.867
TATIBA	227.643	18.040	132.740	43.710	422.133
Total in Acres	**261.203 Acres**	**95.315 Acres**	**238.252 Acres**	**45.230 Acres**	**640.000 Acres**
					258.98968 Hects.

Water Regime:

In Baraiburu Tatiba Iron & Manganese Ore Mines, mining operations both at iron and manganese section are on hilly terrain, there is no danger of inundation of mines working by surface waters. As the mine is in operation for more than 45 years, regular contour drains are cut around the working quarry faces to prevent any accumulation of water at the quarry faces, rain water either gets absorbed in the sub-soil or seeps through various cracks and exposures in the ore body. In this nalla in the northeastern part of M.L. area a natural spring emerge from where water percolates and is being used by the workers of the mine and by the local people.

In the southern part in Tatiba Iron ore section there is no nalla/water body. The quantity of water for human use shall be too negligible to attract any consideration in drainage system. The source of water of this project shall be ground water. The water requirement will be 114 KLD from borewell. The permission to draw ground water has been obtained from Central Ground Water Board.

Quality of Air:

Mining activities i.e. drilling, blasting, transportation, loading, dumping etc and mineral processing i.e. handling of ore, operation of crusher and screen etc will have significant

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effect on the air quality of the core zone. The mining operation in the area is being carried out by open cast fully mechanized method. It is proposed to continue the same mining method during the plan period also. Generation of air pollution will be during the operation of mining machineries, from loaders and dumpers. The quality of ambient air will depend upon the background concentration of specific contaminants, the emission sources and meteorological conditions. The Industrial impact on air quality mainly depends on the method of construction, technology adopted for production, storage facilities & mode of transport for material.

The AAQ of the area is being regularly monitored and found within the prescribe norms. Copy of monitoring report is enclosed as **Annexure – XII**. However, the intensity of operation is directly related to the rate of production. Fugitive emission from the mining and crushing process is expected. The transport of iron ore by surface transport system is likely to increase the suspended particulate matter emissions.

Due to discontinuation of mining operation in the area, there is no generation of Air pollution due to mining activity. The quality of AAQ is well within the permissible limit. Copy of AAQ monitoring report of the last quarter of working time is enclosed as **Annexure – XII.**

Ambient Noise Level:

Running of machines, movement of dumpers within the area and blasting are the source of noise pollution. Since the lease area is mostly surrounded by forest, path of the noise will be interrupted and it will not be felt at distance from the operation site. The noise quality of the area is well within the limit.

There will be some effect on the noise environment as the proposed mining will employ additional HEMM like Excavator, loaders, dumpers, crushing and screening of ore. The effect is anticipated to have some impact in core zone but will be insignificant in buffer zone due to the vegetation around the mine area which will effectively obstruct the transmission of noise to area away from the source. Prediction of anticipated noise levels resulting from the operation is the most critical step in assessment of the impact of alternatives on the noise environment.

The noise level has been regularly monitored and found that in most cases noise levels are within permissible limits of 85 dB(A) for maximum 8 hrs exposure. Copy of Noise monitoring report of last quarter of working time is enclosed as **Annexure – XII**. The peaks at times

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may be marginally higher but this situation does not continue for any appreciable length of time. Considering the norm of reduction of noise level as above for each doubling of distance from the site of measurement, it is anticipated that impact of noise at the site will remain localized although there will be increase in noise level during operation phase. The noise level at boundary of the mine premises will be not more than 70 dB (A) in normal operation. The impact on noise quality within the lease area may be termed marginal which may require mitigative measures. Insignificant impact is envisaged outside the lease area in the buffer zone.

Flora and Fauna:

The Baraiburu Tatiba Iron & Manganese Mines is a part of Saranda Forest of Singhbhum. Here all types of timber yielding plants are present, they are as follows. :

Shorea robusta (sal), Pterocarpus marsupium, (Bija & piasal), Terminalia tomentosa (asan), Anogeissus latifolia (dhaura), Ardina Crodifolia (Karam), Gmelina arborea (Gamhar). Besides above timber yielding plants at this mine, there are *Terminalia chebula (herra), Terminalia belarica (Behera), Madhuca indica (Mohua), Schleichera indica (Kusum), Ficus bengalensis (Baniyan)* etc.

The fruit yielding plants found within M.L. area are Diospyros melanoxylon (kendu), Anthocephalus cadamba (Kadam), Syzygium jambolana (Jamum), Aegle marelos (Bail)), with Zizyphus jujube (Bair) and Emblica officinates (aonla).

Also there are shrubs and bushes within target area. It is observed that within this mine there are 132 trees of 1 ft. girth & above per acres, or 326 trees per Hectares. So, the density of forest growth as observed is less than one may be 0.3.

The fauna of the area consists of wild bear, jackal, deer and monkey. Sambar had never been noticed in this area rarely elephants come to the area from nearby Saranda Forest.

Climatic Conditions:

The climate of the area is generally cold in winter between November and February and hot in summer between March and June. The monsoon sets in late June and continues up to the end of August. Maximum and minimum Temperature during last 10 years is 43.2°C in May 1995 and 7.2°C in December 1997.

