SCHEME OF MINING

(Submitted under Rule – 12 of MCDR, 1988)

Along With

PROGRSSIVE MINE CLOSURE PLAN

(Submitted under Rule – 23B of MCDR, 1988)

Of

BHANJAPALI IRON MINE

Over an area of 18.00 hectares in villages Bhanjapali under Bonai subdivision ofSundargarh District, Odisha
Lease period-01.04.1997 to 31.03.2027
Forest land-12.565 ha
Non-forest land-5.435 ha

Mining Scheme period - 2012-13 to 2016-17.

Category - A "OTFM"

for and on behalf of

Sri Jitendra Nath Patnaik

Keonjhar

Approved vide letter no. MS/OTFM/38-ORI/BHU/2013-14 dated. 04.07.2014

PREPARED By

DEBASISH GOUDA

I.B.M.Regd.No. RQP/CAL/231/95-A.
58, Kharavel Nagar,
Bhubaneswar – 1

J. N. PATNAIK

MINE OWNER

DNA KELA, JODA
IST-KEONJHAR, ODISHA
N - 758 038

Phone : 272091, 272101
273727, 273700 (Joda)
265417 (Keonjhar)
2419734 (Bhubaneswar)
FAX : (06767) 273807 / 273727
E-mail : jnp_joda@rediffmail.com

Ref. No....................   Date......................

CONSENT LETTER FROM THE APPLICANT

The Mining Scheme in respect of "Bhanjapali Iron ore Mines" over an area of 18.00 hectares in Village Bhanjapali under Bonai Sub-division, of Sundargarh District, Odisha has been prepared by RQP Sri Debasish Gouda, having Regd. No. - RQP/CAL/231/95/A, of M/s. Envomin Consultant (Pvt.) Ltd. Bhubaneswar, Odisha. I request the Regional Controller of Mines, IBM, Bhubaneswar, Govt. of India to make further correspondence regarding approval of the Mining Scheme with the RQP in the following address.

Sri Debasish Gouda
M/s. Envomin Consultant (Pvt.) Ltd.
58, Kharavel Nagar
Bhubaneswar - 751001.
Ph. No. - 0674-2394518, 2396708(fax)

I hereby undertake that, the Mining Scheme prepared by the RQP, be deemed to have been made with my knowledge and consent and shall be acceptable to me and binding on me in all respect.

Place :- Joda
Date :-- 12/05/2014.

SRI JITENDRANATH PATNAIK
(Mines Owner)
At/PO: Baneikala
Dist: Keonjhar

J. N. PATNAIK

MINE OWNER

BONAIKELA, JODA
DIST-KEONJHAR, ODISHA
PIN - 758 038

272101
273700 (Joda)
255417 (Keonjhar)
2419734 (Bhubaneswar)
FAX : (06767) 273807 / 273727
E-mail : jnp_joda@rediffmail.com

Ref. No.................... Date......................

CERTIFICATE

"The provision of Mines Act, Rules and Regulations made there under have been observed in the mining Scheme of " Bhanjapali Iron ore Mines" over an area of 18.00 hectares in Village Bhanjapali in Bonai Sub-division, Sundargarh District, of Odisha, belonging to Sri Jitendranath Patnaik and wherever specific permissions are required, the applicant will approach the D.G.M.S. Further, standards prescribed by DGMS in respect of Miners Health will be strictly implemented."

Place : Joda

Date:- 12/05/2014

SRI JITENDRANATH PATNAIK
(Mines Owner)
At/PO: Baneikala
Dist: Keonjhar

CERTIFICATE

In Bhanjapali Iron ore Mines of Sri J.N. Patnaik over an area of 18.00 hectares in village Bhanjapali under Bonai subdivision of Sundargarh district, Odisha

1. Certified that the provisions of Mineral Conservation and Development Rule, 1988 have been observed in the preparation of Mining Scheme and wherever specific permissions are required the Applicant / Mine Owner will approach the Indian Bureau of Mines, Bhubaneswar.
2. Certified that the provisions of Mines Act, 1952, the rules & regulations made there under have been observed in the Mining Scheme and wherever specific permissions are required, the applicant will approach the Director General of Mines Safety.
3. Certified that there is no serious violation of Mines Safety Rules in the mine which may jeopardise human health and safety.
4. Certified that the information furnished in the Mining Scheme are true and correct to best of my knowledge.

Place: Bhubaneswar:

Date:- 12/05/2014

(Debasish Gouda)

Regd. No. RQP/CAL/231/95/A

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Debasish Gouda
Regd. No-RQP/CAL/231/96/A

INTRODUCTION

Development and industrial growth of a country depends to a great extent on the availability of minerals occupies an important place due to its varied use in the production of steel. This project is meant for the exploitation of the Iron ore deposit that occurs within the mining lease hold area of 18.00 hects of Sri Jitendra Nath Patnaik a Private Individual based at Joda, in Keonjhar district, Odisha.

The mining lease was executed in favour of Sri Jitendra Nath Patnaik on 01.04.1997 for a period of 30 years would be expired on 31.03.2027. (A copy of Mining lease deed and grant letter of Govt. of Orissa Department Steel & Mines vide memo no. III(B) SM -9/95-11721. dated 13.12.1996 is attached as Annexure- I). Surface right permission for 14.173 ha out of 18.00 ha. was granted in two phases by District Magistrate & Collector, Sundergarh District vide letter no. 2671/mines dated. 27.05.1997 and 789/mining dated 27.04.2007. (A copy of the same is attached as Annexure-II).

The first Mining Plan was was prepared by Nilamani Datta, Barbil under Rule- 22,MCR 1960 and was approved by the Regional Controller Mines letter no. CAL/SG/FE/MP-459 dated 06.11.1996 for the period of 1997-2002. The 1st mining Scheme for the period of 2002-2007 has been approved by Indian Bureau of Mines, Bhubaneswar vide letter no BBS/SNG/ MS-55 on dated 15.02.2001 under Rule 12 M.C.D.R, 1988, prepared by the RQP, Mr. H.K. Sahoo. 2nd Scheme of Mining has been approved by Indian Bureau of Mines, Bhubaneswar vide letter no MS/OTF-MECH/22-ORI/BHU/2007-08on dated 15.02.2008 under Rule 12 M.C.D.R, 1988, prepared by the RQP, Mr. H.K. Sahoo IBM Regd. No. RQP/CAL/257/97-A for the period of 2007-2012. The scheme of mining has been modified in the year of 2011-12. As per the compliance to the violation under rule13 (1) of MCDR 1988 the modification of approved scheme of mining has been prepared under rule 10 of MCDR 1988 by Mr. P. R. Mishra IBM Regd. No. RQP/BBS/083/2007/A , has been approved by Indian Bureau of Mines, Bhubaneswar vide letter no MSM/OTF.MECH/59-ORI/BHU/2010-11 on dated 07.03.2011. The Lessee has entrusted the job for preparation and approval of 3rd mining scheme and progressive mine closure plan to RQP Debasish Gouda. Regd.no RQP/CAL/231/95-A under

अनुमोदित
APPROVED
4/8/14
क्षेत्रीय खान नियंत्रक
REGIONAL CONTROLLER OF MINES
भारतीय खान ब्यूरो
INDIN BUREAU OF MINES
भुवनेश्वर/BHUBANESWAR

Debasish Gouda
Regd. No. RQP/CAL/231/95-A

rule 12 of MCDR 1988 for the period of 2012 to 2017 with annually average production target of 0.26 million tonne of Iron ore.

The said mining scheme was earlier submitted on 05/09/2012 for the planning period of 2012-13 to 2016-17. But the Mining Scheme was disapproved due to certain technical queries and delay for final submission vide letter No.- SM/OTFM/23-ORI/BHU/2012-13, dated-13.03.2013. The delay for time gap between 2012-13 & 2013-14 was also caused due to joint verification of ORSAC and other statutory officials for the legality of mines.

For obtaining of Environment Clearance, Public hearing is completed and State Level Expert committee of Ministry of Environment & Forest have been recommended for grant of Environmental clearance vide letter no. 827/SEAC-52 dated 01.11.2011. A copy is attached as annexure- V.

For obtaining Forest Clearance of 12.565 ha out of 18.00 ha which is coming under ~~DLC~~ forest land attracts provision of Forest Conservation Act 1980. The forest diversion proposal over 12.565 ha has been submitted at office of the PCCF Govt. of Odisha (A copy of the Forest Department correspondence is attached as Annexure –XII.) The NPV of the entire forest land amounting Rs. 91,72,450/- (Ninty one laks Seventy two thousands Four hundred fifty only) has been deposited in the CAMPA fund.

The lessee Sri Jitendra Nath Patnaik is an individual mine owner & industrialist in sponge iron & steel making. Bhanjapali iron ore mining lease is the only mine in his name in the state of Odisha & there is no other mine in his name. Their registered office is at Joda, in Keonjhar district, Odisha.

Debasish Gouda
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PART – I

CHAPTER – 1

1.0 REVIEW OF MINING PLAN:

1.1 Name of the Mine.

Bhanjapali Iron Ore Mines over 44.477 Acres or 18.00 Hectares in village Bhanjapali under Bonai Subdivision of Sundargarh District, Odisha.

1.2 Particulars of Approval of Mining Plan:

Initially the Mining Plan of Bhanjapali Iron Ore Mines over an area of 18.00 Hectares was prepared by Nilamani Datta, Barbil under Rule- 22,MCR 1960 and was approved by the Regional Controller Mines letter no. CAL/SG/FE/MP-459 dated 06.11.1996 for the period of 1997-2002. But the mining operation commenced from 01.10.1997. The 1ST mining Scheme for the period of 2002-2007 has been approved by Indian Bureau of Mines, Bhubaneswar vide letter no BBS/SNG/ MS-55 on dated 15.02.2001 under Rule 12 M.C.D.R, 1988, prepared by the RQP, Mr. H.K. Sahoo. 2nd Scheme of Mining has been approved by Indian Bureau of Mines, Bhubaneswar vide letter no MS/OTF-MECH/22-ORI/BHU/2007-08on dated 15.02.2008 under Rule 12 M.C.D.R, 1988, prepared by the RQP, Mr. H.K. Sahoo IBM Regd. No. RQP/CAL/257/97-A for the period of 2007-2012. The production as proposed in the approved scheme of mining has been achieved more than the proposal & the development of quarries has been changed from the proposals. The change in development and incompliance to the violation under rule13 (1) of MCDR 1988 the modification of approved scheme of mining is prepared under rule 10 of MCDR 1988 by Mr. P. R. Mishra IBM Regd. No. RQP/BBS/083/2007/A , for the year of 2011-12. has been approved by Indian Bureau of Mines, Bhubaneswar vide letter no MSM/OTF.MECH/59-ORI/BHU/2010-11 on dated 07.03.2011 The Lessee has entrusted the job for preparation and approval of 3rd mining scheme along with Progressive Mine Closure Plan to RQP Debasish Gouda. Regd.no-RQP/CAL/231/95-A under rule 12 of MCDR 1988 for the period of 2012 to 2017 with annually average production target of 0.26 million tonne of Iron ore.

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1.3 Date of Commencement of mining operations:

Mining operation at first was initiated from **01.10.1997.** The mining lease area ~~18.00 ha~~ of this iron ore mine was granted for 30 years, from 01.04.1997 to 31.03.2027: Surface right permission for 14.173 ha out of 18.000 ha was granted in 2 phases by District Magistrate & Collector, Sundergarh District: Mining lease area comprises 12.565 ha DLC forest land which attracts provision of Forest Conservation Act 1980 & Non-forest land is about 05.435 ha.

1.4 Review of compliance position in the mining scheme.

(a) Review of compliance position of salient features of the mining plan and justifications.

Salient features and Justification of the last five years 2007-2012 of the Scheme period has been considered in the approved mining scheme for the period of 2007-2011 and 2011-12 of the modification of on approved scheme of Mining which is as follows:-

(b) Review of Compliance position of Salient Features of the Mining Scheme for Iron ore:

Exploration:

Commitment:

An exploration proposal had been chalked out in the Mining Scheme period, and 26 nos. of boreholes has been proposed at 100mt interval to probe the mineralized zone and area to be proved the barrenness for dumping site.

Year	No of Bore Holes	Achievement
1st Year (2007-08)	4	Nil
2nd Year (2008-09)	5	--do--
3rd Year (2009-10)	5	2 nos.
4th Year (2010-11)	5	Nil
5th Year (2011-12)	7	8 nos.
Total	**26**	**10 nos.**

Compliance: - Actual exploration done in the area is less than the proposed figures. During the mining scheme period of , 10 nos. of boreholes has been carried out. The mines is under temporary suspension since Oct'2010 for want of forest clearance of DLC forest land . Deputy Director of Mines, Koira Circle allowed to dug the bore hole within the lease area vide letter no. 1447/Mines dt. 16.03.2012. A copy is attached as Annexure-XII.

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Total exploration carried out is furnished below & shown

Details of Bore Hole data is attached as Annexure-III

Summery of Bore Hole carried out are tabulated below:-

Name of the Bore hole	Location	Type of Bore hole	Angle of the Bore Hole	Depth in meter	Remarks
BH No-1	3518N, 5679E	Core type	Vertical	17.00	Mineralised Zone
BH No-2	3421N, 5647E	--do--	Vertical	21.00	- do -
BH No-3	3615N,5698E	--do--	Vertical	10.00	- do -
BH No-4	3612N, 5586E	--do--	Vertical	10.00	- do -
BH No-5	3700N,5667E	--do--	Vertical	10.00	- do -
BH No-6	3704N,5584E	--do--	Vertical	18.00	- do -
BH No-7	3655N, 5587E	--do--	Vertical	19.00	- do -
BH No-8	3641N, 5632E	--do--	Vertical	10.00	- do -
BH No-9	3222N,5672E	--do--	Vertical	18.00	- do -
BH No-10	3185N,5683E	--do--	Vertical	20.00	- do -
Total				**153.00**	

Exploitation:

Commitment:

The year wise production of marketable Iron ore and subgrade of iron ore in the approved Mining Scheme were as follows:

Year	Production marketable ore in MT		Production Sub-grade ore in MT	
	Proposal	Achievement	Proposal	Achievement
1st Year (2007-08)	59,080	90,850.00	6330	Generation of sub grade during the plan period has been blended with high grade and dispatched to the consuming industries. Some of the materials has been stacked separately would be marketed during the scheme period
2nd Year (2008-09)	60,900	172477.830	6525	
3rd Year (2009-10)	66,584	230000.62	7134	
4th Year (2010-11)	67,508	115487.22	7233	
5th Year (2011-12)	1,64,220	Nil	27,857	
TOTAL	**4,18,292**	**6,08,814.84**	**55,079**	

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Compliances : - The production has been achieved more than the proposal, due to heavy market demand the production of iron ore has been increased. The year wise production of marketable Iron ore and subgrade of iron ore in the approved mining scheme were as follows

Year	Ore from pit in MT	Dump working in MT	Marketable Ore in MT
1st Year (2007-08)	65700.00	25150.00	90,850.00
2nd Year (2008-09)	145677.00	26800.00	172477.830
3rd Year (2009-10)	203101.06	26899.56	230000.62
4th Year (2010-11)	21562.00	93925.22	115487.22
5th Year (2011-12)	Nil	Nil	Nil
TOTAL	**436040.06**	**172774.78**	**6,08,814.84**

Comparison between the Planned production and Actual production.

Year	Proposed in MT	Actual in MT	Deviation
1st Year (2007-08)	59,080	90850	+53%
2nd Year (2008-09)	60,900	172477.830	+183%
3rd Year (2009-10)	66,584	230000.62	+245%
4th Year (2010-11)	67,508	115487.22	+71%
5th Year (2011-12)	1,64,220	Nil	Nil
TOTAL	**4,18,292**	**608814.84**	**+45%**

Deviation: The deviation of production of Iron ore is more than the Actual production of mining scheme period due to heavy market demand. During the 5th year of the scheme period, the production has not been carried out due to the statutory clearances.

Waste management:

Commitment:-

Total of **1,97,507** m^3 waste were supposed to be generated during the Mining Scheme period. The waste was proposed to be dumped in the non mineralized zone of the lease area. The waste to be generated during last five years of approved Mining Scheme is as follows:-

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Year	Quantity of waste in m^3	
	Proposal	Achievement
1st Year (2007-08)	46,590	51,810
2nd Year (2008-09)	23,275	55,675
3rd Year (2009-10)	22,402	68,333
4th Year (2010-11)	21,669	2,427
5th Year (2011-12)	83,571	Nil
Total	**1,97,507**	**1,78,245**

Compliances : - **1,78,245** m^3 Waste was generated from the mines has been dumped on non mineralized zone of the lease area. In the scheme period waste material shall be rehandeled.

Afforestation programme.

