MODIFICATION OF THE APPROVED MINING PLAN

INCLUDING ENVIRONMENT MANAGEMENT PLAN

&

PROGRESSIVE MINE CLOSURE PLAN'

IN RESPECT OF

JERELDABURU IRON ORE DEPOSIT

AREA- 537.00 HECTARES (FOREST LAND)
IN MOUZA - JERELDABURU., P.S.: GUA
DISTRICT: WEST SINGHBHUM, STATE: JHARKHAND
CATEGORY – A (FULLY MECHANISED)
UNDER RULE – 22(6) OF M.C.R., 1960
FOR MODIFICATION OF THE APPROVED MINING PLAN

APPLICANT

JINDAL STEEL & POWER LIMITED
241/B, ROAD NO. 2, ASHOK PATH,
ASHOK NAGAR, RANCHI - 834002
JHARKHAND

PREPARED BY

P.K.SEN
KALIMANDIR ROAD, P.O. : DORANDA,
RANCHI – 834 002
REG. No. RQP/CG – RNC/010/87/A

MODIFICATION OF THE APPROVED MINING PLAN

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CATEGORY – A (FULLY MECHANISED)

UNDER RULE – 22(6) OF M.C.R., 1960

FOR MODIFICATION OF THE APPROVED MINING PLAN

APPLICANT

JINDAL

JINDAL STEEL & POWER LIMITED

241/B, ROAD NO. 2, ASHOK PATH,
ASHOK NAGAR, RANCHI - 834002
JHARKHAND

पत्र संख्या 314 (3)/ 2009 एमसीसीएम (मध्य अंचल)/
एमएस/पीएमसीपी. 8 दिनांक 13-07-2009
द्वारा अनुमोदित
Approved vide 314 (3)/ 2009
MCCM(CZ)/MP/ 8 dated 13-07-2009

अनुमोदित
APPROVED

PREPARED BY

P.K. SEN

KALIMANDIR ROAD, P.O. : DORANDA,
RANCHI – 834 002
REG. No. RQP/CG – RNC/010/87/A

खान नियंत्रक (मध्यांचल)
Controller of Mines (Central Zone)
भारतीय खान ब्यूरो
Indian Bureau of Mines

JINDAL STEEL & POWER LIMITED
P. B. No. 16, Kharsia Road, Raigarh – 496 001 (Chhattisgarh)
Phone : (07763) 227001 – 227 010 (10 Lines)
Fax : (07763) 227031 – 227 036
Email : raigarh@jspl.com
Gram : PIGIRON

Date: May 30, 2009

CONSENT LETTER FROM THE APPLICANT

The Modification of the approved Mining Plan and Progressive Mine Closure Plan of Jereldaburu Iron Ore Deposit for 537 Hects. area in Mouza – Jereldaburu, District – West Singhbhum, State – Jharkhand has been prepared by Sri P.K. Sen, R.Q.P., Registration No. RQP/ CG-RNC/010/87/A.

We request the REGIONAL CONTROLLER OF MINES, KOLKATA REGIONAL OFFICE, KOLKATA to make further correspondence regarding modifications etc. of the Modification of the approved Mining Plan and Progressive Mine Closure Plan with the said recognized person on his following address :-

Sri P.K. Sen
Kalimandir Road,
P.O. Doranda,
Ranchi – 834002
Phone: 0651 – 2481110 / 9334718315

We hereby undertake that all the modifications so made in the Modification of the approved Mining Plan and Progressive Mine Closure Plan by the recognized person be deemed to have been made with our knowledge and consent and shall be acceptable to us and binding in all respects.

We, hereby authorize Sri P.K. Sen, RQP; to collect the approved copy of Modification of the approved Mining Plan and Progressive Mine Closure Plan and all the papers/documents on our behalf from Indian Bureau of Mines, Kolkata Region.

(A.K.Mukherji)
Director Cum Nominated Owner

JINDAL STEEL & POWER LIMITED
P. S. No. 16, Kharsia Road, Raigarh – 496 001 (Chhattisgarh)
Phone : (07762) 227001 – 227 (10 Lines)
Fax : (07762) 227031
Email : raigarh@jspl.com
Gram : PKHROW

CERTIFICATE

"THE PROVISIONS OF MINES ACT, RULES AND REGULATIONS MADE THERE UNDER HAVE BEEN OBSERVED IN THE MODIFICATION OF THE APPROVED MINING PLAN JERELDABURU IRON ORE DEPOSIT FOR 537 HECTS. AREA BELONGING TO JINDAL STEEL & POWER LIMITED AND WHERE SPECIFIC PERMISSIONS ARE REQUIRED, THE APPLICANT WILL APPROACH THE D.G.M.S. FURTHER, STANDARDS PRESCRIBED BY D.G.M.S. IN RESPECT OF MINERS HEALTH WILL BE STRICTLY IMPLEMENTED".

(A.K.Mukherji)
Director Cum Nominated Owner

APPROVED

CERTIFICATE

1. Certified that the provision of the Mineral Conservation and Development Rules, 1988 have been observed in this Modification of the approved Mining Plan and wherever specific permissions are required, the lessee will approach the concerned authorities of Indian Bureau of Mines for granting permission.

2. The information furnished in this Modification of the approved Mining Plan is true and correct to the best of my knowledge.

09/07/09

(P.K. Sen)

Regn. No. RQP/CG-RNC/010/87/A

Valid up to 27/11/2011

Place : Ranchi

Date : 09/07/2009

CERTIFICATE

1. Certified that the provisions of Mines Act, Rules and Regulations made there under have been observed in this Modification of the approved Mining Plan and wherever specific permissions are required, the lessee will approach the concerned authorities of D.G.M.S. for granting permission.