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Rain fall:

Annual rainfall as obtained as secondary data from meteorological office at IMD Jamshedpur over a period of 10 years indicates rainfall to be above 1200 mm. Most of the rainfall is received during monsoon season. The monsoon starts in June and continues till September. The maximum amount of rainfall in received in July and also the maximum rainy days occurs in July.

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Temperature & Humidity:

The winter seasons sets in towards end of November and continues till February. The last week of December is the coolest month of the year, with annual minimum temperature falling as low as below 5°C. The temperature gradually rises after February and March to May is the summer season. This is also referred to as Pre-monsoon season. During this time the mean maximum temperature 38.2°C where as the mean minimum temperature is 24.3°C. The monsoon season starts during June with temperature ranging from 29.1°C to 34.4°C. Last week of August sees the increment of temperature with mean minimum being 22.2°C. From October the mean temperature falls gradually marking the onset of the winter season. The mean minimum temperature is 18.3°C and means maximum temperature is 28.8°C in this month. The fall in temperature continues in November with mean minimum being 12.6°C during this month.

The maximum humidity is observed during the monsoon season with mean value of 85%. The minimum humidity is observed in December as 26%. Generally the weather during the other seasons is more or less dry and in the comfortable zone.

Wind speed & Direction

Wind speed is by and large moderate and varies between slow to medium with maximum speed reaching a value of 10.5 km/h. During early monsoon and during retrieval of monsoon wind speed is very high. As wind direction and speed are most important factors for the transportation of dusts. Seasonal data were collected. The calm condition is generally low. In general strong wind blows from all the directions.

<u>Human Settlements:</u>

Within target area in its eastern part there are 7 (seven) houses of Adivasi villagers having a total population of 42 (forty-two) heads including children. This is on the non-mineralized zone and is not going to be disturbed by mining. Also within the lease hold in labour

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hutment about 100 persons can reside. The nearest town of Barajamda is 10 kms. away by road, within 5 kms, of the lease hold area in all sides a population of about 58163 resides mainly in Bolani, Tatiba, Baraiburu, Bokna, Uliburu, Barbil Barajamda etc.

Because of rocky structure, the support from agricultural activity is not predominant. The main livelihood of the population is from mining jobs and forest products. No special craft is conspicuous.

Employment & Occupation :

The village people mostly earn their livelihood from mining, forestry and cultivation. People of Noamundi township earn their livelihood from business, service, etc.

Water Supply :

The village population use untreated water which they collect from the nearby wells and tube-wells for drinking and general requirement.

Health Care :

IISCO's Gua Hospital is located about 6.5 km away from the mine. Apart from the above hospitals, a health center is also located at Barajamda. Mobile cess medical van visits the mine once in a week.

Education :

The area is having the following moderate facilities for schooling.

Primary School	At Baraiburu Village.
High School	At Gua.
College	At Noamundi

Other Infrastructural Facilities :

The area is connected by fair weather road to Barajamda, which is having modest facilities for Bank, Post Office, Police Station and other facilities, etc. The nearest metal road is Chaibasa-Kiriburu State Highway. Nearest Railway Station and siding is at Barajamda.

Public Building, Places of Worship and Monuments:

The area is devoid of any notable public buildings, national monuments, place of worship religions/historical/archaeological importance etc. There is also no natural part of tourist interest or wild life sanctuary near to the area.

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Indicate any sanctuary is located in the vicinity of leasehold:

There is no wild life sanctuary near the area.

8.2 IMPACT ASSESSMENT:

Attach an Environment Impact Assessment Statement describing the impact o mining and beneficiation on environment on the following:

The objective of this assessment was to identify the likely impact on the environment in the study area, which can arise due to the proposed project activities. Based on the present environmental scenario an exercise was done to identify and evaluate the impact on the environment by the proposed mining and ore sizing & crushing activity, covering the core and buffer zone around the quarry site.

In case of Baraiburu Iron & Manganese Mines, mining and mineral processing is proposed. Intensity of mining activity varies directly according to the market demand of Iron ore. Currently, the demand of Iron Ore is steeply on the rise and thus the intensity of activity in the surrounding area is also expected to elevate the prevalent ambient readings which include the pollution effects of the intensified activity. In nutshell, assessment of the effects of different activities proposed to be undertaken on the baseline environmental parameters will be on incremental basis only.

Marginal impact on air quality is envisaged due to mining and crushing activity. But the effect will be suitably mitigated by adequate pollution control measures. Marginal positive impact on socio-economic environment is foreseen due to direct and indirect employment. The mostly rural population may see development of educational, medical and infrastructural facilities. An attempt has been made here to assess the impact of the proposed mining activities on the various environmental attributes. The important environmental attributes of the study area may broadly be grouped under:

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

This is an old mine as such the area has been degraded due to mining and allied activities such as degraded by way of quarries, waste dump, infrastructure, road and other mining related ancillary works. Till date, total 38.581 ha land has been degraded due to mining and allied activities. At present 0.23 ha area has already been reclaimed. It has been estimated

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that about 14.69% of the lease area has been used. Now, during this Review of plan period about 54.566 ha area will be degraded due to mining and allied activities out of which 41.898 ha area comes under excavation. The waste so generated during this Review of plan period shall be used for reclamation of the mined out area. The itemwise land to be utilized for different purposes during Review of plan period is given in **Table - 8.2**.