Commitment:-

A plantation schedule comprising 2425 no. of saplings was to be programmed in the approved scheme of Mining, on the safety zone and around the road. Yearwise plantation programme is tabulated as follows:-

Year	Proposal		Achievement	
	Area of Plantation in hectares.	Nos of species.	Area of Plantation in hectares.	Nos of species.
1st Year (2007-08)	0.17	425	Nil	Nil
2nd Year (2008-09)	0.2	500	--do--	--do--
3rd Year (2009-10)	0.2	500	--do--	--do--
4th Year (2010-11)	0.2	500	0.2	500
5th Year (2011-12)	0.2	500	Nil	Nil
Total	**0.97**	**2425**	**0.2**	**500**

Compliances : -During the plan period about 0.970 ha area was proposed to be planted with 2425 indigenous species inside the mining lease area . About 500 saplings planted in 2010-2011 with 20% survival rate.

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Reclamation

Commitment

There was no proposal for reclamation by back filling or rehabilitation of mining pit. Extension of the ore body is still in the proposed depth of mining and hence reclamation by back filling will be done only after exhaustion of the ore from the pit.

Compliances : -

There is no deviation observed.

(c) Review of the compliance position of conditions and stipulations imposed if any, while approving the mining plan.

Not Applicable

(d) Review of compliance of violations pointed out after inspections made under MCDR-1988 during last 5 yeras.

Violations & compliances are attached as Annexure-IV

IBM Letter No. & Date	Violation of Rules	Lessee Letter No. & Date	Compliances
ORI/IRON/SNG/MCDR-20/BBS, dt. 19.05.2010	Rule 13 (1) : Bench height in the pit near dump is more than 8m instead of stipulated 5-6m	150(A)/JNP/10-11, dt. 03.07.2010	The OB are removed forming 5-6m benches but the height may vary from 6m when the ore body is touched /encountered. However, the needful shall be done at the earliest.
	Rule 23 (E)(2) : the annual report for 2008-09 for rehabilitation work has not been submitted		No reclamation & rehabilitation are proposed for plan period. The reclamation proposal shall be prepared in the next plan period.
	Rule 29 : the Plan & Sections for 2008-09 has not been submitted		The Plan & Sections for 2008-09 are submitted.
	Rule 45 (1)(c) : the annual return of 2008-09 has not been filled up in revised format, columns are left blank, part V PMV is not given		The annual return of 2008-09 is submitted in the revised format.

Debasish Gouda
Regd. No. RQP/CAL/231/95-A

	Rule 46 : Appointment of Sri N.C Behera as mines manager is not given in form -1.		Notice of appointment of mines manager is submitted in Form-1.
H/11021/2/2010-BBS; dt 01.09.2010	Rule 13(1) : Deviation from the approved Mining Scheme i) No quarry along grid 100S & 00 as proposed ii) During 2009-10 only 2 nos. boreholes have been done against proposed 5 nos. iii) Noplantation in 200-10 against the proposal of 500. iv) Surface plan prepared on 06.04.2010 is not updated.	219/JNP/10-11, dt 17.09.2010	i) The quarry has been developed along grid 00 & 100W due to ore body extension in that area. A RQP is being engaged to submit the modification on approved mining scheme. ii) Pending 3 bore holes shall be made this year. iii) The plantation proposal is changed during preparation of EC, which is under process. iv) The recent working plan couldn't be prepared as the mining activity is suspended by the DDM on 13.08.2010 due to want of EC
T/MISC/1/BBS-2011, dt 10.05.2011	Rule 42(1)(c) : appointment of a part time Mining Engineer & a part time Geologist	39/JNP/11-12, dt. 24.05.2011	The mentioned officials shall be appointed after opening of the mines. Now the mines is closed from 13.08.2010 due to want of EC.
ORI/IRON/SNG/MCDR-20/BBS, dt. 24.07.2012	Rule 12 of MCDR: Preparation of Scheme of Mining.	98/JNP/12-13, dt. 8.08.2012	The scheme of mining is under preparation by RQP, which will be submitted very shortly.
ORI/IRON/SNG/MCDR-20/BBS, dt. 29.11.2012	1. Rule 33(2): Mining operation are not being carried out as per approved scheme of mining 2. Rule 23E(2) : Yearly report of extent of protective measures carried out as approved PMCP has not been sent. 3. Rule 47: Form –J has not been sent to IBM	217/JNP/12-13, dt. 24.12.2012	1. Reclamation and restoration of safety zone will be done as per MMDR Act and statutory Norms. 2. Bench height shall be maintained after reopening of the mines. 3. Form –J has been submitted at IBM.

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(e) Any other points requiring attention in the interest of proper mine design development & conservation and environment & ecology of the area.

Development proposals for production of ore and dumping of waste materials has been made 60m barrier as per 111 of MMR, 1961 along north-western side, western side and south western side of lease area and northern side of lease area for dumping.

Show cause Notice was issued to the mine owner for workings and dumping outside the lease area. The correspondences regarding the encroachment and its compliances between steel & mines dept govt of odisha are attached as Annexure-XIII.

Debasish Gouda
Regd. No. RQP/CAL/231/95-A

PART – II

CHAPTER – II

2 Proposal under scheme of mining for the next five years

2.1. Name and adress of the applicant:

Sri Jitendra Nath Patnaik
At/Po- Joda,
Dist. Keonjhar, Odisha
Ph: 06767- 270106 Fax:06767 -270107

2.2 Name and adress, registration no. Of the recognized person who has prepared the mining scheme.

Shri Debasish Gouda
Regd. No. RQP / CAL /231 / 95 /A
(Valid up to 25.10.2021)
C/o Envomin Consultant (Pvt.) Ltd.
58, Kharavel Nagar
Bhubaneswar - 751001
Tel: - (0674) – 2394518, 2396708 (Fax)
Email- envomin@yahoo.com
A copy of RQP Certificate is attached as Annexure-VIII

2.3. Mineral (s) to be mined:

Mining operation will be continued for production of Iron ore.

2.4. Area and date of expiry of lease:

The area is located within the Latitude: 21^0 54′ 30″ to 21^0 55′ 00″ North and Longitude: 85^0 15′ 03″ to 85^0 15′ 17″ East, Toposheet No:- 73 - G/1 & G/5.

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The leasehold Bhanjpali iron ore mine over an area of 44.477 Acres or 18.000 hectares was owned by Sri Jitendra Nath Patnaik for the period of 30 years w.e.f 1997. The lease was executed on 1st April 1997 for the period of 30 years and the said lease is to be expired on 31st March 2027.

2.5 Date of expiry of 5 year period for which the mining scheme is prepared:

The last Scheme of Mining has been approved by Indian Bureau of Mines, Bhubaneswar vide letter no MS/OTF-MECH/22-ORI/BHU/2007-08on dated 15.02.2008 under Rule 12 M.C.D.R, 1988, prepared by the RQP, Mr. H.K. Sahoo IBM Regd. No. RQP/CAL/257/97-A for the period of 2007-2012. The production as proposed in the approved scheme of mining has been achieved more than the proposal due to increase in production, so the production of iron ore has been increased. Also the development of quarries has been changed from the proposals due to large scale development and regularizing the quarry benches. Now the change in development and incompliance to the violation under rule13 (1) of MCDR 1988 the modification of approved scheme of mining is prepared under rule 10 of MCDR 1988 by Mr. P. R. Mishra IBM Regd. No. RQP/BBS/083/2007/A , for the year of 2011-12. has been approved by Indian Bureau of Mines, Bhubaneswar vide letter no MSM/OTF.MECH/59-ORI/BHU/2010-11 on dated 07.03.2011 Now, the Lessee has entrusted the job for preparation and approval of mining scheme and progressive mine closure plan to RQP Debasish Gouda. IBM Regd.no RQP/CAL/231/95-A. under rule 12 of MCDR 1988 for the period of 2012 to 2017.

Debasish Gouda
Regd. No. RQP/CAL/231/95-A

CHAPTER – III

3.0 RESERVE & EXPLORATION

3.1 Category wise reserves estimated earlier in the mining plan with grade.

In the last approved Mining Scheme and modification of the scheme of mining the reserve were estimated under proved, probable and possible category for iron ore. The geological reserves has been estimated by cross sectional area method. The cut off grade had been maintained at 58% of Fe for iron ore. However, the reserve with grade as summarized in the previous mining scheme is as follows (Ref. Table 3.a).

Based on the above parameters, the reserve were calculated for iron ore as per approved mining Scheme which has been computed on 01/04/2007.

Geological Reserves:- **Table No. -3(a)**

Category	Insitu Iron ore in MT	Float Iron ore in MT	Total (MT)
Proved (A)	4,94,900	1,01,920	5,96,820
Probable (B)	4,15,940	--	4,15,940
Possible (C)	5,23,600	--	5,23,600
Total (A+B+C)	**14,34,440**	**1,01,920**	**15,36,360**

Mineable Reserve: **Table – 3(b)**

Category	Insitu Iron ore in MT	Float Iron ore in MT	Total (MT)
Proved (A)	4,05,580	89,936	4,95,516
Probable (B)	3,49,720	--	3,49,720
Possible (C)	4,33,300	--	4,33,300
Total (A+B+C)	**11,88,600**	**89,936**	**12,78,536**

3.2 Depletion of reserves during mining scheme period:

No reserve has been depleted during the modification of approved scheme of mining due to closure of mines, but reserve has been depleted in the last Mining Scheme as follows:-

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Table – 3(c)

Year	Marketable Ore in MT
1st Year (2007-08)	65700.00
2nd Year (2008-09)	145677.00
3rd Year (2009-10)	203101.06
4th Year (2010-11)	21562.00
5th Year (2011-12)	Nil
TOTAL	**436040.06**

During approved scheme period from 2007-2012, a total tune of 436040 MT of Iron ore has been depleted from the total reserve. Up to date geological reserve for Iron ore is to be of the order of 15,36,360 MT – 436040 MT = 11,00,320 MT.

3.3. Additional reserves established category wise:

The additional reserve has been established based upon the 30 numbers of DTH boreholes which were dug up to the last Scheme period i.e. 2011-12. So the limit of ore reserve has been considered up to maximum level of the ore encountered in the bore hole and the extension of quarry exposures in vertical direction. The topography of the area has been resurveyed, lateral extension and vertical extension from the available datas has been taken into consideration to revise the reserve of iron ore in the lease area.

Category wise updated reserve with grade:

3.4.1 Basis of Estimation:

The area is evaluated on the basis of surface geological mapping; number of working quarries and reserves are estimated by cross-sectional area method. [Ref.: Geological Plan & Sections, Plate No. IV & IV (A)]. Detailed observation from the working quarries & bore holes, updated depths of G_1 and G_2 limits are taken into account.

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The norms or basis for calculating the reserve are as follows:-

1. The G_1 level has been considered
   i. 25mt as lateral influence from quarry ends and existing boreholes.
   ii. as vertical influence. maximum depth attained by quarries, mineralized horizons of bore holes
2. The G_2 level has been considered 5 m below the G_1 level where the bottom of the ore body is not proved in vertical wise & 25 m in lateral wise from the exposed quarry pit beyond G_1 category and exposed virgin area.
3. Bulk density has been considered as 3.5t/m^3 for the compact ore.
4. The cut-off grade has been considered 55 % of Fe content.
5. The sub grade ore has been taken 45% Fe to 55% Fe content.
6. The mineable reserve has been considered by excluding the reserve blocked under safety zone and pit slope.

3.4.2. Method of reserve estimation

The reserve estimated is based on cross sectional area method. The following formula is used for computation of reserve.

Reserve in MT = C x I x RF x BD

Where C = Cross section Area

I = Length of influence

RF = Recovery factor

BD = Bulk Density

3.4.3 Reserves:

i. Mineralised zone has been considered as per the surfacial exposure, existing quarry and bore hole datas and accordingly reserve has been calculated.
ii. The Estimation of mineable reserve has been done by excluding reserve blocked under safety zones/pit slope from the geological reserve.
iii. The thickness of ore of the area has been taken in accordance with the borehole data and depth of existing quarry.

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iv. The average bulk density is taken as 3.5 .

v. The recovery factor has been considered 70% of the total excavation as per the submitted past mining datas generated in course of mining (annual return submitted for 2008/9 ,2009/10 and 2010/11 ref annexure –xv) which is above 45% Fe content. The yearwise production of ore and waste during 2008-09 to 2010-11 as given in annual return has been tabulated below:

Year	ROM in MT	Production (+ 60% Fe) in MT	Waste (+55% Fe) in MT	Percentage of Recovery
2008-09	2,18,477	1,45,677	72800	66%
2009-10	3,04,701	2,03,101	101600	66%
2010-11	1,30,247	1,05,797	24450	81%

Based on the above, the recovery is assumed to be 70%.

vi. Out of the 70% total excavation ,80% is considered as marketable ore containing 55% Fe and 20% considered as subgrade with Fe content +45 to -55% Fe.

vii. 30% of the total excavation has been considered as complete waste i.e. Fe content <45%.

3.4.4. Categorization of Reserves:

Proved:-

a. The geological reserve sections from 3200 E (X_1Y_1) to 3800E (X_6Y_6) on the E-W grid line have been considered for estimation proved reserve.

b. The G_1 level has been considered lateral and vertical influence of maximum depth attained by quarries and mineralized horizons of bore holes.

c. Influence of bore hole for proved limit has been considered is about 25 m laterally from the bore holes and also from quarry exposures.

Probable: -

a. The geological reserve sections from 3200 E (X_1Y_1) to 3800E (X_6Y_6) on the E-W grid line have been considered for estimation proved reserve.

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b. The G_2 level has been considered 5 m **below the** G_1 level where the bottom of the ore body is not proved in vertical wise & 25 m in lateral wise from the exposed quarry pit beyond G_1 category and exposed virgin area.

3.4.5. Grade :

The Bhanjapali Iron ore Mines are mainly consist of Float iron ore respectively.

i. The geological reserve has been estimated taking the recovery factor of Iron ore as 70% of the total excavation and balance 30% has been considered as waste .

ii. Out of the geological reserve 80% has been considered as marketable ore contenting + 55 % Fe .

iii. Balance 20% is considered as sub grade contening between 45 % Fe to 55% Fe.

Chemical Constituents (%)	Iron Ore
Fe	61.33
SiO2	8.88
Al2O3	1.75
Phosphorous (P)	0.039
Sulphur(S)	0.007

Chemical Analysis report is attached as Annexure- IX

3.4.6. Supporting Plans and sections:

The geological plan and cross sections of the area are furnished in Plate – IV and IV (A).

3.4.7. *Mineable Reserve:*

As can be seen from Geological sections certain quantity of iron ore will be blocked due to overall pit slope of 40^0 and 7.5m zone around the M. L. boundary. While assessing mineable reserves of the deposit have been calculated after excluding the safety zones and bench sloping.

Geological Resources for Iron ore	2.769 million tones
Mineable Reserve for Iron ore	2.261 million tones

Mine has been planned for a projected maximum production of 0.26 million tonne per annum of iron ore. Total estimated mineable reserve within the area is 2.261 million tonnes for iron ore. Estimated total production of ore during five years would be 0.568 million

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tones. Therefore, remaining reserves are 1.693 million tonnes would be depleted within about 6.5 years say 7 years with respect to the projected production of 0.26 million tonne per annum. Therefore, anticipated life of the mine would be 7+3 = 10 years (up to financial year of 2024). However change in the reserve figures will be there with further exploration and exploitation, by which the life of mines shall be changed by some years.

Grade wise recovery of Resources:-

In order to access the gradation of Iron ore reserve within the lease area, considering the analysis report of bore holes and existing Quarries. Taking an account of calculation from past mining data, out of total geological resources 80% considered as iron ore contain between 45-55% Fe and balance 20% contain between 45-50% Fe as sub-grade reserve.

Grade Geological resources -

Category	Total Geological Reserve in MT	Iron ore in MT + 55% Fe	Iron ore in MT 45%-55%Fe
A	**B**	**E=(Bx0.80)**	**C= (Bx0.20)**
Resouces under 331	24,01,980	19,21,584	4,80,396
Resouces under 332	3,67,500	2,94,000	73,500
Total	**27,69,480**	**22,15,584**	**5,53,896**

Grade wise Mineable Reserve calculated from the section:-

Category	Total Mineable Reserve in MT	Marketable ore in MT + 55% Fe	Sub Grade in MT 45%-55%Fe
A	**B**	**C= (Bx0.08)**	**D=(Bx0.20)**
Reserve under 112	20,49,180	16,39,344	4,09,836
Reserve under 122	2,11,974	1,69,579	42,395
Total	**22,61,154**	**18,08,923**	**4,52,231**

During the course of past mining, the iron ore has been found in the old dump which can be used after screening of waste materials by rehandling. The recovery percentage of ore,

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contain 30% from the total volume of waste out of which 40% is considered as + 55%Fe and 60% as 45% to + 55%Fe sub-grade. In the present scenario the screening of waste dump materials is a scientific process for augmentation of production of ore in the mine. So it will be planned to continue rehandle two dumps with install of screening plants in the lease area, so as to add the production of ore to that from mines. The details of ore will be recovered from dumps are as follows.