Table - 8.2

PRESENT AND FUTURE LAND USE PATTERN

Purpose wise break - up	Total land used within lease (Forest + Non Forest) (Ha.)	At the end of REVIEW OF Plan Period
Excavated area	28.070	41.895
O/B Dumps	0.389	0.389
Sub grade stack (Previous O/B dump)	1.492	1.492
Infrastructure	0.30	0.30
Road	5.60	5.60
Reclaimed area	0.23	0.23
Green belt	2.5	4.5
Crushing and screening plant	-	-
Garland drain and parapet wall	-	0.16
Total Land Use	38.581	54.566
Unused Land	220.408	204.423
Total land in lease area	258.989	258.989

ii) *Air quality:*

The quality of AAQ is well within the permissible limit. Copy of AAQ monitoring report of last quarter of working time is enclosed as **Annexure – XII.** Regular monitoring of air quality is being done every quarterly in the mining area through volumetric dust samplers placed at definite locations and the results are within the limits. Various control measures to suppress the dust at its point of origin are being taken. All the surface/ backfilled areas are to be stabilized by planting trees so that there will be no air borne dust. Following adequate control measures during the mining operation as well as transportation of material is being taken to control dust pollution.

► Thick plantation around existing mine has been done.

► Monitoring of air quality in the mine and surrounding villages is being done.

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► Regular maintenance of vehicles and machinery.

► Wet drilling system in the drills.

► Water sprinkling on Haulage roads.

► Use of dust masks by workmen.

iii) ***Water quality:***

Water quality of surface water and ground water is not affected due to mining activity of this mine. There is no perennial source within the leasehold. There is no cause of contamination of water, as no industrial effluent is discharged and there is also no quarry discharge water from mine.

There is no perennial nala within the leasehold. There are dry seasonal nalas within this lease hold which are flowing in East West, NW-SE, WNW-ESE directions also there are many dry nalas as indicated in the geological & Surface, Plans. The Karo River is located about a kilometre east of lease hold area. There are two major water streams present in the northern part of the buffer zone i.e. Koina River is flowing from south-west to north and Karo River which flows from south to north. There is Sarakon nala which is flowing in the NW direction from south in the buffer zone. The Koina River is about 5.7 kms away from the core zone whereas Sarakon nala is about 9.5 kms away.

Possible source of contamination of surface water will be from rainwater runoff during monsoon. Water will be required for greenbelt & Sprinkling purpose. Drinking water will be taken from Ground water. This is a nominal quantity which will be drawn from existing tube wells of Tatiba village. The areas of the stack yard and dumps will be surrounded by garland drains to arrest the wash offs. Since the water will be recharged adequately through infiltration and seepage, no effect is envisaged on the groundwater resource also. There is no intersection of water table during mining and as such there will not be any impact on the water regime.

Iv) ***Noise levels:***

Running of machines, movement of dumpers within the area and blasting are the source of noise pollution. Since the lease area is mostly surrounded by forest, path of the noise will

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be interrupted and it will not be felt at distance from the operation site. The noise quality of the area is well within the limit.

There will be some effect on the noise environment as the proposed mining will employ additional HEMM like Excavator, loaders, dumpers, crushing and screening of ore. The effect is anticipated to have some impact in core zone but will be insignificant in buffer zone due to the vegetation around the mine area which will effectively obstruct the transmission of noise to area away from the source. Prediction of anticipated noise levels resulting from the operation is the most critical step in assessment of the impact of alternatives on the noise environment.

The noise level has been regularly monitored and found that in most cases noise levels are within permissible limits of 85 dB(A) for maximum 8 hrs exposure. Copy of Noise monitoring report is enclosed as **Annexure – XII**. Considering the norm of reduction of noise level as above for each doubling of distance from the site of measurement, it is anticipated that impact of noise at the site will remain localized although there will be increase in noise level during operation phase. The impact on noise quality within the lease area may be termed marginal which may require mitigative measures. Insignificant impact is envisaged outside the lease area in the buffer zone.

On the other hand, Preventive maintenance for all the machineries eg. Drills, compressor, loader, dozers, shovels, transport vehicles etc. was done by competent personal.

v) *Vibration levels (due to blasting):*

It has been mentioned that drilling and blasting will be require for the excavation. As the ore body of this area is of soft and hard type, drilling and blasting will be carried out only for hard patches which accounts to 50% of the total excavation. It is proposed that deep hole drilling will be carried out by wagon drill. Problem of fly rocks can be envisaged in the mining area due to blasting, proper precaution will be required to prevent any damage to life and property due to fly rocks.

vi) *Water regime:*

Water quality of surface water and ground water is not affected due to mining activity of this mine. There is no perennial nala within the leasehold. There are dry seasonal nalas within this lease hold which are flowing in East West, NW-SE, WNW-ESE directions also there are many dry nalas as indicated in the geological & Surface, Plans. The Karo River is located

about a kilometre east of lease hold area. There are two major water streams present in the northern part of the buffer zone i.e. Koina River is flowing from south-west to north and Karo River which flows from south to north. There is Sarakon nala which is flowing in the NW direction from south in the buffer zone. The Koina River is about 5.7 kms away from the core zone whereas Sarakon nala is about 9.5 kms away.

Possible source of contamination of surface water will be from rainwater runoff during monsoon. Water will be required for greenbelt & Sprinkling purpose. Drinking water will be taken from Ground water. This is a nominal quantity which will be drawn from existing tube wells of Tatiba village. The areas of the stack yard and dumps will be surrounded by garland drains to arrest the wash offs. Since the water will be recharged adequately through infiltration and seepage, no effect is envisaged on the groundwater resource also. There is no intersection of water table during mining and as such there will not be any impact on the water regime.

Environmental Monitoring Program

To evaluate the effectiveness of environmental management program, regular monitoring of the significant environmental parameters will be taken up as under:

SL. No	Description of parameters	Schedule & duration of monitoring
1	AIR QUALITY: Ambient air quality-monitoring stations will be established inside the mine area for SPM, RPM / PM_{10}.	Quarterly at every station.
2	WATER QUALITY : Water quality of ground water and other perennial and non perennial Nalas will be monitored. Selection of monitoring station will be done in consultation with State Pollution Control Board.	Physico-chemical, biological and toxic metals Seasonally or as prescribed by JSPCB.
3	NOISE LEVEL	Quarterly at every station.

The monitoring report of Air, Water and Noise is enclosed as **Annexure-XII.**

vii) *Acid mine drainage:*

Not Applicable, as the surface and ground water was analyzed for colour, biological oxygen demand, chemical oxygen demand, suspended solids, total hardness etc. The hydro geological study of the area was carried out in the year 2002/2003 and no water quality problem was found out. There is no toxicity of the ground water so far because of the mining activity. There is no chance of the precipitated rain water overflow from the mine/

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water reservoir even during abandoned condition. Analysis report of water samples is enclosed as **Annexure- XII**.

viii) *Surface subsidence:*

High risk factors such as landslide, subsidence flood, fire, tailing dam failure etc are neither encountered nor anticipated. As such, emergency plan for quick evacuation, ameliorative measures are not proposed.

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ix) *Socio-economics:*

The setting up of the various industries has improved the socio economic conditions in the surrounding area. The present proposal will further improve the infrastructure: economic conditions thus further improve the socio economic development. The communities, which are benefited by the mining activities, are thus one of the key stakeholders for the mining project. It is proposed that the management of Baraiburu-Tatiba iron & Mn mine shall have structured interactions with the community to disseminate the measures taken by the management and also to elicit suggestions for overall improvement for the development of the area.

viii) *Historical monuments etc.:*

The area is devoid of any notable historical monuments.

8.3 PROGRESSIVE RECLAMATION PLAN:

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

The progressive mine reclamation plan will be for the period of 01-04-2016 to 31-03-2020 and will have following activities.

8.3.1. *Mined- Out Land:*

Existing Land use:

Mining operation in this area is being carried out since long resulting development of numbers of quarries, roads, infrastructures, dumps etc. At present, total 38.581ha area has been degraded due to mining and allied activities out of which, 28.070 ha is due to excavation.

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Land use at the end of Review of plan period:

At this stage, due to development of quarries, road etc total 54.566 ha area shall be in use due to mining and allied activities out of which, 41.895 ha is due to quarry by the end of the Review of mining plan period.

Land use at conceptual stage:

Total 54.566 ha area shall be degraded, out of which, 41.895 ha area shall be involved by way of excavation.

Table: 8.3

Zone wise extent of area proposed to be degraded in each year (within broken area)

(IRON ORE)

	Existing Quarry	Degraded during 2017-18	Degraded during 2018-19	Degraded during 2019-20
ZONE - A	6.264	6.264	8.410	8.929
ZONE - B	5.672	5.672	7.989	11.531
ZONE - C	1.420	1.420	1.420	2.654
(Non- forest)				
	11.43	11.69	11.69	11.69

Reclamation and Rehabilitation:

Existing position:

Presently, 0.23 ha area has already been reclaimed.

At the end of Review of Plan period:

As stated earlier, In the light of recent Gazette Notification dated 27.03.2015, The Mines and Minerals (Development and Regulation) Amendment Act, 2015, mine period shall be extended up to 31.03.2020. So, by the end of this REVIEW OF plan period, about 4.73 ha excavated part of quarry shall be reclaimed by backfilling and also plantation shall be done over the reclaimed area.

Reclamation at conceptual stage:

Based on the present condition in forest area all the excavated area will be planted and handed over to the Forest authority. But the lessee has applied for diversion of fresh forest land for additional area and if the same shall be granted by the forest authority, then the life

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of the mine shall be 9.708 years based on mineralized area marked with a production capacity of 2.26 mtpa. In this case, 36.836 ha area shall come under excavation. Reclamation and rehabilitation by plantation of all dead benches and floor shall be done at this stage.