Dump No.	Surface area in sqm.(A)	Height in mtr. (B)	Volume in cum. (C)	Reserve in MT D=(CX30% X3.5)	Iron ore in MT + 55% Fe E=(DX40%)	Iron ore in MT 45%-55%Fe F=(DX60%)
Dump No.- I	14122	17	240074	252078	100831	151247
Dump No.- 2	4888	10	48880	51324	20530	41059
	Total		288954	303402	121361	192306

Summarized figures of Reserves as on 01.04.2014 as follows:-

Category	Geological Reserves in MT	Mineable Reserve in MT
Proved(G_1)	24,01,980	20,49,180
Probable(G_2)	3,67,500	2,11,974
Total	**27,69,480**	**22,61,154**

..OLOGICAL RESERVE UNDER (331) OF IRON ORE. **TABLE - 3(d)**

	C/S area	Length of influence	Volume of Ore	Recovery Factor	Bulk density	Geological Reserve	High Grade + 55% Fe	Low Grade 45-55%Fe
	(m^2)	(m)	(m^3)	%	t/m^3	(t)	(t)	(t)
	B	C	D	E	F	G (DxExF)	H (Gx0.8)	I(Gx0.20)
[illegible]	1280	100	128000	70	3.5	313600	250880	62720
(X_4Y_4)	2540	100	254000	70	3.5	622300	497840	124460
(X_5Y_5)	2260	100	226000	70	3.5	553700	442960	110740
(X_6Y_6)	1220	100	122000	70	3.5	298900	239120	59780
(X_7Y_7)	1680	100	168000	70	3.5	411600	329280	82320
(X_8Y_8)	1030	80	103000	70	3.5	201880	161504	40376
		TOTAL				**24,01,980**	**19,21,584**	**4,80,396**

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GEOLOGICAL RESERVE UNDER (332) OF IRON ORE. TABLE - 3(e)

…ction …sidered	C/S area	Length of influence	Volume of Ore	Recovery Factor	Bulk density	Geological Reserve	High Grade + 55% Fe	Low Grade 45-55%Fe
	(m^2)	(m)	(m^3)	%	t/m^3	(t)	(t)	(t)
A	B	C	D	E	F	G (DxExF)	H (Gx0.8)	I(Gx0.20)
N (X-Y_2)	260	100	26000	70	3.5	63700	50960	12740
N (X_4Y_4)	360	100	36000	70	3.5	88200	70560	17640
N (X-Y_5)	400	100	40000	70	3.5	98000	78400	19600
N (X_6Y_8)	600	80	60000	70	3.5	117600	94080	23520
		TOTAL				3,67,500	2,94,000	73,500

…INEABLE RESERVE UNDER (121) OF IRON ORE. Table No. -3(f)

… …ered	C/S area	Length of influence	Volume of Ore	Recovery Factor	Bulk density	Mineable Reserve	High Grade + 55% Fe	Low Grade 45-55%Fe
	(m^2)	(m)	(m^3)	%	t/m^3	(t)	(t)	(t)
	B	C	D	E	F	G (DxExF)	H (Gx0.8)	I(Gx0.20)
[illegible]	1020	100	102000	70	3.5	249900	199920	49980
[illegible]	2260	100	226000	70	3.5	553700	442960	110740
[illegible]	1880	100	188000	70	3.5	460600	368480	92120
[illegible]	1080	100	108000	70	3.5	264600	211680	52920
[illegible]	1460	100	146000	70	3.5	357700	286160	71540
[illegible]	830	80	83000	70	3.5	162680	130144	32536
		TOTAL				20,49,180	16,39,344	4,09,836

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..NEABLE RESERVE UNDER (122) OF IRON ORE. **Table No. -3(g)**

..ction ..dered	C/S area	Length of influence	Volume of Ore	Recovery Factor	Bulk density	Mineable Reserve	High Grade + 55% Fe	Low Grade 45-55%Fe
	(m^2)	(m)	(m^3)	%	t/m^3	(t)	(t)	(t)
A	B	C	D	E	F	G (DxExF)	H (Gx0.8)	I(Gx0.20)
..N (X_3Y_3)	334	100	33400	70	3.5	81830	65464	16366
..N (X_4Y_4)	664	80	53120	70	3.5	130144	104116	26028
		TOTAL	**49400**			**2,11,974**	**169580**	**42394**

..) MINERAL RESOURCES:

..ssification of Resources as per UNFC System:

..FC system has been adopted to categorize the mineral Resources: For the estimation of different ..neral resources, Occurrences of mineral of intrinsic economic interest, location, grade, quantity, ..logical characteristic etc has been studied in detailed and are given hereunder:

..e UN FRAME CLASSIFICATION consists of a three dimensional grid with following three axes.

(i) Geological Assessment
(ii) Feasibility Assessment
(iii) Economic Viability

The parameters of the above axis are as follows

(i) Geological Axis (G)
- Detailed Exploration (1)
- General Exploration (2)
- Prospecting (3)
- Reconnaissance (4)

(ii) Feasibility Axis (F)
- Feasibility Study (1)
- Pre Feasibility Study (2)
- Geological Study (3)

(iii) Economic Axis (E)
- Economic (1)
- Potentially Economic (2)
- Intrinsically Economic (3)

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i) Proved Mineral Reserve (121):

Detailed geological survey has been carried out, surface exposures have been found, exploration by putting boreholes was carried out, number of pits were opened which later on converted into quarries. The proved (G_1) reserve has been estimated based on the actual thickness of the ore body as exposed in quarry faces and boreholes. Thus, geological axis can be brought under G_1. On feasibility axis, Mining plan was prepared and approved. Further scheme of mining was prepared, Environmental clearance has been recommended by Ministry of Environment & Forest. The forest clearance is under process in government level. Manpower/machine requirement has been estimated based on actual need. Infrastructure resources are already available. Thus, the resources can be brought under F_2. On economic front, the materials already being dispatched to the various consuming industries since last 2 decays, accordingly the grade of the ore is suitability for market value the end use, land use pattern, working plan is already known or designed. Cost of production is Rs. 700.00 and sale value is Rs. 2200.00, profit would be Rs. 1500.00, so it will be economical and the reserves can be brought under E1. Thus Proved reserves can be classified under **121** groups. (Ref Annexure-III,V,VI & IX)

ii) Probable Mineral Reserve (122):

Based on the exploration carried out in the area and also from the nearby working mines, the thickness of this probable zone is considered below the proved zone. Also, lateral extension from the proved zone is considered. This lateral as well as depth extension of the ore body is kept under probable category assuming that the ore body may continue further. Thus, the geological axis can be brought under G2. On feasibility axis, Forest Clearance is still awaited. There will be no displacement. Thus, the resources can be brought under F2. On the economic front, based on previous extraction of ore in the area, the grade of ore is assumed to be the same. Hence it can be grouped under E1. Thus Probable reserves can be classified under **122** groups. (Ref Annexure- III,V,VI & IX)

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ii) Prefeasibility mineral resources (221 & 222):

Detailed geological survey has been carried out, surface exposures have been found, reserve has been estimated as per projection of Bore Hole data. Thus, geological axis can be brought under G2. On feasibility axis, the ore can not been excavated due to the safety precaution, so 7.5 mts along the lease boundary, ore blocked under pit slope has been excluded during the estimation of mineable reserve, the resources can be brought under F2. On economic front, as per the above 112 classified, the reserves can be brought under E1. Thus Prefeasibilty mineral resources can be classified under **221** group. Considering the above matter, the reserve blocked within the probable reserve, has been taken as **222**

As per the above parameters the resource as per UNFC codification as follows:-

TABLE - 3(h)

Classification	Code	Iron ore in MT.
Total Mineral Resources (A+B)		**27,69,480**
A. Mineral Reserves		**22,61,154**
(1) Proved Mineral Reserves	111	---
(2) Probable Mineral Reserves	121	20,49,180
Probable Mineral Reserves	122	2,11,974
B. Remaining Resources		**5,08,326**
(1) Feasibility Mineral Resources	211	---
(2) Prefeasibility Mineral Resources	221	3,52,800
Prefeasibility Mineral Resources	222	1,55,526
(3) Measured Mineral Resources	331	---
(4) Indicated Mineral Resources	332	---
(5) Inferred Mineral Resources	333	---
(6)Reconnaissance Mineral Resources	334	---

3.5. EXPLORATION PROPOSAL:

Exploration already carried out:

There are 30nos of DTH bore holes already carried out till now, out of which 20nos of boreholes was done during 2005-06 and rest were done in during 2012-13.the details of boreholes is appended as Annexure-III.

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Future Exploration

Further exploitation is necessary to prove the strike extension and depth continuity of iron ore zone and also for conversion of G_2 reserve into G_1 category. Since the quarry will be developed in iron ore zone, So additional 33 bore holes has been proposed in 50m grid interval to know the nature of the ore body and depth ward continuity of iron ore zone. The details exploration schedule is given below.

Table – 3(i)

Year	Name of the boreholes	Holes Type	Location	Depth
3rd Year (2014-15)	PBH-1	Core	3800N-5542E	30m or end of the mineralization
	PBH-2	---do---	3800N-5590E	
	PBH-3	---do---	3800N-5636E	
	PBH-4	---do---	3800N-5736E	
	PBH-5	---do---	3750N-5542E	
	PBH-6	---do---	3760N-5600E	
	PBH-7	---do---	3750N-5660E	
	PBH-8	---do---	3700N-5720E	
	PBH-9	---do---	3700N-5860E	
	PBH-10	---do---	3660N-5770E	
	PBH-11	---do---	3600N-5650E	
4^{th} Year (2015-16)	PBH-12	---do---	3566N-5680E	
	PBH-13	---do---	3500N-5572E	
	PBH-14	---do---	3500N-5620E	
	PBH-15	---do---	3500N-5800E	
	PBH-16	---do---	3450N-5600E	
	PBH-17	---do---	3450N-5800E	
	PBH-18	---do---	3430N-5700E	
	PBH-19	---do---	3400N-5600E	
	PBH-20	---do---	3350N-5600E	
	PBH-21	---do---	3350N-5700E	
	PBH-22	---do---	3350N-5800E	
5^{th} Year (2016-17)	PBH-23	---do---	3300N-5600E	
	PBH-24	---do---	3300N-5750E	
	PBH-25	---do---	3300N-5800E	
	PBH-26	---do---	3250N-5600E	
	PBH-27	---do---	3250N-5750E	
	PBH-28	---do---	3250N-5800E	
	PBH-29	---do---	3200N-5620E	
	PBH-30	---do---	3200N-5750E	
	PBH-31	---do---	3200N-5800E	
	PBH-32	---do---	3160N-5740E	
	PBH-33	---do---	3120N-5744E	

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CHAPTER – IV
CONCEPTUAL MINING PLAN

4.0 Conceptual mining plans.

Mine has been planned for a projected maximum production of 0.26 million tonne per annum of iron ore. Total estimated mineable reserve within the area is 2.261 million tonnes for iron ore. Estimated total production of ore during five years would be 0.568 million tones. Therefore, remaining reserves are 1.693 million tonnes would be depleted within about 6.5 years say 7 years with respect to the projected production of 0.26 million tonne per annum. Therefore, anticipated life of the mine would be 7+3 = 10 years (up to financial year of 2024). However change in the reserve figures will be there with further exploration and exploitation, by which the life of mines shall be changed by some years.

4.1 The Ultimate extent & size of the pit

The maximum depth up to which the quarry can be developed economically is considered as the ultimate limit or conceptual extent of the quarry. The depth varies from quarry to quarry as the proved and probable limits of the quarry are different.

The ultimate extent and size of the pit would be as follows

Number of pit	Length in m	Breadth in m	Depth in m	Total Area (LxB) in m^2	Bottom RL of the pit in m
A	B	C	D	E=(BxC)	F
Pit-1	500	154	20	77,000	574
Pit-2	180	154.28	20	27770	568

104,770

4.2. The final slope angle

The individual bench slope would be kept nearly vertical, height and width of the benches would be kept at 6m (Maximum) & 6m (Minimum). The overall quarry slope angle would be maintained at 40^0 to the horizontal during last year of mining as well as at the end of the life of the mine. Till the depth of occurrence of ore is proved, mining would be carried on up to the Proved depth.

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Ultimate pit limit boundaries

In the conceptual stage pits would be developed excluding the 7.5m safety zone along the lease boundary. The ultimate pit limit boundaries around the deposit have been earmarked in the conceptual plan (ref. Plate VIII).

Ultimate capacity of Dumps.

The waste generated during conceptual mining period to be used for construction of road and reclamation of quarry and the remaining materials to be dumped eastern part of the non mineralised lease area as ear marked in the conceptual plan. This will cover an area of 2.1 hects. The ultimate height of dump will be up to 30 mt. The ultimate dump slope should be maintained at 22^0 with individual 37^0.

Details of shape size of the Dump yard at the end of the life of the mine.

Ultimate extent of pit and dump yard			
Features	**LengthxBreadth (mxm)**	**Ultimate area (m^2)**	**Depth/height (m)**
Dump	210x100	21000	30

Land degradation (mining, exploration, dumping etc.), Reclamation/ [afforestation]

[Post] mining reclamation and land use.

[The] aerial extent of the lease area is 18 hectares. At the end of conceptual period (life of [the] mine), an area of 14.469 hectares land is likely to be utilized / degraded due to mining [and] allied activities (excluding plantation & safety zone). As far as present exploration is [concerned], conceptual quarry boundaries have been delineated. However, there may be [possi]bility of occurrence of ore at depth around the exposed mineral zone at depth around [the] exposed ore zone which has been kept to be explored during the remaining part of the [life] of the mine i.e. beyond the planned period.

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The reclamation procedure will start after complete exhaust of minerals in the Pit area. During the conceptual period a total of 10.477 hects of land would be degraded through mining. This would be subjected to backfilling by waste generated from the quarries. The backfilled area would be covered with soil to restore the environmental setup.

The reclamation of the dumps would be carried out systematically. As the dumping of one strip is over the second strip will be taken into use leaving a wide barren. The space left between different phases will be covered by top soil for growing plants in these areas. Moreover dump slopes will also be utilized for plantation in order to prevent damage to the dumps by the surface run-off (rain) water. The breakup of the land use will be as follows:

OPTIMUM LAND USE PATTERN FOR MINING & ALLIED ACTIVITIES

Table No. 4(a)

ITEM	Existing	Scheme Period	Ultimate Period
Mining	7.25	9.50	10.477
Dumping	1.901	2.10	2.10
Road	0.12	0.12	0.12
Site Service	0.849	0.849	0.849
Ore stacking	0.423	0.423	0.423
Subgrade Stacking	---	0.50	0.50
Plantation/green belt	0.50	1.97	3.531
Total	**11.043**	**15.462**	**18.00**

These waste materials available during mining will be dumped eastern part of the non mineralised lease area as ear marked in the conceptual plan. Therefore, top soil and cow dung bio-fertilizer will be utilized for formation of a fertile layer on the top of the waste dump and backfilled area.

Utmost care will be undertaken to ensure the survival & growth of existing trees in the area and drought resistant & fast growing trees will be planted in the reclaimed area over 14.469

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ectares and 3.531 hectares plantation over the virgin land within the conceptual period (ef. Plate – VIII).

he following protection measures are proposed for the dump for safeguarding the nvironment.

- Regular compaction of the active dump top spaces for controlling erosion during rain & ind.
- Maintaining the terraces along the dump slopes for all the time to control erosion and ope failure.
- Erection of retaining wall along the dump slopes for all the time to prevent the slope ilure.
- Construction of garland drain and settling tank to arrest loose materials and to drain n water outside.
- Building of parapet wall of length of 100mt along the dump road to ensure safety in e year 2014-15.

Afforestation:-

per approved mining scheme dust arresting, creation of green belts and block plantation und the lease will be continued during the conceptual plan period. Besides this the waste ps will be planted with adequate number of sapling to avoid erosion of the same. While pting plantation in the dump, the non-active areas will be utilized. A rough estimate cates that plantation will give rise to afforestation of about 3.531 hects of virgin area 14.469 hectares reclaimed area within conceptual period. The scheme and selection of t species are mainly based on the local soil conditions and social accept abilities. The t species which preferably will be nitrogen fixers, pollution abaters, fruit bearing shall be n up for plantation. The species recommended are Diospyros melanoxylon (Kendu), e marmelos (Bel) Gmelina arborea, Gambhari, Albizzia procena (Siris), Mangifera indica go). Madhuca indica (Mahul), Syzigium cumini (Jamu).

g the scheme period afforestation programme will be carried out over an area of 1.05 res of safety zone area and 1.20 hectares in non mineralised area. The plantation l be carried out @ 2500 nos per hectare.

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[illegible]EARWISE PLANTATION: **Table no. 4(b)**

	Srtrip Plantation			Block Plantation		
[illegible]	Area of plantation in hects	No of Saplings.	Location	Area of plantation in hects	No of Saplings.	Location
[illegible] year ([illegible]014–[illegible]15)	0.35	875	North-Western boundary of Safety zone area.	0.40	Near the North-Western boundary	1000
[illegible] year ([illegible]015–[illegible]16)	0.35	875	North-Eastern boundary of Safety zone area.	0.40	Near the North-Eastern boundary	1000
[illegible] year ([illegible]016–[illegible]17)	0.35	875	South-Western boundary of Safety zone area.	0.40	Near the Southern boundary	1000
[illegible]tal	**1.05**	**2625**	---	**1.20**	---	**3000**

[illegible] Waste management.

The waste generated from mines shall be dumped in the northeastern side of the non [illegible]eralized area. The dumping site shall be proved barren by putting bore holes in the 2nd [illegible] of the mining operation. If the dumping site is found to be mineralized, then [illegible]dification under Rule-10 of MCDR, 1988 shall be done. (REF. PLATE-V). The materials [illegible] be transported to the dumping site by dumpers and tippers. Proposed dump will be [illegible] by retreating dumping method. As the dumping of one strip is over, the second strip [illegible] be taken into use leaving a wide barren all around to maintain stability. Each of the [illegible]mp will be properly terraced with 10mt height should be maintained for individual terrace. [illegible] dump shall be covering a height about 30 m in total over an area of 2.10 hects in the [illegible]nceptual period with three terraces. The ultimate dump slope should be maintained at

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22° with individual 37°. Each terrace should have inward slope with catch drains at the inward side of terrace. The catch drains of the individual terrace should be connected to the garland drain out side the periphery of the dump. These catch drains should preferable have half concrete open pipes followed by settling tanks to avoid wash offs. Each terrace have a provision of berms at the outer end to reduce gully formation due to rain water wash offs. The space left between different phases will be covered by top soil for growing plants in these areas. Moreover dump slopes will also be utilized for plantation in order to prevent damage to the dumps by the surface run-off (rain) water.

4.8.1 Nature of waste

The material generated during mining which has no iron content is regarded as waste, it is present within the ore bearing zone. From the borehole data it is found that the intercalated waste comprises mainly of hard ferruginous shale etc.

While considering the nature of the waste two types of rejects are considered

1. Overburden containing mainly soil alluvium, laterite, moroum , BHJ, BHQ etc
2. Off material ore below the 45% Fe content which is without market at present?

It is discussed in the previous chapter that 30% of intercalated waste from the ROM ore shall be generated from the total volume.

Selection of stacking/ Dumping.

Referring to the Geological Plan in Plate - IV, it is noted that at the eastern part of the lease hold there is non mineralized zone which has been proved barren by digging boreholes. This non - mineralised zone has been selected for dumping of wastes. The intercalated waste shall be dumped in the dump site. A retaining wall and deep garland drain is suggested around the dump which allows the clear rain water flowing out of the waste dump area.

Environmental aspects.

The afforestation programme and the reclamation proposal as a part of maintaining balance in the ecosystem. Disposal of waste has been planned with due regard to environmental implications. In order to avoid air pollution arising out of generation of dust,

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water spraying will be done on roads and other points where dust is likely to be generated. Dust due to blasting, however, will not be of any significance to cause set back to the air regime. The average wind speed of the area will be able to diffuse the dust quickly in the air and render it proper for inhalation.

Pollution to water regime will be caused by the run off rainwater from dumps mainly. This has been taken care of by planning a suitable settling pond in close vicinity of the dump. Similarly the ore may contaminate the ground water and surface water accumulated in the quarry floor. This contamination is expected to be so negligible that treatment of the same may not be required.

Though the mines will be worked mechanically there will be use of modern machinery. So the noise pollution will minimal level. The workers in the close vicinity of sources of noise like machinery, diesel pumps compressors etc. will be provided with ear protective devices.

Degradation of land is unavoidable in a surface mining operation. This has been kept into a minimum level by planning more of depth-wise extension of the quarry. Lateral extension has been kept at bare minimum necessary level.

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CHAPTER – V

MINING

5.1 SALIENT DESCRIPTION OF PRESENT MINING METHODS.

After execution of Lease, mining operation was carried out during 1997's by developing some shallow pits. Presently the mining operation has not been carried out due to want of statutory clearance.

Mining was undertaken in a OTFM method with deployment of machines like jack hammer drill, hydraulic excavator, dumper and tipper and development also followed by drilling, blasting, excavation, transportation, communication, sorting, sizing, blending and dispatch. Ten tones capacity tippers are used for transportation of ore to the ore sorting yard and waste to the waste dump.

In the referred Bhanjapali lease area, a total of three nos (3) quarries have been developed here and there by the lessee. Iron ore production has been obtained mainly from Quarry-1,2 & 3 where as Quarry-3/1 which is situated in the eastern side of the lease area are abandoned during last five years. Quarry-1,2 & 3 exposes insitu iron ore mostly the high grade iron ore (+60% Fe) which is suitable for steel as sponge iron plant. The lessee has planed to merge some of the quarries to a single quarry by scientific method to achieve the target production in future. Two nos of active dump are situated north & eastern part of the lease area. Those dumps are old dumps, so salable materials are recovered during the earlier approved scheme period. The temporary stacking have been done near the screening plant, which is situated in the central and southern part of the lease area. The details of existing Quarries & Dumps are follows:-

...rry no.- 1

Status- Active 2

Location- North western part

Area- 18084 sqm.

Nos of Benches- 5 nos.

Top RL- 613.237m.

Bottom RL-569.593m.

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Quarry no.- 2

Status- Active

Location- Central part

Area- 30446 sqm.

Nos of Benches- 8 nos.

Top RL- 611.297m.

Bottom RL- 581.351m.

Quarry no.- 3

Status- Active.

Location-southern part

Area- 10853 sqm.

Nos of Benches- 5 nos.

Top RL- 611.972m.

Bottom RL- 583.822m.

rry no.- 3/1

Status- Abandoned.

Location-North eastern part

Area- 13117 sqm.

Nos of Benches- 4 nos.

Top RL- 597.770m.

Bottom RL- 574.338m.

p no.- 1

Location- Northern part

Area- 14122 sqm.

Nos of Benches- 2nos.

Height of the dump.- 17m.

Top RL-607.449m

Bottom RL-577.993m

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Dump no.- 2

Location- Eastern part

Area- 4888 sqm.

Nos of Benches- 1no.

Height of the dump.- 10m.

Top RL- 597.510m.

Bottom RL- 586.208m.

Existing land use pattern of the lease area as follows:-

ITEM	Existing
Mining	7.25
Dumping	1.901
Road	0.12
Site Service	0.849
Ore stacking	0.423
Plantation/green belt	0.50
Total	**11.043**

Yearly Development Plan Proposed for the next three years (2014-15 to 2016-17)

(Plate – V)

approved mining Scheme period, it was planned to achieve the target production of million tonne for which environmental clearance has been recommended by Ministry of Environment and Forest. So, lessee has planned to achieve same production per annum during the ensuing scheme period.

Method of Mining.

Method of mining will be adopted as open cast, other than fully mechanized with development of bench from top level to ground. In order to achieve the production target capacities of machineries will be deployed in this mine. The mine will be carried out

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OTFM method to provide employment to the labourers near by the villagers of the mine. Where ever any hard formation is encountered then the blasting procedure will be adopted to excavate the ore. The waste generated are generally soft, mainly laterite and morum which will be used as road material. Waste generated from the quarry faces and in course of mining will be heaped 20m away from the face which will be subsequently removed by trucks/tippers to waste dumping yard.

The existing quarries of the lease area will be developed to produce for iron ore. Height and width of the benches will be kept at 6m and 6m respectively for iron ore production. The individual faces of the bench will be kept nearly vertical whereas the overall quarry slope angle (the angle between the line joining the toe of bottom bench and the crest of the top bench with the horizontal) is proposed to be kept at less than 40^0 with the horizontal. Hard iron ore strata will be loosened through drilling and blasting for facilitating the movement of labourers between the benches, appropriate number of foot steps is proposed to be developed. Blasted rocks will be loaded by manually or machines in the tippers. The run-off mine ore is proposed to be developed 10 – 12m wide haul roads are proposed with the gradient of 1:16 to 1:20.

The mining is proposed to be carried out by manually as well as semi mechanised open-cast mining method because of following reason.

a) To deploy the piece rated old workers in the mine

b) The bench length is shorter where frequent shifting of machinery will be required.

c) The sizing and sorting is done by manual laborers.

Use of Machineries.

Mining equipments like Jack hammer, compressor, rock breaker, dumpers and hydraulic excavators shall be used. Processes of excavation and loading of overburden/waste will be done by deploying hydraulic excavators and dumpers, but at the time of need a wagon drill will be used. The ore sorting, picking and stacking shall be done manually.

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Loading and Transportation.

ring the coutse of mining the existing road shall be used for mining and dumping, new road shall be constructed for further extension. These existing mining approach roads are suggested to be intained in a suitable gradient of about 1:20 for the easy movement of trucks and tipper. The ding shall be carried out manual as well as by machineries. Waste will be dispatched to dumping e by using rear dump truck, which will be loaded by excavators capacity of 10 MT payload pacity rear dump trucks shall be used.

Manpower deployment.

There shall be deployment of 150 persons in total both for supervisory personal, management and miners to achieve the targeted production. As the mine belongs to a category A (OTFM) mines, the Lessee will appoint a ten (10) years experienced Geologist and Mining Engineer under Rule 42 (1)(c) of MCDR-1988 (Amended). The distributions of personnel's are as follows:-

- Management and supervisory personnel - 10 persons.
- Skilled Miners - 20 persons.
- Semi skilled Miners - 70 persons
- Unskilled Miners - 50 persons.

Annually Production target of Iron ore 2,60,000 MT for Iron ore will be carried out by deployment of 140 laborers. Thus the planned production would be 867 MT per day, taking the 300 working days in a year. So O.M.S. would be 6.19 MT.

nsidering the above facts it has been planned to be kept continued method of ning on single shift basis. So this mine is a category "A" Other Than Fully chanised.

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2 Yearwise production plan proposed for next three years along with grade.

Method of Development:- All the sections have been prepared across the quarries. The year wise programme has been projected in plate no. V. The slope of the individual bench is proposed to be kept nearly vertical and overall quarry slope in each year and also at the end of the fifth year will be kept at 40^0 angles to the horizontal. Mining approach roads around the quarries has been developed. These existing mining approach roads are suggested to be maintained in a suitable gradient of about 1:20 for easy movement of trucks and tippers. The marketable ore will be dispatched after breaking, sizing, sorting and blending.

The Scheme of Mining was proposed with a production target of 2.60 lakhs metric tones. Mining was undertaken by deployment of machines and manual sorting sizing by labourers and it will be continued with deployment of machines like Jack hammer drill, hydraulic excavator, dumper and tipper. Development also followed by drilling, blasting, excavation, transportation, communication, sorting, sizing, blending and dispatch. Ten tones capacity tippers are to be used for transportation of ore to the ore sorting yard and waste to the waste dump.

The method of mining, drilling, blasting area of degradation for mining and dumping has been kept same as per the approved scheme of mining.

During the scheme, development will be started from the central part of the mineralized zone area and continue towards western side for which concurrent back filling method will be adopted. 7.5m along the lease boundary has been kept as Safety zone.

Recovery of mineable ore has been taken as 70% from the total excavation and balance 30% as waste which is below 45% Fe. i.e threshold. Out of ROM ore, 80% has been considered as marketable ore, this will range from 55-65% Fe with average Fe content of 62%. and 20% has been taken as sub grade, which is 45- 55% Fe content. The average bulk density is taken as 3.5 for iron ore and 2.0 for waste or mineral reject.

Dump rehandling:- During the past mining due to the course of rehandling of the waste materials, the iron ore contains has been found in the old dump after screening the waste

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materials. The recovery percentage of the waste materials of the dump is around 30% out of which 40% is ore containing + 55%Fe and 60% as subgrade. In the present scenario the screening of waste dump materials is a scientific process for augmentation of production of ore in the mine. So it will be planned to continue rehandle all the dumps within the mineralised zone with install of screening plants in the lease area, so as to add production of ore to that from mines. The details of dumps proposed to be rehandled are as follows.

The year wise production from dumps are tabulated as follows:

Table no. – 5(a)

Year	Volume of Waste material to be rehandled in Cum.	Saleable ore in MT +55 % Fe	Subgrade in MT 45 to 55 % Fe	Waste in MT.
A	B	C(Bx0.30x3.5x0.40)	D(Bx0.30x3.5.x0.60)	E(Bx0.70x2)
ear (2014-15)	30230	12697	19045	42322
ear (2015-16)	71843	30174	45261	100580
ear (2016-17)	52462	22034	33051	73446
Total	**154535**	**64905**	**99357**	**216348**

parate year wise five years proposal as follows:-

evelopment during First year of Planned Period (2012-13).

e financial year 2012-2013 of scheme period already lapsed and no working being carried t during this period. So proposal has not been given during the financial year of 2012-13.

evelopment during Second year of Planned Period (2013-14)

e financial year 2013-2014 of scheme period is verge of completion and no working being ried out during this period. So proposal has not been given during the financial year of 13-14.

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Development during Third year of Planned Period (2014-15)

During the plans period of 3rd year, it is proposed to work mainly the existing area over 0.673 hectares, which is situated in the central west side of the lease area and extended towards eastern side. It is proposed to produce 40,572 MT of saleable ore and 10,143 MT of sub grade of iron ore from the proposed quarry and 12697 MT of salable ore & 19,045 MT of sub grade ore from dump working to achieve targeted production. Simultaneous development of benches at the proposed quarry will be developed along section X5Y5 & X6Y6 . At the end of the 3rd year of the scheme period , the floor of the proposed quarry will be maintained at RL 609 m

As working is confined within the existing quarry pit area so, the generation of Top Soil is found nil. The existing haul road as situated within the lease area for transportation of ore & waste to be used in the 3rd year. The method of mining, drilling, blasting practice and dumping have been kept same as per the previous practice.

The details of development, during 2nd year of planned period are explained below :

Particulars	Proposed Iron Quarry
Section Considered	X5Y5 & X6Y6
No. of benches to be developed	X5Y5=1, X6Y6=2
Bottom R.L of benches (m)	X5Y5=609, X6Y6=609
Length of influence (m)	100m
Height and width of the benches(m/m)	6/6
Overall quarry slope	40°

Third year of proposed production of iron ore, waste, sub-grade etc.

Saleable ore	53,269 MT
Sub Grade Ore	29,188 MT
Top Soil	Nil
Over burden	12,000 MT
Intercalated Waste	12,420 MT

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Rehandeled Waste	42,322 MT
Total Waste	66,742 MT
Striping Ratio(Ore:Waste)	1 : 0.81

..evelopment during Fourth year of Planned Period (2015-16)

..uring 4th year of the plan period, it is also proposed to work west-central part of the ..ineralized zone as per 3rd year planning period and extended towards eastern side. It is ..lso proposed to produce 1,19,952 MT of saleable ore and 29,988 MT of sub grade of iron ..re from the proposed quarry and 30,174 MT of saleable ore & 45,261 MT of sub grade ore ..om dump working to achieve targeted production. Simultaneous development of benches ..t the proposed quarry will be developed along section X5Y5, X6Y6 & X7Y7. Further, a new ..enches from RL 609m - 603m are proposed to be developed below the 3rd year limit. At ..e end of the 4th year, the floor of the proposed quarry will be maintained at RL 603m RL

..s most of the working is confined within mainly below the 3rd year of the proposed area ..d existing benches. so, the generation of top soil is found nil. The haul road as proposed .. be developed for transportation of ore & waste in the 3rd year to be used in 4th year. The ..ethod of mining, drilling, blasting and dumping have been kept same as per the previous ..actice. The details of development, during 4th year of planned period are explained ..elow :

Particulars	Proposed Iron Quarry
Section Considered	X5Y5, X6Y6 & X7Y7
No. of benches to be developed	X5Y5=1, X6Y6=1 & X7Y7=1
Bottom R.L of benches (m)	X5Y5=603, X6Y6=603 X7Y7=603
Length of influence (m)	100m
Height and width of the benches(m/m)	6/6
Overall quarry slope	40°

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Fourth year of proposed production of iron ore, waste, sub-grade etc.

Saleable ore	1,50,126 MT
Sub Grade Ore	75,249 MT
Top Soil	Nil
Over burden	9,000 MT
Intercalated Waste	36,720 MT 36 720
Rehandeled Waste	1,00,580 MT 100 580
Total Waste	1,46,300 MT 137,300
Striping Ratio(Ore:Waste)	1 : 0.65

Development during Fifth year of Planned Period (2016-17)

During 5th year of the plan period, it is also proposed to work central part of the mineralized zone as per 4th year planning period and extended towards eastern side. It is also proposed to produce 1,64,052 MT of saleable ore and 41,013 MT of sub grade of iron ore from the proposed quarry and 22,034 MT of saleable ore & 33,051 MT of sub grade ore from dump working to achieve targeted production. Simultaneous development of benches at the proposed quarry will be developed along section X5Y5, X6Y6 & X7Y7. Further, a new benches from RL 603m to 597m are proposed to be developed below the 4th year limit. At the end of the 5th year, the floor of the proposed quarry will be maintained at RL 597m.