Afforestation:

The detail of plantation proposed during this scheme period is given below table:

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Table: 8.4

Table showing proposed plantation programme during The REVIEW OF Plan period

Year	Location	Plant Species	No. of Plants	Area covered (Ha.)
2017-18	SAFETY ZONE	Neem, Karanja, Simarua, Bamboo, Teak, Bara, Radhachuda, Amala, Jhaun. Jammun, Asan, Harida, Bahara, Eucalyptus, Mango	1650	0.66
2018-19	SAFETY ZONE	Neem, Karanja, Simarua, Bamboo, Teak, Bara, Radhachuda, Amala, Jhaun, Jammun, Asan, Harida, Bahara, Eucalyptus, Mango	1675	0.67
2019-20	SAFETY ZONE	Neem, Karanja, Simarua, Bamboo, Teak, Bara, Radhachuda, Amala, Jhaun, Jammun, Asan, Harida, Bahara, Eucalyptus, Mango	1675	0.67
TOTAL			5000	2.00

Protective measures to be taken:

The following protective measures are being implemented and also proposed to be continued in future: -

(i) Plants would generally be planted with the first effective monsoon rains.

(ii) Only those species not grazed by cattle recommended for plantation.

(iii) Suitable fencing around the saplings would be provided.

(iv) The sapling shall be protected by old used tar drums in the initial stages.

(v) Watering shall be done immediately after the sapling is planted. Further watering shall be done depending on monsoon.

(vi) After the plants stabilize little Urea and cattle manure shall be applied with sufficient watering.

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(vii) Replacement of dead plants by suitable live saplings shall be made.

8.3.2 *Topsoil Management:*

No top soil will be generated as there is no topsoil in the targeted area selected during the Review of plan period. Hence no proposal for storage and preservation soil is required.

8.3.3 *Tailing Dam Management:*

Not applicable

8.3.4 *Acid mine drainage, if and its imitative measures.*

Not Applicable

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

The summary of year-wise proposal for the year 2017-18 to 2019-20 is given in next page.

SUMMARY OF YEAR WISE PROPOSAL FOR (2017-18)

ITEMS	DETAILS	AREA (HECT)	QUANTITY	EXPENDITURE (Rs.)	REMARKS
		PROPOSED	PROPOSED	PROPOSED	
(A) RECLAIMATION & REHABILITATION OF MINED OUT LAND/AREA	i) Backfilling	-	-	-	Not possible as not any pit exhausted.
	ii) Afforestation of the backfilled area	-	-	-	-
	iii)Others (please specify)	-	-	-	-
	iv) Pisciculture	-	-	-	Not possible as no water shall be accumulated in the pit
	v) Converting into water reservoir.	-	-	-	Not possible due to the hilly terrain.
	vi)Picnic Spot	-	-	-	Mine is not going to be closed due to the reason stated above.
(B) STABLIZATION & REHABILITATION OF DUMPS (with lease)	i)Terracing	-	-	-	Terracing shall be done after this plan period
	ii) Pitching	-	-	-	At present there is no proposal of pitching.
	iii) Construction of Parapet Walls/Retaining wall at the toe of dumps	-	-	-	Not necessary.
	iv) Construction of Check Dams along slope of vallies etc.	-	-	-	Not necessary.
	v) Construction of Settling ponds (Garland Drain etc.)	-	-	-	Not necessary.
	vi) Desilting of settling ponds, channels.	-	-	-	Not applicable at this stage.
	vii) Afforestation on dumps	-	-	-	Not applicable during plan period

(Dr. G. S. Jaiswal)
Qualified Person

	viii) Others (Please Specify) Plantation	-	-	-	-
(C) REHABILITATION OF BARREND AREA WITHIN LEASE	i) Afforestation(Green Belt building)	0.66	1650	Rs. 82500.00	Plantation shall be done at safety zone area
	ii)) Others (Please Specify)	-	-	-	-
(D) ENVIRONMENTAL MONITORING (Core zone & Buffer Zone separately)	i) Ambient Air Quality	-	-	Rs. 30000	There is a proposal to monitor the AAQ every quarterly at 3 station.
	ii) Water Quality	-	-	Rs. 30000	There is a proposal to monitor the water quality every year.
	iii) Noise Level Survey	-	-	Rs. 12000	There is a proposal to monitor the Noise Quality every quarterly at 3 station.
	iv) Ground Vibration	-	-	-	-
	v) Others (Please Specify) Safety	-	-	Rs. 30000	-
	TOTAL			Rs.184500.00	

SUMMARY OF YEAR WISE PROPOSAL FOR (2018-19)

ITEMS	DETAILS	AREA (HECT)	QUANTITY	EXPENDITURE (Rs.)	REMARKS
		PROPOSED	PROPOSED	PROPOSED	
(A) RECLAIMATION & REHABILITATION OF MINED OUT LAND/AREA	i) Backfilling	-	-	-	Not possible as not any pit exhausted.
	ii) Afforestation of the backfilled area	-	-	-	-
	iii)Others (please specify)	-	-	-	-
	iv) Pisciculture	-	-	-	Not possible as no water shall be accumulated in the pit.
	v) Converting into water reservoir.	-	-	-	Not possible due to the hilly terrain.
	vi)Picnic Spot	-	-	-	Mine is not going to be closed due to the reason stated above.
(B) STABLIZATION & REHABILITATION OF DUMPS (with lease)	i)Terracing	-	-	-	Terracing shall be done after this plan period
	ii) Pitching	-	-	-	At present there is no proposal of pitching.
	iii) Construction of Parapet Walls/Retaining wall at the toe of dumps	-	-	-	Not necessary.
	iv) Construction of Check Dams along slope of vallies etc.	-	-	-	Not necessary.
	v) Construction of Settling ponds (Garland Drain etc.)	-	-	-	Not necessary.
	vi) Desilting of settling ponds, channels.	-	-	-	Not applicable at this stage
	vii) Afforestation on dumps	-	-	-	Not applicable during plan period.
	viii) Others (Please Specify) Plantation	-	-	-	-
(C) REHABILITATION OF BARREND	i) Afforestation(Green Belt building)	0.67	1675	Rs. 83750.00	Plantation shall be done at safety zone area