As working is confined within mainly below the 4th year of the proposed area so, the generation of top soil is found nil. The same haul road as proposed to be developed for transportation of ore & waste to be used in 5th year. The method of mining, drilling, blasting and dumping have been kept same as per the previous practice.

The details of development, during 5th year of planned period are explained below :

Particulars	Proposed Iron Quarry
Section Considered	X5Y5, X6Y6 & X7Y7
No. of benches to be developed	X5Y5=1, X6Y6=1 & X7Y7=1
Bottom R.L of benches (m)	X5Y5=597, X6Y6=597 X7Y7=597
Length of influence (m)	100
Height and width of the benches(m/m)	6/6
Overall quarry slope	40°

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h year of proposed production of iron ore, waste, sub-grade etc.

Saleable ore	1,86,086 MT
Sub Grade Ore	74,064 MT
Top Soil	Nil
Over burden	3,300 MT
Intercalated Waste	72,540 MT
Rehandeled Waste	73,446 MT
Total Waste	1,49,286 MT
Striping Ratio(Ore:Waste)	1 : 0.57

mery of year wise Generation of Waste **Table no. –5(b)**

Year	**Over burden in mt**	**Intercalatrd waste in mt**	**Rehandling waste in mt**	**Total** 2.
3rd year (2014-15)	12,000	12,420	42,322	**66,742**
4th year (2015-16)	9,000	36,720	1,00,580	**1,46,300**
5th year (2016-17)	6,600	72,540	73,446	**1,52,586**
Total	**27,600**	**1,21,680**	**2,16,348**	**3,65,628**

ERY OF YEAR WISE PRODUCTION FROM PROPOSED QUARRY. Table – 5 (c)

Year	**Saleable ore in MT**	**Sub grade in MT**	**Mineral Reject, I/C Waste in MT.**	**Total Ore in MT**	**RoM Ore in MT**
	+55% Fe.	**45 to 55%Fe.**	**-45% Fe.**	**+45% Fe.**	**56% Fe. (Avg)**
	B	**C**	**D**	**E(B+C)**	**F(B+C+D)**
year(2014-15)	53,269	29,188	54,742	82,457	1,37,199
year(2015-16)	1,50,126	75,249	1,37,300	2,25,375	3,62,675
year(2016-17)	1,86,086	74,064	1,45,986	2,60,150	4,06,136
Total	**3,89,481**	**1,78,501**	**3,38,028**	**5,67,982**	**9,06,010**

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wise production of Iron Table No. 5(d)

	Saleable ore from proposed Quarry in MT	Saleable ore from Dump rehandling in MT	Total Saleable Ore in MT	Sub-grade ore from proposed Quarry in MT	Sub-grade ore from Dump rehandling in MT	Total Sub-grade Ore in MT	Total Production in MT
	+55% Fe.	+55% Fe.	+55% Fe.	45 to 55%Fe.	45 to 55%Fe.	45 to 55%Fe.	+45% Fe.
	B	C	D(B+C)	E	F	G(E+F)	H(D+G)
year -15)	40,572	12,697	53,269	10,143	19,045	29,188	82457
year -16)	1,19,952	30,174	1,50,126	29,988	45,261	75,249	2,25,375
year -17)	1,64,052	22,034	1,86,086	41,013	33,051	74,064	2,60,150
	3,24,576	**64,905**	**3,89,481**	**81,144**	**97,357**	**1,78,501**	**5,67,982**

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SUMMERY OF YEAR WISE PRODUCTION. **Table– 5(e)**

4/8/14
क्षेत्रीय खान नियंत्रक
REGIONAL CONTROLLER OF MINES
भारतीय खान ब्यूरो
INDIN BUREAU OF MINES
भुवनेश्वर / BHUBANESWAR

Section considered	C/S area in Sqm.	Length of influence in m.	ROM ore in cum	Volume of the ore.	Saleable ore in MT	Sub-grade ore in MT	Waste in MT.
B	C	D	E=(CxD)	F=(EX0.70X3.5)	G=(Fx0.80)	H=(Fx0.2)	I=(Ex0.30X2)
3500N(X_5Y_5)	87	100	8700	21315	17052	4263	5220
3600N(X_6Y_6)	120	100	12000	29400	23520	5880	7200
Total			**20700**	**50715**	**40572**	**10143**	**12420**
3500N(X_5Y_5)	245	100	24500	60025	48020	12005	14700
3600N(X_6Y_6)	319	100	31900	78155	62524	15631	19140
3700N(X_7Y_7)	48	100	4800	11760	9408	2352	2880
Total			**61200**	**149940**	**119952**	**29988**	**36720**
3500N(X_5Y_5)	305	100	30500	74725	59780	14945	18300
3600N(X_6Y_6)	372	100	37200	91140	72912	18228	44640
3700N(X_7Y_7)	160	100	16000	39200	31360	7840	9600
Total			**83700**	**205065**	**164052**	**41013**	**72540**
Grand Total			**165600**	**405720**	**324576**	**81144**	**121680**

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3 Any change in proposed method of mining and deployment of machinery.

ring the planned period of approved mining scheme, mining was undertaken in a OTFM thod but in the proposed scheme period, for achievement the production target the ning method will be continued as semi mechanized with deployment of machines like ck hammer, compressor, hydraulic excavator, dumper and tipper and development also owed by drilling, blasting, excavation, transportation, communication, sorting, sizing, nding and dispatch. Ten tones capacity tippers are used for transportation of ore to the sorting yard and waste to the waste dump. Supply of drinking water to storage tank r mining faces, from well, by diesel operated pump. Spraying of water will be done on es road by water tankers.

As indicated earlier and as per the approved mining scheme, the quarry will be eloped by other than fully mechanized means with 6m benches. Bench width will be ntained at 6m too. Therefore the slope of the sides will be maintained at 40°. As the rburden indicates is very less, no more time will be wasted to bring the mine to uctive stage. At the beginning, the existing quarry bench floors will be reshaped to form to planned proper levels at various parts of the quarry as indicated in the plan and tions. Having developed the quarry floor at proper level and production for the following rs will be achieved by shifting the benches. In the process of excavation the quarry area expand laterally. But this lateral expansion is planned to remain within the dimensions n in the mining scheme.

1 Mode of entry.

quarries shall be approached from the southern part of the area by mines road with a dient of 1:16 to 1:20. To approach the fresh area the same road shall be extended rds Quarry as shown in plate no – V.

2. Extent of Mechanisation.

FM method of mining would be adopted. The workings would be carried out with matic benching. Some machinery like Jack hammer and Wagon drill is being used for g in hard faces and boulders. The poclain and loaders (L&T 93CK, Kamastu 200 & 300) also being used as the production increases every year onwards.

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of Mechineries. **Table no. – 5(f)**

PE	MODEL	CAPACITY(CUM)	NOS.
CAVETOR	93CK & KAMASTU 200	0.9	2
ADER	KAMASTU 300	0.9	2
CK HAMMER	ATLAS COPCO	--	2
MPRESSOR	ATLAS COPCO		2
GON DRILL	ATLAS COPCO INGERSONLAND 180	12kgf	1
PER/DUMPER	TATA	4.5	6
TER INKLER	TATA	1000ltr	2
CK BREAKER	---	---	2
BILE SCREEN NT	TEREX	100TPH	3
USHER PLANT	SR 1000	150TPH	1
BULANCE	VAN	---	1
IGH BRIDGE	---	---	1

lation of Dumper/Tipper and Excavator is given below:

Study for Dumper:

(i)	Distance from quarry to the stacking Point of the leasehold	-	0.5Km.
(ii)	Distance of dumping point from the quarry.	-	0.5 Km.
(iii)	Therefore, total distance to be covered by the dumper would be	-	1.0Km.
(iv)	Taking the average speed of dumper in this hilly terrain to be 15 Km/hr, time to travel 1.0 Km would be	-	4.00 mt.
(v)	Total time for travel up & down	-	8.00 mt.
(vi)	Dumpers loading & unloading time	-	3 mt.
(vii)	Therefore, total time for one dumper, Loading + travel + unloading	=	15 minutes.

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[...]lation for nos. of dumpers required :

(i) Dumper availability - 85 %.

(ii) Dumpers Utilisation - 70 %.

(iii) In 8 hr shift, effective working hours for a dumper - 8x0.85x0.70 =4.76 hrs Or 285.6 mt.

(iv) Therefore, in one shift, one dumper would make - $\frac{285.6}{10}$ = 29 Trips.

(v) Quantities of ore carried by one dumper in a shift - 29 x 10 = 290 Tes.

(vi) Maximum projected production = 2,60,000 MT /annum.
= 867 MT/day with 300 working day/year.

(vii) Nos. of dumpers required = 867/ 290 = 3Nos.

Calculation for nos of bucket required for a Dumper.

Rock Type - Hard Rock (0)
Insitu density - 3.5
Coeff. of Swelling - 1.6 (Swell factor)
Coeff. of Back filling - 0.85 (Fill factor)
Bucket Capacity - 0.9 m^3.
Therefore, actual capacity of Single bucket (blank) - 0.9 x 0.85 = 0.765 m^3.
Considering the Coeff. of Swelling Density of 1.6 m^3 broken rock
($1M^3$ insitu = 1.6 M^3 broken)

Therefore, 0.765x3.5/1.6 = 4.2 MT/bucket.

Therefore, nos. of bucket fills required in filling one dumper of 10MT capacity would be =10/4.2= 2Nos.

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Study of a Excavator:

(i) Time taken for sumpting in bucket, scooping for load, roll back at ground with load, lifting the bucket, and unloading on to dumper - 1.0 minute.

(ii) Time taken for 8 buckets loads - 8.0 minute.

(iii) Time taken for positioning the dumper to take the load off the bucket - 1.0 minute.

(iv) Time taken for loading one dumper - 9.0 minute.

(v) Maximum time taken for loading one dumper - 10 minute.

ulation for Nos. Excavator Required:

taken for loading one dumper, i.e., 10 MT is 10 minutes. Since the Excavator is diesel rated, effective working time is taken to be 8 hrs.

Therefore, in 6 hrs the Excavator can handle 480/10 = 48 dumpers.

i.e., 48x10MT = 480MTs.

Projected production is 260000 MT /annum. i.e., 867 MT/day.

of Excavator required 867/480= 2nos.

ers for waste Removal:

Average run of dumper Dumping site is taken to 0.5 Km. therefore, both up and down travel distance would be 1.0 Km.

Therefore, with 15 Km/hr speed, the total travel time of dumper would be.	=	4 minute.
Taking Pay loader of 1 m^3 capacity bucket, and bucket fill factor of 0.85, each load would be	=	0.85 m^3.
Taking the dumpers of 4.5 cum, nos. of bucket fills requited in filling one dumper would be	=	$\frac{4.5}{0.85} = 5.29$

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		say 6 nos
Time taken for dumper positioning, pay loader sumpting in, unloading on to dumper, travel time of dumper, unloading of dumper.	=	4+4+6=14minute.
With 75 % availability, in each dumper would make	=480/1	4=34Trips.
Therefore, one dumper can handle		$34 \times 4.5\ m^3$ $= 153\ m^3$
At the peak ore production of 260000 mt the waste generation shall be 76,743 Cum.	=	$76,743 m^3$/annum or $256\ m^3$/ day.
Nos of dumper required for waste handling	=	256/153 =1.6 nos. say 2 nos.

2nos. of Dumper will be required for waste transportation, taking 1 nos. extra dumper emergency total number of dumper will be required - 3nos.

ulation for Nos. Loader Required:

taken for loading one dumper, i.e., 4.5cum is 10minutes. Since the Loader is diesel rated, effective working time is taken to be 6 hrs.

Therefore, in 6 hrs the Loader can handle 480/10= 48 dumpers.

i.e., 48x4.5 = 216 cum.

waste generation shall be 76743 cum /annum. i.e., 256 cum/day.

Nos of Loader required 256/216= 1.18 nos. say 2 nos.

ng in view of production, 2 nos of loader with 2nos of dumper would be sufficient for purpose.

3. Drilling Parameters

to the nature of the ore, about 60% of the total production will be obtained without ng. Remaining 40% will be blasted with proper development of the benches &

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uggested blasting pattern. Jack hammer drill 32mm dia is suitable for this mines only, but at the time of need a wagon drill can be used.

The drilling details are as follows:

* Diameter of hole	=	100 mm dia
* Burden	=	2.5 m.
* Spacing	=	3 m
* Bench Height	=	6m
* Sub-grade Drilling (10%)	=	0.1m
* Depth of hole	=	6 + 0.1 = 6.1m
* Output / hole	=	Burden x spacing x Bench Height
	=	2.5 x 3 x 6.1
	=	45.75 cum
	=	45.75 x 3.5 (tonnage factor)
	=	160 t
Drill availability	=	80%
Utilization	=	70%
Drilling meterage achievable per day of one shift working	=	50m

4.3.1 Holes Required /Day

Volume of yearly excavation	=	106100cum (ref. production table)
Average daily Excavation	=	106100/300 = 354cum
Average daily Excavation from blasting	=	354 x 40% = 142 cum
No of holes required / day	=	142/45.75 = 3 nos.

Drills Required

Meterage to be drilled	=	3 x 6.1 = 18.3m
No. of drills required to be in operation	=	18.3/50 = 0.4
No. of drill required in all		

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Total = 0.4/ (80% x 70%) = 1nos

...ping in view of production,1 nos of 32mm dia Jack hammer would be sufficient for the ...pose, but at the time of need a wagon drill can be used.

...3. BLASTING:

...e to the nature of the ore, about 60% of the total production will be obtained without ...ting. Remaining 40% will be blasted with proper development of the benches & ...gested blasting pattern.

...3.1. BROAD BLASTING PARAMTER:

...e Jack hammers 32mm dia and Wagon drill 100mm dia to be utilized for drilling. These ...es will be drilled in staggered pattern with burden and spacing of 2.5m and 3m ...pectively.

...power factor of 7 tonne of saleable ore per Kg explosive is considered for estimating ...losive requirement. However, this may suitably be changed depending upon the type of ...e and other site conditions.

...4.2. TYPE OF EXPLOSIVE TO BE USED:

Charging by Explosive and Use

One cartridge of 25mm x 200mm. Nitrate mixtures 80% ANFO mixture charge up to 2/3rd hole length and remaining 1/3rd will be stemmed for a hole.

Detonator: By cordex fuse between hole in series. Cordtex fuse will be detonated by one ordinary detonator and safety fuse for deep hole and for short hole only ordinary detonator and safety fuse.

Stemming material: Clay or clay mixed with sand or lateritic soil.

...e calculation is however made as follows:

Annual production is	=	2,60,000MT
Production to be obtained from blasting	=	2,60,000 x 60%
	=	1,56,000 t
Power factor	=	7t/Kg
Explosive requirement per annum	=	1,56,000 / 7
	=	22,285 Kg

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Storage and Transportation of Explosives

An explosive magazine has been proposed at safety side of the mining lease area. The capacity of the magazine will be as follows:-

Sl. No.	Explosives	Class / Division	Quantity
1.	Nitrate mixture	Class –III	100,00Kg
2.	Safety fuse	Class-VI/Div – 1	30,000m
3.	Detonating Fuse	Class – VI/Div – 2	50,000m
4.	Electric & Ordinary Detonators	Class –VI/Div-3	50,000nos

5.4.4.3. Precautions to be observed during drilling and blasting:

Proper charging, steaming, muffle blasting are proposed against fly rock fragments while other preventive measures like marking within the blasting zone.

There is no residential set up within the specified limits of the blasting zone in the mining areas and therefore no special precaution is necessary. Blasting shelters have been provided as per the statutory provision. The holes being shallow and of 32mm & 100mm diameter, noise is not expected to warrant any special precautions.

Drilling and blasting operations are conducted strictly as per various provision of metalliferous mines regulation 1961 under the supervision of the competent persons. While maintaining the storage and issue of explosive the compliance to the relevant provisions of Indian explosive rules 1983 are observed.

Noise level due to drilling & blasting operation may affect to some extent. In work zone drillers & blaster are proposed to be protected by earplugs. Proposal has also been made to give more stress on plantation in different areas to minimize the noise level.

All the holes are proposed to be blasted by safety fuse firing system to control the blow and vibrations.

Ground vibration can be minimized by reducing the amount of change fired at a time but delay blasting with sufficiently delay interval can cause successive blast to behave independently from each other form the point of view of ground vibration.

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CHAPTER – VI

6.0 HANDLING OF WASTE / SUB-GRADE MATERIAL

Disposal of Mine waste and separate stacking of sub-grade Mineral

ring the proposed mining operation from 2014-17 the quantity of overburden and waste rials will be generated with production of ore are proposed to make arrangement for rate dumping overburden, waste and subgrade materials.

Nature of Waste and rate of yearly generation.

material generated during mining which has no Fe content <45% is regarded as waste, it sent within the ore bearing zone. From the borehole data it is found that the intercalated e comprises mainly of hard ferruginous shale etc. Overburden containing mainly soil um, laterite, moroum , BHJ, BHQ etc

ng this mining operation detail of the waste & overburden materials that will be rated is given below-

MARY OF YEAR WISE TOTAL WASTE GENERATES. Table No – 6(a)

Year	Over burden in cum	Intercalatrd waste in cum	Rehandling waste in cum	Total in cum
3rd year (2014-15)	6000	6210	21161	**33371**
4th year (2015-16)	4500	18360	50290	**73150**
5th year (2016-17)	3300	36270	36723	**76743**
Total	**13800**	**60840**	**108174**	**183264**

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wise generation of overburden of Iron ore **Table No -6(b)**

Year	Section considered	C/S area in Sqm.	Length of influence in m.	Waste in Cum.
A	B	C	D	E= CxD
3rd Year (2014-15)	X_5Y_5	60	100	6000
4th Year (2015-16)	X_6Y_6	45	100	4500
5th Year (2016-17)	X_7Y_7	33	100	3300
	Total			13800

Waste Management:- The waste generated from mines shall be dumped in the eastern side of the non mineralized area. The dumping site shall be proved barren by bore holes in the 3rd year (REF. PLATE-V).

The materials shall be transported to the dumping site by dumpers and tippers. ...sed dump will be built by retreating dumping method. As the dumping of one strip is ..., the second strip will be taken into use leaving a wide barren all around to maintain ...ty. Each of the dump will be properly terraced with 10mt height should be maintained ...ividual terrace. The dump shall be covering a height about 20 m in total over an area ...10 hects in the Conceptual period with two terrace. The ultimate dump slope should be ...ained at 22° with individual 37°. Each terrace should have inward slope with catch ... at the inward side of terrace. The catch drains of the individual terrace should be ...cted to the garland drain out side the periphery of the dump. These catch drains ... preferable have half concrete open pipes followed by settling tanks to avoid wash ... Each terrace have a provision of berms at the outer end to reduce gully formation due ... water wash off. The space left between different phases will be covered by top soil ...wing plants in these areas. Moreover dump slopes will also be utilized for plantation ... to prevent damage to the dumps by the surface run-off (rain) water.

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Arrangement for separate stacking of the sub-grade ore:

ng the mining operation period from the year 2014-17 sub-grade in the tune of ,501 MT ore will be produced. It is proposed to stack this subgrade ore in the separate yards as shown in Development plan.

Sub Grade management:-

sub grade has been considered as less than cut off grade & greater than the threshold , which is 20% of the mineable ore. The sub grade ore shall be stacked separately ear ed in the plan ref Plate No.-VI.

Year wise Subgrade Generation: - **Table no. 6(c)**

Year	Sub grade ore in MT		Total ore in MT
	From Pit	**From Dump working**	
3rd year (2014-15)	10,143	19,045	29,188
4th year (2015-16)	29,988	45,261	75,249
5th year (2016-17)	41,013	33,051	74,064
Total	**81,144**	**97,357**	**1,78,501**

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CHAPTER – VII

7.0 USE OF MINERALS

1 changes proposed in the use of mineral, if any, with reasons.

The ore from this mine is being marketed to the following industries as:

1. Prakash Industries Ltd, Koira
2. Ores Enterprises, Rengalbeda
3. Kalinga Iron Works, Barbil
4. Jaiswal NICO, Raipur
5. Raipur Alloys & Steel Ltd.

How ever no changes are proposed at present in the name of mineral.

2 Changes in the specification imposed by user industries, and/or changes in specifications required by new user industries, if any.

User industries, mentioned above have not imposed the change in the specifications. The iron ore quality as prescribed for the integrated steel plants is as follows:

	CONSTITUTES	SPECIFICATION
Lump (BF)	Fe	60% Min
	Al_2O_3	2.5% Max
	$SiO_2 + Al_2O_3$	4.5% Max
	Size	+10 -30mm
Lump (SMS)	Fe	61% Min
	Al_2O_3	2% Max
	Size	-10 -40/50 mm
Fines (For sinter)	Fe	60% Min
	$SiO_2 + Al_2O_3$	5% Max
	Over size	-(+10 mm) 10% Max
	Under size	-(-1 mm) 20% Max

Efforts made for utilization of Sub grade mineral including fines.

...re of the deposit is such that, it is possible to segregate and prepare the stocks for ...rent grades and qualities. During such process, whatever sub-grade ore is generated, is ...d by blending & no stock leaves.

...rly, fines, generated while mining, are stacked separately, for high market demand, ...s no ore stock in the mine.

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CHAPTER – VIII

8. MINERAL BENIFICATION

Changes proposed in the use of mineral.

re are crushing & screening units exist within the lease area for required size & grade of ore. Establishment of a beneficiation unit is under proposal for mineral conservation of . Details of the processing machinery are furnished, as available, in Table 8.1.

PROCESSINGUNIT

TABLE 8(a)

S.N.	Existing Processing Unit		Status	Proposal
	Nature	Capacity	Quantity	Quantity
1	Mobile Screening unit	100 TPH: 210 HP	03	---
2	Crusher	150 TPH: 350 HP	01	---

Feed size 400 mm max. & out put: -5 +18 mm (60-64%), 10-30 mm, (55-62%), 25-150 mm (55-63%), -5 mm (54-63%).

Broad physical and chemical specification of ore for different end use

The physical and chemical parameters prescribed for different end uses are:

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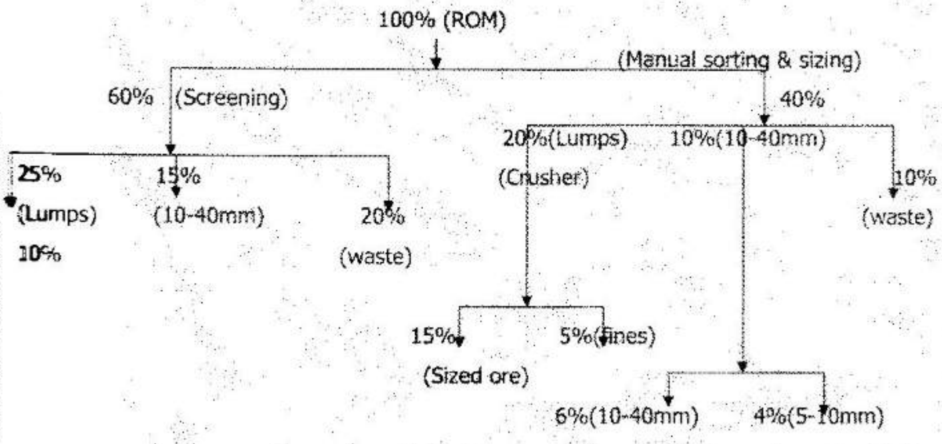
YSICAL & CHEMICAL SPECIFICATIONS OF IRON ORE **TABLE 8(b)**

S.N.	Parameters(%)	Grade of Iron
1	Fe	64-65.0
2	SiO2	2.5 to 5
3	Al2O3	1.5 to 2.5
4	Al2O3 + SiO2	6.5 max
5	Al2O3: SiO2	1.5 max
5	P	0.05
6	S	0.02 max
7	Cu	0.01 max
8	Moisture	5 max
9	Size	05-18 mm

Material Balance flow sheet



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CRUSHING PROCESS FLOW CHART

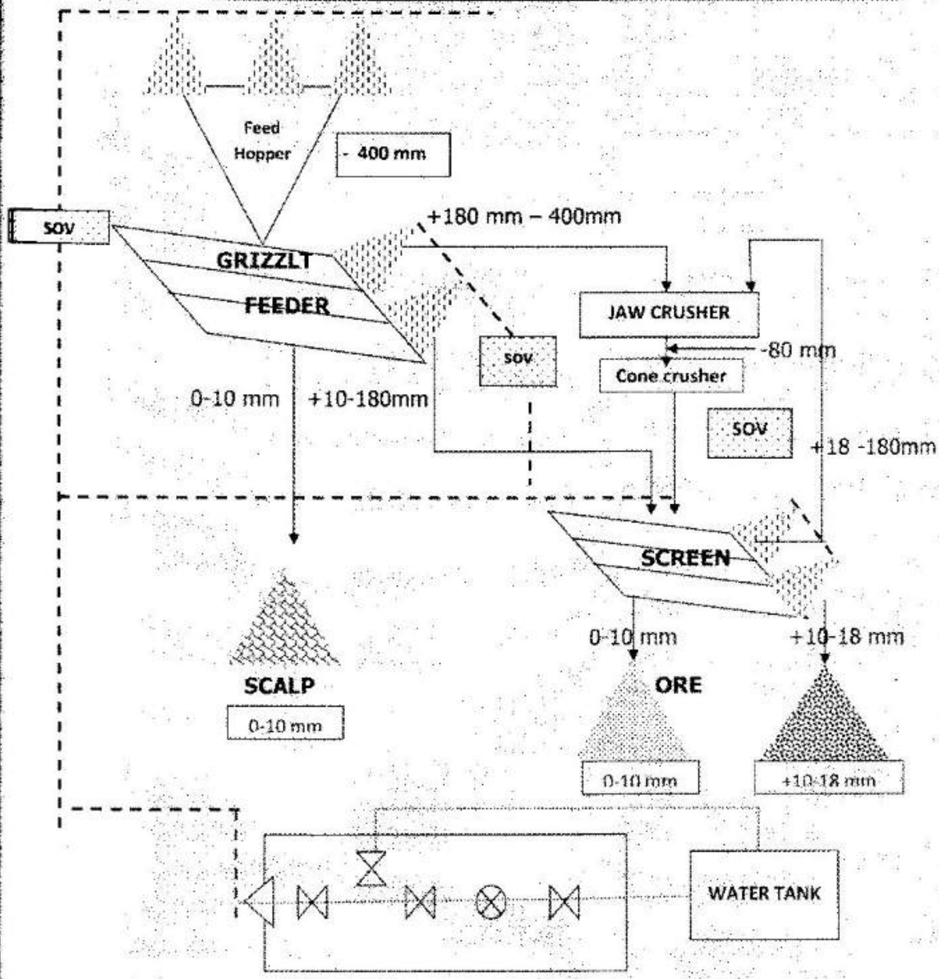

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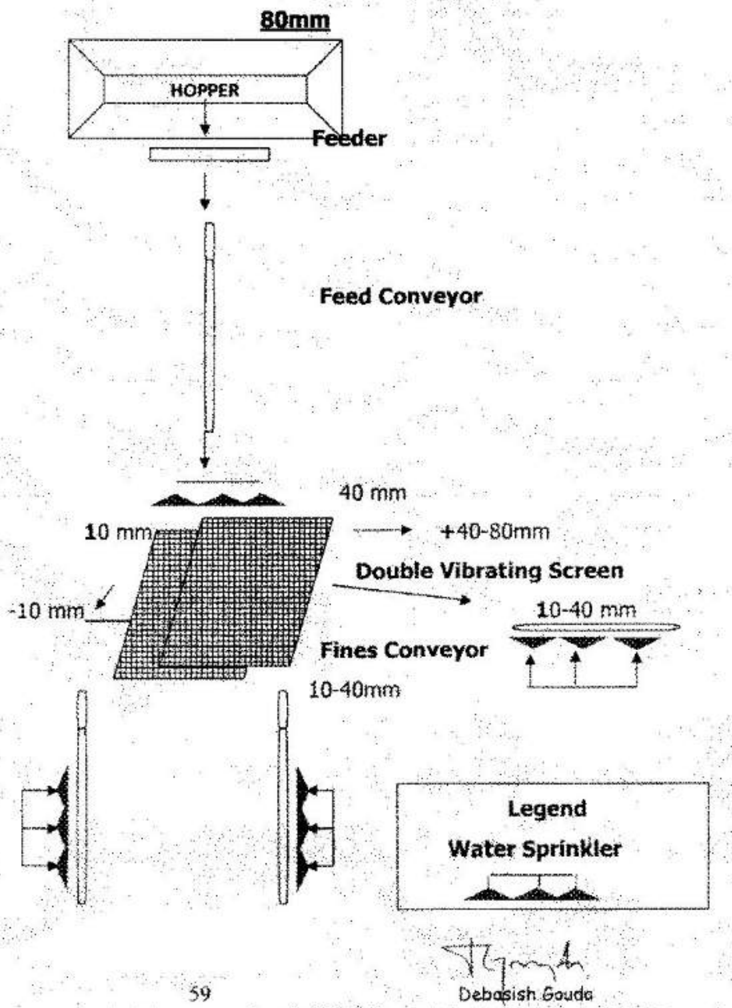
Fig. 6

FLOW CHART FOR PORTABLE SCREENING PLANT



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CHAPTER – IX

9.0 ENVIRONMENT MANAGEMENT PLAN

...wise programme of different environmental parameters and its management.

...ENT ...M	PROPOSAL AS PER APPROVED MINING PLAN (2)	POSITION AT THE END OF 5 YEAR, BY 2011-12 (3)	PROPOSED FOR NEXT 5 YEAR SCHEME PERIOD: 2012-13 TO 2016-17 (4)
... soil ...age, ...ervation ...utilization	No topsoil cover because of rock exposure & laterite cappings. Hence, no special proposal was there for topsoil management.	Position remains unchanged as described in the mining plan.	There is no fresh proposal made for next 5 year Scheme period.
...ste dump ...agement	Proposal was there to provide Catch drains at the inward side of the terrace. These drains were to be connected to garland drain outside the dump periphery. Concrete open pipes to be provided followed by settling tanks to restrict wash offs. Each terrace needed berns at outer end to reduce gully formation due to rain water wash offs. Plantation on dead end of waste dump slopes to be done with local species in consultation with forest authority.	Retaining wall made at the toe to check run off based on the rain fall data & safety factor; 50% & regular repairing done. Sedimentation ponds constructed at corners of garland drains. Adopted plantation for stabilisation	As per discussion in chapter – 6, the waste generated during the ensuing plan period will be dumped northeastern side of the non mineralized area. At end of the scheme period the area of dumping has been ear marked as plan over 2.10 hects, The quarries, which are confirmed for no mineralisation, will undergo for backfilling with waste material from the dumps in the next scheme period. Retaining wall & garland drain will be provided around all the active dumps to prevent wash off from it. The details has been given as follows in subsequent table no - 9 (a_1 & a_2).

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...estation ...gramme ...cautions ...survival & ...ection of ...ntation	Saplings proposed for plantation in mine road side (500 no: 2008-09), safety zone (2500 no:2009-10 & 2500: 2010-11) & in waste dump terrace (500 no:2011-12) within the mining lease area. Indigenous species enlisted were: Haldu, Kurum, Bela, Siris, Char, Tendu, Behera, Harida, Kusum, Jamun, Banaphulo & others.	Number of species planted: 2007-08: 2820, 2008-09: 2500, 2009-10: 5200 & 2010-11: 5000. The species are: Akasia, Chakundi, Arjuna, Amla, Sagwan, Devdaru, Amrud, Mango, Mahaneem, Bamboo, Jackfruit, Karanj & Sisoo.	**Strip plantation:** No of saplings-2625 at its total area- 1.05 hectares place of plantation - Safety zone boundary i.e. with a yearly 875 saplings all along the lease boundary 2014/15 -0.35 hectares 5, 2015-16 - 0.35nhects 2016-17 -0.35 hects respectively. **Block plantation** i) An area of 0.40 hectares has been earmarked in the north western boundary for plantation of 1000 saplings over the non-mineable benches in the year 2014-15. ii) An area of 0.40 hectares has been earmarked in the north eastern boundary for plantation of 1000 saplings over the barren land in the year 2015-16. iii) An area of 0.40 hectares has been earmarked in the south central boundary for plantation of 1000 saplings over the non-mineable benches in the year 2016-17. The species would be Simarua, Kadamba, Chakunda, Neem, Mango, Jammu, Guava.