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Qualified Person

AREA WITHIN LEASE	ii)) Others (Please Specify)	-	-	-	-
(D) ENVIRONMENTAL MONITORING (Core zone & Buffer Zone separately)	i) Ambient Air Quality	-	-	Rs. 30000	There is a proposal to monitor the AAQ every quarterly at 3 station.
	ii) Water Quality	-	-	Rs. 30000	There is a proposal to monitor the water quality every year.
	iii) Noise Level Survey	-	-	Rs. 12000	There is a proposal to monitor the Noise Quality every quarterly at 3 station.
	iv) Ground Vibration	-	-	-	-
	v) Others (Please Specify) Safety	-	-	Rs. 30000	-
	TOTAL			Rs.185750.00	

SUMMARY OF YEAR WISE PROPOSAL FOR (2019-20)

ITEMS	DETAILS	AREA (HECT)	QUANTITY	EXPENDITURE (Rs.)	REMARKS
		PROPOSED	PROPOSED	PROPOSED	
(A) RECLAIMATION & REHABILITATION OF MINED OUT LAND/AREA	i) Backfilling	-	-	-	Not possible as not any pit exhausted.
	ii) Afforestation of the backfilled area	-	-	-	-
	iii)Others (please specify)	-	-	-	-
	iv) Pisciculture	-	-	-	Not possible as no water shall be accumulated in the pit.
	v) Converting into water reservoir.	-	-	-	Not possible due to the hilly terrain.
	vi)Picnic Spot	-	-	-	Mine is not going to be closed due to the reason stated above.
(B) STABLIZATION & REHABILITATION OF DUMPS (with lease)	i)Terracing	-	-	-	Terracing shall be done after this plan period
	ii) Pitching	-	-	-	At present there is no proposal of pitching.
	iii) Construction of Parapet Walls/Retaining wall at the toe of dumps	-	-	-	Not necessary.
	iv) Construction of Check Dams along slope of vallies etc.	-	-	-	Not necessary.
	v) Construction of Settling ponds (Garland Drain etc.)	-	-	-	Not necessary.
	vi) Desilting of settling ponds, channels.	-	-	-	Not applicable at this stage.
	vii) Afforestation on dumps	-	-	-	Not applicable during plan period
	viii) Others (Please Specify) Plantation	-	-	-	-
(C) REHABILITATION OF BARREND AREA WITHIN LEASE	i) Afforestation(Green Belt building)	0.67	1675	Rs. 83750.00	Plantation shall be done at safety zone area
	ii)) Others (Please Specify)	-	-	-	-
(D) ENVIRONMENTAL MONITORIN	i) Ambient Air Quality	-	-	Rs. 30000	There is a proposal to monitor the AAQ every quarterly at 3 station.
	ii) Water Quality	-	-	Rs. 30000	There is a proposal to monitor the water quality every year.

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G (Core zone & Buffer Zone separately)	iii) Noise Level Survey	-	-	Rs. 12000	There is a proposal to monitor the Noise Quality every quarterly at 3 station
	iv) Ground Vibration	-	-	-	
	v) Others (Please Specify) Safety	-	-	Rs. 30000	
	TOTAL			Rs.185750.00	

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8.4 DISASTER MANAGEMENT AND RISK ASSESSMENT:

High risk factors such as landslide, subsidence flood, fire, tailing dam failure etc are neither encountered nor anticipated. As such, emergency plan for quick evacuation, ameliorative measures are not proposed. However, preventive measures will be undertaken:

- Mobile vehicles and arrangement for the first aid will always be available at the mine site all the time.
- An effective communication system like wireless, mobile phones, landline phones will also be available at the mine site all the time.

During the emergency:

The names of contact person	Shri A. B. Singh,
Mobile number of the person	91- 9439366801
Nearest fire stations	Barbil
Hospitals:	Kiriburu (SAIL HOSPITAL)
Police station:	Kiriburu

8.5 CARE AND MAINTENANCE DURING TEMPORARY DISCONTINUANCE:

In case of any temporarily discontinuous following care and maintenance shall be taken as given below:

- Notice of temporarily discontinuance shall be send to the Controller General, Controller of mines and the Regional Controller of mines in form-D.
- All the relevant plans and sections shall be maintained and submitted if the same is required. Maintenance of light and heavy machineries shall be carried out and if required these machines may be engaged in other place for the mining purpose in other unit of our company.
- To take care of the infrastructure adequate security personnel shall be kept in case of any temporary discontinuation.