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[illegible]uality of air	1	Two water tanker-cum-sprinklers were deployed for water sprinkling on haulage roads on regular basis, every 1-2 hour interval. Plantation carried out. Water injection adopted during drilling Monitoring done as per CPCB norms in core & buffer zones:	Two water tanker-cum-sprinklers were deployed for water sprinkling on haulage roads on regular basis, every 1-2 hour interval. Plantation would be carried out as barrier to arrest the fugitive dust.. Water injection shall be adopted during drilling. Monitoring done as per CPCB norms in core & buffer zones:
[illegible]ity & [illegible] of water [illegible]ding [illegible]ce water	Provision of stone barriers with garland drainages was there for settlement of suspended particle from surface rain water in the mine during monsoons, before it joins the natural hydrographic system. Proposed for a garland drain on top bench to prevent entry of rain water run off in the eastern quarry. Periodic cleaning of garland drains was also there to make them effective. To check leaching effect if any from ground water.	Catch water drains & siltation ponds made to restrict silt & sediment flow from the dumps. Regular cleaning of drains & silt ponds done. Sedimentation ponds constructed at the corner of garland drain. Retaining wall designed at the toe of the dumps to check the surface run off. Regular monitoring of ground water in core & buffer zone done. Suitable conservation measures in process in consultation with Regional CGWB. Mining activities are well above the present ground water level.	Catch water drains & siltation ponds made to restrict silt & sediment flow from the dumps. Regular cleaning of drains & silt ponds done. Sedimentation ponds constructed at the corner of garland drain. Retaining wall designed at the toe of the dumps to check the surface run off. Regular monitoring of ground water in core & buffer zone done. Suitable conservation measures in process in consultation with Regional CGWB. Mining activities are well above the present ground water level.

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level	Noise level in & around the mine is within permissible limit. However, proposed to provide acoustic wool, ear plug & other to mine machine operators, regular machine & vehicle maintenance as a preventive measure to control high decibel noise creation, if any.		Same preventive measures will prevail throughout 2014 - 2017 by providing acoustic wool, ear plug & other to mine machine operators, regular machine & vehicle maintenance as a preventive measure to control high decibel noise creation, if any
ion	Vibration level too is within permissible limit. But provision was kept for designing blast parameters for permissible charge per delay for various distances of structures from blast site	Controlled blasting adopted. Blasting done in day time only. Non-electrical initiating system was in use to mitigate ground vibration & fly rocks.	Same measures will be effective during Scheme period:
ment of water effluent ances rge	No plant exists within the mining lease area to generate contaminated water or affluent or toxic substances which need treatment before discharge.	Position at the end of the first five-year period is unchanged.	During the course of next three years, no use of water for the treatment of the ore by wet process has been envisaged. Hence there is no such proposal.
ulation treated	Recirculation not required	Not required	Not required

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WISE PLANTATION:

Table no.-9(a)

	Srtrip Plantation			Block Plantation		
	Area of plantation in hects	**No of Saplings.**	**Location**	**Area of plantation in hects**	**No of Saplings.**	**Location**
year 14–15)	0.35	875	North-Western boundary of Safety zone area.	0.40	Near the North-Western boundary	1000
year 15–16)	0.35	875	North-Eastern boundary of Safety zone area.	0.40	Near the North-Eastern boundary	1000
year 16–17)	0.35	875	South-Western boundary of Safety zone area.	0.40	Near the Southern boundary	1000
	1.05	**2625**	---	**1.20**	---	**3000**

<u>Wise Proposed for construction of Boulder wall / Garland drain/Check Dam</u>

<u>Boulder wall</u> **Table No -9(a_1)**

Scheme period	Length	Height/Width	Location
3rd year (2014– 2015)	150 m	1.5m / 1m	Northern side of the proposed dump at the toe.
4th year (2015– 2016)	100 m	15m / 1m	Eastern side of proposed dump at the toe.
5th year (2016– 2017)	55 m	1.5m/1m	southern side of proposed dump at the toe.

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Garland Drain / Check Dam **Table No.-9(a)**

Scheme period	Length	Height/Width	Location
3rd year (2014– 2015)	150 m	0.5m / 0.75m	Northern side of the proposed dump at the toe.
4th year (2015– 2016)	100 m	0.5m / 0.75m	Eastern side of proposed dump at the toe.
5th year (2016– 2017)	55 m	0.5m/0.75m	southern side of proposed dump at the toe.

At every 50 mtrs interval a check dam should be provided along the garland drain.

Status of baseline information:

Existing Land Use Pattern:

...pali Iron ore Mines over an area of 18.00 ha of area. Most of the land is found to be ...getated. The vegetation is scanty. The areas already degraded due to quarrying/pitting, ...ing, roads are given below.

Existing land use pattern. **Table no – 9(b)**

ITEM	Existing
Mining	7.25
Dumping	1.901
Road	0.12
Site services	0.849
Ore Stack	0.423
Total	**10.543**

Water Regime:

...oject area is having undulating hilly terrain and poor permeability. The depth of water ...elow ground level varies depending on the local topography, geology & hydrological ...ions. The nearest surface water source is Karo River which is flowing 2.5 km away from ...estern side of the mining lease. Karo River is the major drainage system of the area. ...ing water is available in most of the nearby villages in for of Borewells, Dug Wells and ...ells. The drinking water requirement of the mines is met by the borewell present in ...e Bhanjapalli.

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Details of Flora and Fauna existing in the Area:

e common flora existing in the lease hold area as well as in the buffer zone around a us of 10 Kms of the project area are (1) Shorea robusta, (2) Terminalia tomentosa, (3) s bengalensis, (4) Madhuca indica, (5) Anoegeissus latifolia, (6) Diospyros anoxylon, (7) Mangifera indica, (8) Terminalia arjun, (9) Gmelina arborea, (10) arindus indica

e faunas are available as Spiders, Butterflies, Grass hoppers, Ants, Bees, Flies, Mites, ds, Frogs, Toads, Water snakes, Crates, Rat snakes, Lizards, Pigeon, Crow, Koel, , al, Monkeys, Squirrel, Rabbit etc.

Quality of Ambient Air, Noise Level and Water : -

To monitor the ambient air quality and noise levels for the one Season, two stations in e zone and four stations in buffer zone to be fixed. The Air Samples to be analysed as per 5182. Water samples from Buffer Zone & Core Zone to be collected at 5 locations. All total pling locations to be chose which includes 2 of surface water points and 2 of ground water ts. Samples to be collected in one season and analysed following IS: 10500 & 2296.

Monitoring station of Air and Noise

me of the ions	Zone (Core / Buffer)	Name of the Area	Direction
	Core Zone	Inside the lease area	
	Core Zone	Inside the lease area	
	Buffer Zone	In village Bhanjpali	NE
	Buffer Zone	In village Densa	SW
	Buffer Zone	In village Sagasahi	NE
	Buffer Zone	In village Kansaha	NW
	Buffer Zone	In village Dhubulabarha	SE

Monitoring station of Water Sample.

me of the ions	Zone (Core / Buffer)	Name of the Area	
	Buffer Zone	Karo River (2.5 Km from the lease hold area)	Surface Water(up stream)
	Buffer Zone	Karo River (2.5 Km from the lease hold area)	Surface Water(Down Strean
1	Buffer Zone	In village Densa	Tube well
1	Buffer Zone	In village Sagasahi	Tube well
1	Buffer Zone	In village Kansaha	Tube well

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Climatic Condition: The climate of the area is sub tropical. May is the hottest whereas December and January are comparatively colder months. The annual tation recorded for the last 10 years varies from 1200 - 1400 mm out of which about precipitation takes place during monsoon. It is seen that rain occurs almost over 4 s in a year, which is the precise reason for good vegetation cover. Maximum rature recorded in the study area is 46^0 C & Minimum temperature observed in the area is 6.5^0 C.

Human Settlement:

re area is practically devoid of any human settlements. Following are the twelve populated villages located within the buffer area of 10 km radius around the lease rea:-

Table no. 9(c)

Sl No.	Name of the villages	Total population
1	Rengalberha	600
2	Sagasahi	255
3	Bhanjapali	1659
4	Teheral	602
5	Nuagan	391
6	Kola	538
7	Koirha	5002
8	Kusumadihi	678
9	Kadodihi	642
10	Tentulidihi	284
11	Komarho	300
12	Roladihi	425

blic Place & Monuments:

s no historical monuments or places of archaeological importance within the region.

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) Does the area fall under Notified area under water (Prevention & Control of tion) Act, 1974: Yes

ENVIRONMENTAL IMPACT ASSESSMENT :

Land Degradation:

item-wise proposed land use area are given below: -

Table – 9 (d)

ITEM	Scheme Period	Ultimate Period
Mining	9.50	10.477
Dumping	2.10	2.10
Road	0.12	0.12
Site Service	0.849	0.849
Ore stacking	0.423	0.423
Subgrade Stacking	0.50	0.50
Plantation/green belt	1.97	3.531
Total	**15.462**	**18.000**

ct on Land environment and Land use:

n cast mining causes various types of environmental pollution. It is predicted that the ss of mining have little impact on the existing ecological conditions of the project area e proposed mining activities shall be concentrated in the broken up area. Due to open mining and construction of permanent infrastructure, the land of the area degraded and me unsuitable for the vegetation and other uses. Mining activity has a profound impact nd environment due to formation of quarries and dumps. Following are the identified es which degrade the land and soil of the area:

- Change in land use due to mining, dumping, construction and infrastructure development.
- Covering of top soil by dusts.
- Soil erosion due to blockage of natural drains.

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Leachets from the waste dump and the polluted water from the mines affect the characteristic of the top soil affecting the land use.

Change in drainage pattern due to alteration in the surface topography and subsidence due to mining and associated activities.

Mining may affect the ground water regime which may also affect the quality of soil and land in due course.

ation / Afforestation

egradation during the plan period about 9.50 hectares Reclamation in the upper s in the western boundary shall be reclaimed by plantation in the 3rd and 4th year of eme period, which shall be covered under strip plantation. Three patches totaling 1.2 s shall be subjected for reclamation and plantation. The dump slopes in the eastern y has also been proposed for plantation. The details of year wise plantation is as

SE PLANTATION:

Srtrip Plantation			Block Plantation		
Area of plantation in hects	**No of Saplings.**	**Location**	**Area of plantation in hects**	**No of Saplings.**	**Location**
0.35	875	North-Western boundary of Safety zone area.	0.40	Near the North-Western boundary	1000
0.35	875	North-Eastern boundary of Safety zone area.	0.40	Near the North-Eastern boundary	1000
0.35	875	South-Western boundary of Safety zone area.	0.40	Near the Southern boundary	1000
1.05	**2625**	---	**1.20**	---	**3000**

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Ambient Air Quality.

...nt Air Quality (AAQ) in respect of particulate matter of less than 10 micron size (PM_{10}), ...r dioxide (SO_2), oxides of Nitrogen (NOx) and Co to be studied and determined ...tatively through planned monitoring. AAQ monitoring to be done at four selected ...ns in the study area, taking into consideration all possible intervening factors and the ...a for selection of sampling stations relating to AAQ monitoring and the Indian ...ards and Emissions Regulations published by notified the Ministry of Environmental & ..., Central Pollution Control Board (CPCB). The monitoring to be carried out in all the ...ns.

...t on Air Quality:

... cast mining leads to air pollution, which is mainly caused due to generation of dust ...g from mining activities. The sources of emission or generation of dust within the project ...include:

...eration of small quantity of dust because of very less truck movement in the haul ...d.

...ing the occasional blasting very small quantity of noxious gases will be produced.

...icular movement on the haul roads.

...st pollution potential is directly related to the wind speed and wind direction of the area. ...edominant wind direction of the area is SE & NE. The data on wind speed and direction in ...udy area were collected simultaneously during AAQ monitoring period. Average wind ...y during day, night and 24 hours time remained as 1.18m/s, 0.96 m/s and 1.06m/s ...tively.

...g levels of SPM varies from 80 to 211 $\mu g/m^3$, PM_{10} varies from 32 to 85$\mu g/m^3$. ...g level of SO_2 and NO_x in the core zone area is below 15 $\mu g/m^3$. Comparatively higher ...f SPM and PM_{10} are expected due to emission of fine particles during blasting ...on and movement of vehicles in haul roads. Due to high specific gravity of the ore, ...of dusts shall not be much but excavated wastes shall raise the airborne dust level to ...extent.

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impact has been predicted over the s... site. It is evident from data furnished in ... ght cause a ... maximum within 300 m. radial distance ... l in mining ... ce. Therefore, it can be predicted that, the M... ed by suspended particles; whereas beyond 5 km ...

velocity and direction plays a major role in predicting ... entration ... ntration will occur. Hence, the wind velocity data was con... ase in ... oned earlier, the most predominant wind directions at the pr... ntly ... are Northwest, Southwest and West (blowing from). T... ntration was predicted in directions opposite to these direction... rted by the data presented in the table 4.2 below. Finally, the predic... with monitored existing PM_{10} value, and maximum PM_{10} concen... minant wind directions were calculated.

Predicted maximum ground level concentration values of PM_{10}									
	PM_{10} concentration in $\mu g/m^3$								
	(300m distance)			(500m distance)			(1km distance)		
	Predicted	Existing	Total	Predicted	Existing	Total	Predicted	Existing	Total
	5.04	88.8	93.8	0.17	75.2	75.4	0.05	68.9	69
	3.46	79.2	82.7	0.27	72.3	72.6	0.02	62.3	62
	3.93	76.2	80.1	0.12	70.5	70.6	0.01	63.8	64

served during air quality monitoring that, the dust generations are short term and settle within close ranges. The increase in concentration of PM_{10} is predicted to be a ...m of 5.04 $\mu g/m^3$ which is very less and this dust particle will settle down in the close ...ty of the mining lease area. So there is very less scope of spreading of dust particles to ...by residential areas. Above all, these operations are carried out at far off distances ... habitation.

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..llution Control:

..ng level of air pollution in the core and buffer zone is below the permissible limits ..nal Ambient Air Quality Norms). The pollution level is not expected to rise significantly .. ambient environments as various operations like quarrying, sizing; sorting etc. will be .. manually. As the particles are heavy in nature, they settle easily in the immediate ..ty. There is no other source for SO_2 and, NO_x except a little contributed by the vehicular ..c, which is well below the prescribed limits.

..major dust prone areas are quarry faces, haul roads, drilling sites and blasting faces. In .. to reduce the fugitive dust emission during loading/ unloading of overburden water will ..rayed at regular intervals. Dust emission during jack hammer drilling is proposed to be ..olled by the use of suitable dust extractors. The overburden dumps will be periodically ..ed to reduce fugitive dust generation by wind. Haul road is expected to be another ..ce of fugitive dust. To reduce the dust from the haul roads the following measures will ..ken up:

- The unmetalled hauls road shall be adequately compacted before being put into use.
- Periodically water will be sprinkled on these roads in amounts just sufficient to wet the surface.
- Overloading of the transport equipments shall prevented in order to stop spillage.
- Wherever possible trees will be planted by the sides of haul roads.
- Provision of dust collectors for the drilling machines.
- Plantation of wide leaf trees, creepers, tall grasses around quarry sites, roads, colony and other surrounding barren zones.

Impact on Noise Quality:

..existing noise level in the core zone as measured at Bhanjapali is 40.5 to 51.2 dB during ..me and 32.2 to 42 dB during the night time. The mining will be an open cast mostly ..ual working type. So the increase in level of noise in this mine is very negligible. In this .. cast manual mining the various sources of noise in the area are attributed mainly due ..casional blasting and vehicular

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e various sources of noise mentioned above shall only be periodical and are limited to a ed period of operation only. In addition to this, the transportation of ores might cause a e effect on the noise level. The noise generated by different machinery used in mining ration is given in Table-4.3.

Noise generated by machinery used in mining	
Machinery	**Noise generated in dB (A)**
Shovel	90-100
Dozer	90-106
Dumper	80-100
Drill	105
Sprinkler	80
Backhoe	85
Crusher	80-95

e noise level result due to such operations in the active working zones in the area do not icate any serious concern as it is well below the prescribed standard limits. The ambient ise level data of the area on comparison with the attributes health hazards due to noise ed as per Table below, it can be concluded that, there is no serious alarming effect due present mining activity.

Health hazards by different noise levels	
Level of Noise	**Potential Effects**
35 db (A)	Slight sleep interference
50 db (A)	Moderate sleep interference
55 db(A)	Annoyance (mild)
70 db(A)	Smooth muscles/glands react
75 db(A)	Changed motor coordination
80 db(A)	Moderate hearing damage
85 db (A)	Very annoying
90 db (A)	Affect mental behavior
95 db (A)	Severe hearing Damage
125 db (A)	Pain Threshold
135 db (A)	Very painful
140 db (A)	High potential of hearing loss

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e Control:

e level shall be maintained below 90 dB (A) in the working zone (for 8 hr. Exposure).
itigation measures for noise are of following types:

Prevention at source

Attenuation in transmission path and

Protective measures on work environment.

following measures will be taken up to reduce the noise level:

Diesel powered machineries, which are major source of noise in open cast environment will be properly maintained. Attention shall be paid towards rigorous maintenance of the silencer of the diesel engines.

Static diesel engines shall be housed as far as possible. If possible, they will be placed on vibration isolators.

Truck drivers will be issued earplugs and earmuffs. Duty of the operators of the noisy machineries will be regulated to keep their noise exposures levels within the limits

Green belt will be developed around the office building and mine to reduce noise exposure level.