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Qualified Person

- The entry of the pits would be fenced with Notice Board at the fences prohibiting entry into any of the pits by unauthorized persons.
- The boundaries of the pits would be fenced off to prevent cattle entering any of the pits.

8.6 Financial Assurance:

The area disturbed due to different activities and area reclaimed & rehabilitated have been given in a tabular form as below. Also, a plan is support of below table is submitted herewith as **Plate – 17.**

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

Sl. No a	Head b	Area put in use at the start of plan (Existing land use) c	Additional requirement during plan period. d	Total e e = (c + d)	Area considered as fully reclaimed & rehabilitated f	Net area considered for calculation g g = (e –f)
1.	Area to be excavated.	28.070	13.825	41.895	Nil	41.895
2.	Storage for top soil.	00	00	00	00	00
3.	Overburden dump.	0.389	0.00	0.389	00	0.389
4.	Mineral storage	00	00	00	00	00
5.	Infrastructure (Workshop, administrative building).	0.300	00	0.30	000	0.30
6.	Roads.	5.600	00	5.60	00	5.60
7.	Railways	00	00	00	00	00
8.	Green Belt	2.500	2.00	4.50	00	4.50
9.	Tailing Pond	00	00	00	00	00
10.	Effluent Treatment Plant	00	00	00	00	00
11.	Mineral separation plant (Washing plant)	00	00	00	00	00
12.	Township area	00	00	00	00	00
13.	Others to specify. Sub-grade stack	1.492	000	1.492	000	1.492
14.	Garland drain, Parapet wall etc	00	0.16	0.16	00	0.16
15.	Reclamation	0.230	0.00	0.23		0.23
Total		38.581	15.985	54.566	000	54.566

(Dr. G. S. Jaiswal)
Qualified Person

Computation for financial Assurance

Net area considered for financial assurance - 54.566 Hectares

Now, As per recent gazette notification No.137, dated 27 Feb 2017 Under rule 27 of MCDR, 2017 the financial assurance is calculated to be 54.566 Ha x Rs.300,000/- = Rs. 16369800.00/-

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As per calculation, a fresh financial assurance in the form of Bank guarantee for this Review of mining plan period for Rs. 1,63,69,800 (One Crore Sixty three Lakhs sixty nine Thousand eight hundred) is required. Bank Guarantee of Rs 1,65,00,000.00 is annexed herewith as **Annexure – XXII**

a) List of Certificates and Undertaking.

Certificates and Undertaking are given at Part-B of the text.

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19/05/2017
क्षेत्रीय खान नियंत्रक
Regional Controller of Mines
भारतीय खान ब्यूरो
Indian Bureau of Mines

(Dr. G. S. Jaiswal)
Qualified Person

PART - B

RJM

THE RAMESHWARA JUTE MILLS LIMITED

Registered Office : 'Birla Building', 9th Floor, 9/1, R. N. Mukherjee Road, Kolkata-700 001 Phone No. : 033-30573700 / 30410900 (Extn. 1883)
Website : rameshwarajute.com CIN : L17119WB1935PLC048111 E-mail : rjm.ho@rjm.co.in Fax No. : 033-22109455

CONSENT LETTER FROM APPLICANT

The Review of Mining Plan in respect of Baraiburu-Tatiba Iron & Manganese Mine over an area of 258.98968 Hectares, village- Baraiburu & Tatiba, P.O- Via Barajamda Dist: West Singhbhum, State: Jharkhand, under Rule 17(2) of MCR, 2016 has been prepared by Qualified Person Dr. Gurupinder Singh Jaiswal.

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

Dr Gurupinder Singh Jaiswal
011, Vidyapati Tower,
Road No – 7, Ramnagar,
P.O. Sonari–831011,
Dist.-Singhbhum (East) Jharkhand.
Ph. No. 0657 – 2309730.

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

Signature of the applicant
in full:

Name in full
Block letters: **(H. C. DAGA)**
Director

Place: Kolkata
Date: 25.04.2017

RJM
THE RAMESHWARA JUTE MILLS LIMITED
Registered Office : 'Birla Building', 6th Floor, 9/1, R. N. Mukherjee Road, Kolkata-700 001 Phone No. : 033-30573100 / 30410900 (Extn. 1663),
Website : rameshwarajute.com CIN : L17119WB1939PLC048111 E-mail : rjm.hol@rjm.co.in Fax No. : 033-22109455

DECLARATION

It is Certified that the Progressive Mine Closure Plan of Baraiburu Tatiba Iron & Manganese Ore Mine of M/s The Rameshwara Jute Mills Limited over an area of 258.98968 Hectares complies with all statutory rules, Regulation, 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.