Blasting Effects:

e the mine is small and the mining activity is manual, regular blasting is not required. ng occasionally required for breaking of large quartz boulders. Because of occasional ng the ground vibration is also negligible.

ctive Measures for Ground Vibration/ Air blast Caused by Blasting:

e this is a small scale and manual mining the regular blasting is not required. The ground tion due to small quantity of blasting is very negligible

pact on Water Quality

r shall be used only for afforestation and domestic purposes, which will be met by al ground water sources, and hence exploitation of surface water and aquatic ersity is not anticipated. As the activity involves dry excavation process with no

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...tion process involved, wastewater will not generated and hence there will be no ... due to effluent generation on the surface or ground water.

Impact due to Mine drainage Water

... the rainy season rain water are flowing through the tiny rain cuts within this lease ...wards the small seasonal nala passes outside the western boundary of the area. This ... may contain sediments while flowing through the quarry and dump area. Check dams ... constructed at the lowest to settle the sediments. The clear overflow from the check ... is passed on the downside of the nallah to maintain the natural course of water in the ... Retention walls to the dumps are proposed to check the suspended particles rolling ... and choking the natural drainage system of the area.

Impact due to Water use in Mines:

... is the physical process where the water is mainly used for dust suppression and ...ng of heavy earth moving machineries. Since no chemical transformation takes place ... ore is naturally, occurring there is no possibility of any chemical contamination in the ...water. The domestic effluents being generated will be discharged to soak pits through ... tank.

Impact due to Surface Runoff from the Dumps:

...aste dumps are more prone to erosion. The garland drains around the dumpsites helps ...eck the flow of fines during the surface runoff and helps in minimizing the impact on the ...nding environment. Grasses will also be planted on the dump slope to check the soil ...ion.

Impact on Ground Water:

...ground water table is at a depth of 15 to 20m below the local ground level which is lies ... the proposed quarry floor. So there is no chance of affecting the ground water table ... present and future mining operation.

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r Management & Water Polution Control:

e is no perennial or dry nala with the M.L. area. Some dry nallas cross this area which from upper level to down ward. During the rainy season, rain water is flowing through small rain cuts within this leasehold towards this small seasonal nala which passes the western boundary. It is envisaged that the water accumulated in Quarries g the rainy season will not contamin the surface water and the nalla is flowing far from the lease area. There exist high vel ground between the quarry and the nalla. e run off from the quarry cannot contan ate the nalla water.

ce runoff around the quarries and du near the natural drains will follow the d drains to arrest the eroded sediments, ch shall pass through a series of garland s before being discharged to the natural dra e system. This practice shall be carried ly in rainy season at the time of heavy rains herwise the water from garland drains be collected in reservoirs after settling an all be used for afforestation uses. tion walls to the O.B. soil dumps are proposed eck the suspended particles rolling and choking the natural drainage system of the

r management scheme has been planned and th nt feature of the scheme is as s:

Garland drains shall be made around the quarry dumps. While constructing drains routing and terracing shall be done maint the overall slope in the direction of the flow so that the runoff distribution is n cted.

Garland drains shall be constructed as much as po on all sides of quarry (depending on the contour). In order to handle precipi ater inside of quarry, parallel detach shall be constructed. The connecting drain een them shall carry water down.

Retaining wall shall be made on all sides of the dumps.

Mine water shall not be allowed to dissipate, but collecte lischarged after allowing settlement of the suspended solids.

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Precipitated rain water should be harnessed by taking advantage of the given situation, to create sufficient artificial storage capacities in natural or manmade depressions and inter-connecting them to meet afforestation and other needs.

Small grasses and bushes in drains hold back solid particles from draining away.

Small stone barriers across the drains will check water current and arrest solids.

Terracing will be made at suitable places to regulate water flow.

No overburden or loose sediments will be kept in the working benches particularly during monsoon months.

Settling pits and drains shall be cleaned periodically.

ssibility of the project activity contributing to the pollution of water sources of the or to the ground water regime is so less that this does not significantly constitute an f concern.

pact on Vegetation:

ing lease area of Bhanjapali iron mines does not include any forest land. The forest esent within the ML area is DLC forest which is already degraded. There is no dense on existing within the leasehold. There are only few no. of small Sal and Char trees with few bushes and grasses existing outside the eastern boundary of the lease area. existing vegetation in the ML area is very less there will be negligible impact on on of the project area.

tation/ Plantation:

ecies profuse branching with evergreen canopy of broad and rough leaves and deep stem has been selected for plantation programme. The plantation profile is a mixture herbs and shrubs and large no. of plants to make the area as a mini forest.

pact on Wild Life:

sehold is a terrain of small hillocks and there is no forest area nearby. The wild life ity in the locality is less. Only some rats and reptiles found in the leasehold. Outside sehold, some domestic animals like cattle, goat, dog, cats etc found. As the

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ference of wild life into the mining site is very less there is negligible impact on wild life been envisaged.

ures taken for Protection of Wild life:

mining and other related activities like transportation of ore, mining process involving ng, colonies, dust, dumping of overburden and rejects, noise because of mining ities, vehicular pollution, and lightning in the colonies are some of the cause affecting bio-diversity of the surrounding locality.

leasehold is a terrain of small hillocks and there is no forest area nearby. The wild life ntiality in the locality is less. Only some rats and reptiles found in the leasehold. Outside leasehold, some domestic animals like cattle, goat, dog, cats etc found. Though the ct on wild life because of the mining project is negligible few steps will be taken up by proponent for the protection of wild life. These steps include:

Massive Farm Forestry through plantation of local species used for fuel, fodder, small timber, fruit, ornamental and medicinal use should be taken up with the involvement of the village people. The recommended species for different sites are Neem, Babul, Amla, Phasi, Siris, Jackfruit, Bela, Mango, Sidha, Cashew nut, Ghambhari, Bara, Aswastha, Karanja and patali.

Regulation of vehicular traffic during night which shall aid crossing over elephants without any hindrance.

Improving fodder availability in the forest in order to prevent animals to come the habitation, seasonal edible plants like maze paddy, millets banana edible grasses etc, shall be planted within the forest land.

The quarry area should be fence up with barbed wire fencing on all side except the side acquired for present work and thick bamboo green hedge be planted and maintained for 3 years.

Fire protection measure to prevent forest fire which is the major cause of the loss of flora and fauna of the forest area.

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es	camps will be conducted twice in a year. Imm[ediate] attention for the patients with primary respira[tory] infections coughing, sore throat, Asthma, Breathless ness, expectoration, chest pain and sysponea. Dust mask will be provided to the mines worker.
tion & training	Donation to school for cultural activity Awareness campaign regarding mine safety among the workers
yment to local ants	Local persons will be employed in the mines on priority basis.
ation	Financial support will be given to the village club for their annual sports activities
s (specify)	Donation to Bhanjapali Gramin Committee.

density:

pali iron ore mines is a small project spread over an area of 18.00 ha. The traffic y of the locality will increase because of the movement of trucks for transportation and ent of the workers to the mining site. The increase in traffic density because of the has been given in the following table.

Impact on Traffic Density		
Traffic Vehicle	No. of Vehicles /day (During the study period)	Anticipated increase in traffic density because of the Mining Activity
vy Motor Vehicle	350	365
ht Motor Vehicle	524	552
o /Three wheelers	968	1022
cles	1236	1265
tal	**3078**	**3204**

tant increase in traffic density is very less and manageable within the present y of the highway and the connective link from the highway to project site. The road is lack top to sustain the negligible increase in the no. of vehicle due to project ntation.

ic Condition

ntation of the project will help in improving the overall income pattern of the neighbouring which shall indirectly help them to improve their standards of living. The other facilities that

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available to the local people because of the project implementation include supply of ty, telephone facility, education facility, communication facility etc.

Quality:

ter surface and ground water sources to be monitored for their quality and it will be ned that all the water quality parameter are with in prescribed limit of IS: 10500 & IS

aste:

posed mining activity is likely to generate the overburden/waste in 3 years of on shall be dumped at the eastern part of the lease area earmarked for dumping. as such will not likely to have any adverse impact on the adjacent areas of the

Management Practices

een envisaged that appropriate dump management practice will be undertaken to aste dump for disposal of the mineral rejects. In order to protect the dumps from the following measures can be recommended:

The dump will be adequately benched. The ultimate slope will be maintained at 20° – 22° with individual terrace slope not exceeding 37°.

The individual terrace height will be maintained at 8m.

Each terrace will have inward slope with catch drains at inward side of the terrrace and the catch drain of the individual terrace will be connected to the garland drain outside the periphery of the dump.

The dump bench slope will be vegetated with grasses and in latter stage bushes and shrubs will be grown on the dump slopes

Barrier will be erected around the dumps and quarry side.

Terracing of the dumps shall be done to make it more stable

Also the retaining wall and garland drains for the waste dump will be constructed to arrest wash offs from the dump.

lamation and rehabilitation of the dump by the way of afforestation will be taken up e dump becomes stabilized and the open surface become available. Based on the

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al and chemical characteristics of the soil of waste dump and environmental conditions areas the plantation of economic important trees.

Impact on Biodiversity.

oral population in the core zone is very less. The lease comprises of forest land but ning is confined to the broken up area & hence there will be no impact on the Floral ation within the core zone. The flora in the Buffer Zone is likely to be affected as there cluster of mines around the mining lease area.

unal population especially of mammals is found to be low in the project area. So there e no adverse impact on the fauna existing in the project impact area.

ENVIRONMENT MANAGEMENT PLAN

r sources of pollution and mitigation measures.

Measures for controlling air pollution

g air environment in the surrounding area is of desired quality. The extended mining y in the area might add little pollutants to the existing air environment. Control es have to be considered and implemented. The following preventive measures shall en to control the air pollution inside the lease area & its periphery.

Regular water spraying on haul roads, waste dumps and maintaining approach roads, crushing and screening plant site to suppress the dust.

The volume of dust rising from waste dump areas, quarry site, roads, etc. by action of wind shall be checked by planting grasses and broad leaf trees.

Ensuring transporting vehicles not to across stipulated speed. A strict instruction should be given also in the board it shall be displayed that no vehicle should not run greater than a speed of 20Km/hour.

Over loading on transport vehicles to be prevented in order to stop spillage.

Strengthening further the green belt plantation around ML area, quarry and over burden dump as well as crushing plant site.

Water spraying in the ore stack yard be done to cheek air borne dust.

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Exhaust fumes in the internal combustion engines used in excavators, ensuring vigorous maintenance and stringent overhaul schedules shall minimize dumpers, dozers and other machinery.

The dust suppression arrangement also shall be done in the crushing and screening

asures for controlling water pollution.

rland drains around quarry and dumps shall be constructed. In addition check dams, ge settling ponds and afforestation on existing dumps and on vacant land has been ed. These measures shall be taken to ensure that the surface water quality in the area is within permissible limit in respect of all the parameters for all four seasons. r, it is anticipated that there may be slight increase in water pollution load due to ment of production. The measures being proposed for water treatment and ation of water are as follows: -

ion of garland drain around quarry, waste dump yard etc.

uction of more check dams around the overburden dump site to arrest flow of loose nts before discharge into the drainage system of the region through settling tanks.

to be cleaned up periodically.

hening of small stone/ rock barriers across the drains at intervals to check the water and to arrest the solid particles.

water from the quarry to be pumped regularly and discharged to the adjacent drains.

water of mines have to pass through settling tanks by increasing capacity and after nt to be discharged to the seasonal nalla. This stream after long traverse meets er.

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r shall be treated before use for drinking purpose. Before water is supplied for umption particularly for drinking purpose it has to be ensured that the water is free any pathogens.

lid Waste Management.

r the geological investigation and study of the old quarries in the area, the waste is ed 35% ore of the total recovery. Waste removed from the mine shall be transported k / or tippers to the dumping site earmarked. Water shall be sprinkled at a regular l for compactness of dump as well as to prevent creation of dust at the dumping site. ump will be subjected to afforestation, which will present sliding of materials from the r level. In the 1st year retaining wall and garland drain will be constructed around the so that the smiles and wash offs will be discharged. The overburden dump gement proposed to be followed will make the solid waste pollution issue virtually ant.

mpensatory afforestation.

the forest clearance, project authorities will be allocated area for compensatory station. The cost of CA land shall be deposited with the State forest department to t and improve the present forest land in and around the project area. The scheme and on of plant species are mainly based on the local soil conditions and social acceptabilities. ant species which preferably will be nitrogen fixers, pollution abaters, fruit bearing shall en up for plantation. The species recommended are Diospyros melanoxylon (Kendu) marmelos (Bel) Gmelina arborea (Gambhari), Albizzia procera (Siris), Mangifera indica). Madhuca indica (Mahul), Syzigium cumini (Jamu).

oise pollution control.

eral precaution, to reduce the effect of high noise level, the following ameliorating res have been proposed in addition to the measures being already taken up:-

vision of protective devices like acoustic wool, earplugs, ear muffs to workers osed to noise of more than 80 dB (A) provided.

vision of sound proof cabins for the workers deployed on machines producing higher l of sound like Dozers, dumpers, shovels etc.

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er maintenance of noise generating machinery including transporting vehicles would
nsured.

ick green belt shall be provided around the periphery of mine to screen the noise.

g the exposure time of workers wherever required.

Occupational safety and health.

d any adverse effect on the health of workers due to dust, noise and vibration etc.
s to be implemented are the following.

n of additional rest shelters for mine workers with amenities like drinking water, fans etc.

More numbers of safety measures like use of safety appliances, safety training, safety awards, posters, slogans related to safety etc.

Extensive publicity and propaganda related to safety.

Working of mine as per approved mining plan/scheme and environmental plans.

Regular maintenance and testing of all mining equipment as per manufacturer's guidelines.

Periodical medical examination of all workers by medical specialists shall be conducted.

Socio economic measures.

oposed project, does not involve any displacement of human habilitation, hence no tion package is needed for displacement. The mining activity envisages the ment of local labourers. So, it is likely that the general economic condition of the local will improve. The peripherial development package will also improve their health itation. Apart from introducing eco-friendly mining (mechanised / manual) special n for upliftment of socio economic conditions of the nearby villages by providing ng facilities has been proposed.

and education facilities created in the project shall be extended to villagers also.

ds development in the project shall be utilized by the villagers also which shall nect them to nearby town,

inking water facilities, Cultural and recreational centres.

orestation of the village areas, distribution of seedlings and involving people in such grammes.

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Providing employment to local people will be the one of the major factors for upliftment of the society.

) Environment Monitoring

ous parameters of air, water and noise pollution shall be monitored regularly at the same ons as mentioned earlier for the purpose of abatement of pollution and to maintain various ronmental parameters within the limits prescribed by State Pollution Control Board as well as F, Govt. of India. The continuous monitoring shall help in confirming /observing the cted impacts and their significance. If need be the post EIA result from monitoring shall be piled to sent to the regulatory authorities, for midterm review of their stipulations. This shall re effective implementation to maintain the quality of the local environment within the ilative capacity of the ecosystem in general and society in particular.

) The year wise Reclamation and Rehabilitation of degraded land and dump:

d degradation during the plan period would be about 9.50 hectares .The upper benches he western boundary shall be reclaimed by plantation in the 3rd and 4th year of the eme period after attaining the maximum working limit . Three patches totaling 1.2 ares has been proposed for reclamation and plantation in the three corners . The dump es in the eastern boundary has also been proposed for plantation. The details of year e plantation are as follows:

RWISE PLANTATION:

	Srtrip Plantation			**Block Plantation**		
r	**Area of plantation in hects**	**No of Saplings.**	**Location**	**Area of plantation in hects**	**No of Saplings.**	**Location**
year 4- 5)	0.35	875	North-Western boundary of Safety zone area.	0.40	Near the North-Western boundary and in the dump slope	1000

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year	0.35	875	North-Eastern boundary of Safety zone area.	0.40	Near the North-Eastern boundary and the dump slope	1000
year	0.35	875	South-Western boundary of Safety zone area.	0.40	Near the Southern boundary and the dump slope	1000
	1.05	2625	---	1.20	---	3000

Proposed for construction of Boulder wall / Garland drain/Check Dam

Boulder wall

Scheme period	Length	Height/Width	Location
3rd year (2014– 2015)	150 m	1.5m / 1m	Northern side of the proposed dump at the toe.
4th year (2015– 2016)	100 m	15m / 1m	Eastern side of proposed dump at the toe.
5th year (2016– 2017)	55 m	1.5m/1m	southern side of proposed dump at the toe.

Garland Drain / Check Dam

Scheme period	Length	Height/Width	Location
3rd year (2014– 2015)	150 m	0.5m / 0.75m	Northern side of the proposed dump at the toe.
4th year (2015– 2016)	100 m	0.5m / 0.75m	Eastern side of proposed dump at the toe.
5th year (2016– 2017)	55 m	0.5m/0.75m	southern side of proposed dump at the toe.

At every 50 mtrs interval a check dam should be provided along the garland drain.

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CHAPTER – IX

10.0 ANY OTHER INFORMATION

ts of any investigation carried out for scientific mining, conservation of als and protection of environment; future proposals, if any.

Not proposed

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Debasish Gouda
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