For Baraiburu Tatiba Iron & Manganese Ore Mine

H.C. Daga
(Director)

Place: Kolkata
Date : 25.04.2017

Delhi Office : 4th Floor, UCO Bank Building, 5, Parliament Street, New Delhi – 110001 Ph. No. 011-2371 2616 E-mail : rjm.del@rjm.co.in
Admin Office (Mines) : P.O. : Barbil, Dist : Keonjhar, Odisha, Pin : - 758035, E-mail : rjm.barbil@rjm.co.in, Phone No. 06767-270340
Mines Division Office : Post : Baraiburu, Via Bangiposhi, Dist. West Singhbhum, Jharkhand - 833 221

RJM
THE RAMESHWARA JUTE MILLS LIMITED
Registered Office : Birla Building, 9th Floor, 9/1, R. N. Mukherjee Road, Kolkata-700 001 Phone No. : 033-30573709 / 30610800 (Extn. 1863)
Website : rjmeshwarajute.com CIN : L17119WB1933PLC046111 E-mail : rjm.ho@rjm.co.in Fax No. : 033-22130400

CERTIFICATE

"The Provision of Mines Act, Rule and regulations made there under have been observed in the Review of Mining Plan over an area of 258.98968 hectares in West Singhbhum District in Jharkhand State belonging to Baraiburu Tatiba Iron & Manganese Ore Mine and where specific permissions are required, the applicant will approach to the D.G.M.S. Further, standards prescribed by D.G.M.S. in respect of miners' health will be strictly implemented".

for Baraiburu Tatiba Iron & Manganese Ore Mine

H.C. Daga

H.C. Daga
(Director)

Place: Kolkata

Date : **25.04.2017**

Delhi Office : 4th Floor, UCO Bank Building, 5, Parliament Street, New Delhi - 110001 Ph. No. 011-2371 9618 E-mail : rjm.del@rjm.co.in
Admin Office (Mines) : P.O. : Barbil, Dist. : Keonjhar, Odisha, Pin. - 758035, E-mail : rjm.barbil@rjm.co.in, Phone No 06761-275249
Mines Division Office : Post : Baraiburu, Via Barajamda, Dist. West Singhbhum, Jharkhand - 833 221

RJM

THE RAMESHWARA JUTE MILLS LIMITED

Registered Office : 'Birla Building', 8th Floor, 9/1, R. N. Mukherjee Road, Kolkata-700 001 Phone No. : 033-30573700 / 30410900 (Extn. 1662), Website : rameshwara@rjm.com CIN : L17119WB1933PLC046111 E-mail : rjm.hoc@rjm.co.in Fax No. : 033-22109455

UNDERTAKING

Regarding approval of the Review of Mining Plan in respect of Baraiburu-Tatiba Iron & Manganese Mine over an area of 258.98968 Hectares, village- Baraiburu & Tatiba, P.O- Meghahatuburu, Dist: West Singhbhum, State: Jharkhand.

We do hereby undertake that

a) Baraiburu-Tatiba Iron & Manganese Mine over an area of 258.98968 Hectares, village- Baraiburu & Tatiba, P.O – Via Barajamda Dist: West Singhbhum, State: Jharkhand has been granted in the name of M/S The Rameshwara Jute Mills Limited.

b) There is no any other mining lease in the name of M/S The Rameshwara Jute Mills Limited either in Jharkhand State or out of Jharkhand State.

c) If there is any change in the name/address/partnership in respect to the above said mine, during the pendency of approval, the same shall be informed promptly to the IBM authority with immediate effect.

d) I am working as Director in M/S The Rameshwara Jute Mills Limited.

For Baraiburu Tatiba Iron & Manganese Ore Mine

H.C. Daga
(Director)
M/s The Rameshwara Jute Mills Limited

Place : Barbil.
Date : 25.04.2017

Delhi Office : 4th Floor, UCO Bank Building, 5, Parliament Street, New Delhi - 110001 Ph. No. 011-2371 0616 E-mail : rjm.do@rjm.co.in
Admin Office (Mines) : P.O. : Barbil, Dist. : Keonjhar, Odisha, Pin : 758035, E-mail : rjm.barbil@rjm.co.in, Phone No. 06767-275348
Mines Division Office : Post : Baradburu, Via Barajamda, Dist. West Singhbhum, Jharkhand - 833 221

CERTIFICATE

This is to certify that the provisions of M.C.D.R. 2017 have been observed in the preparation of Review of Mining Plan & Progressive Mine Closure Plan of Baraiburu Tatiba Iron & Manganese Mine of M/s the Rameshwara Jute Mills Limited over an area of 258.98968 Hectares, in village- Baraiburu & Tatiba, District- Singhbhum West, State: Jharkhand, and wherever specific permission is required, the applicant/ Mine Owner will approach the concerned authorities of Indian Bureau of Mines.

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

Jaiswal

Signature of the Consultant
Dr Gurupinder Singh Jaiswal
Qualified person

Place: Jamshedpur.
Date: 29.04.2017

Jaiswal

(Dr. G. S. Jaiswal)
Qualified Person

CERTIFICATE

This is to certify that the plan and section prepared for the Review of Mining Plan under Rule 17(2) of MCR, 2016 of Baraiburu Tatiba Iron & Manganese Mine of M/S The Rameshwara Jute Mills Limited over an area of 258.98968 Hectares, village-Baraiburu & Tatiba, Dist: Singhbhum West, State: Jharkhand, are on the basis of authenticated Lease Map.

(Dr Gurupinder Singh Jaiswal)
Qualified person

Place : Jamshedpur.
Date : 29.04.2017.

(Dr. G. S. Jaiswal)
Qualified Person