2. The information furnished in this Modification of the approved Mining Plan is true and correct to the best of my knowledge.

09/07/09

(P.K. Sen)

Regn. No. RQP/CG-RNC/010/87/A
Valid up to 27/11/2011

Place : Ranchi
Date : 09/07/2009

APPROVED

MODIFICATION OF THE APPROVED MINING PLAN

INDEX

MODIFICATION OF THE APPROVED MINING PLAN

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MODIFICATION OF THE APPROVED MINING PLAN

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INTRODUCTION

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INTRODUCTION

The Mining Plan for Jereidaburu Iron Ore Deposit covers an area of 537 hectare in Ghatkuri R.F. and Kasiapecha P.F., in Jereidaburu Mouza of West Singhbhum District of Jharkhand. It is approved by the Controller of Mines (Central Zone), Indian Bureau of Mines, Nagpur vide letter No. 314(3)/2008-MCCM (CZ)/MP-2 dated 12.08.2008 for the fresh grant of mining lease. Photocopy of approval letter of mining plan is enclosed as Annexure - I. After the approval of mining plan the company applied for Environment Clearance and the EIA/EMP was prepared on the basis of approved mining plan and placed before the MoEF. During the final hearing before the MoEF Expert Committee on 18th Mar, 09, certain points were raised and it was suggested to modify the mining plan on the following issues vide letter No. J – 11015/1208/2007 – IA.II (M) dated 23rd April 2009 (Photocopy attached as Annexure –I).

(i) Information regarding topography of the area should be given. It may be noted that the information given in different documents in this regard is at variance, which may be reconciled.

Action : It is modified accordingly and discussed under para 3.a, Chapter –III, Geology & Exploration.

(ii) The details of first order streams emanating from the mine lease area and impact of the proposed project on the same and thereby on the hydrology of the area.

Action : It is discussed under para 6d, Chapter – VI, Mine Drainage.

(iii) Details and schedule of backfilling.

Action : The details and schedule of backfilling is discussed under para 4.e, Chapter – IV, Mining.

(iv) Details of external OB dump, if any.

Action : The detail of external OB dump is discussed under Chapter –VII, Stacking of Mineral Rejects & Disposal of Waste.

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Controller of Mines (Central Zone)
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(v) The mine plan should be inconformity with the proposed scheme of waste management i.e. the backfilling schedule and external OB dump proposed in the project should be duly integrated and incorporated into the approved mining plan. Wherever necessary, the mine plan should be modified and got approved and submitted.

Action : The proposed scheme of waste management i.e. the backfilling schedule and external OB dump proposed in the project is discussed under para 4.e, Chapter –IV, Mining and para 7.c, Chapter –VII, Stacking of Mineral & Disposal of Waste, under Chapter – XI, Environment Management Plan and Chapter – XII, Progressive Mine Closure Plan.

(vi) Keeping in view the schedule of backfilling and external OB dump, the post mine land use should be modified accordingly and submitted.

Action : The detail about the schedule of backfilling is discussed under para 4.e, Chapter –IV, Mining.

(vii) A written commitment that no red water will be discharged into the river and proposed safeguard measures for the same.

Action : The lessee commits that no red water will be discharged into the river and proposed safeguard will be taken for this. It is discussed under Chapter – VI.

The necessary modifications are made in the mining plan keeping in view the issues of MoEF under rule 22 (6) of MCR, 1960.

The geological and mineable reserves in the area as assessed in the approved mining plan are as under:

Based on the method of estimation of reserve as mentioned above, the details of geological reserve of Iron Ore of Jereldaburu Iron ore mine is given in as under :

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Iron Ore :

Geological Reserve	Category	Reserve (Million Tonne)	Grade	UNFC CODE
	Proved Reserve	74.13	+60% Fe	111
	Probable Reserve	49.19	+60% Fe	122
	Total	123.32	+60% Fe	111 & 122

Mineable Reserve	Category	Reserve (Million Tonne)	Grade	UNFC CODE
	Proved Reserve	49.36	+60% Fe	111
	Probable Reserve	40.08	+60% Fe	122
	Total	89.44	+60% Fe	111 & 122

Considering an average production 3.43 million ton of Iron Ore per annum in the first five years and 6 million tones in the rest of the period of 12 years, the total reserve will last for 17 years. After proposed exploration the reserve figure may be enhanced and accordingly the life of mine may increase.

The proposed target for overburden/waste removal and production of iron ore is given in the table below:

Year	Overburden (m^3) (Weathered Iron Ore/Laterite	Quarry wastes (m^3)	Total Wastes (m^3)	R.O.M. in tonnes.	Stripping Ratio Ore (t): Wastes (m^3)
1st Year	241997	20642	262639	1176594	1:0.22
2nd Year	NIL	45994	45994	2821658	1:0.02
3rd Year	NIL	48929	48929	2788953	1:0.02
4th Year	NIL	78450	78450	4475050	1:0.02
5th Year	NIL	107297	107297	6115929	1:0.02
Total :	**241997**	**301312**	**543309**	**17178184**	**1:0.03**

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The modifications are made in the following chapters of the approved mining plan and other chapters & paras of the approved mining plan remain unchanged.

Chapter No.	Heading	Para No.	Remarks
III	Geology & Exploration	Para 3.a	Modified
IV	Mining	Para 4.b & 4.e.	Modified
VI	Mine Drainage		Modified
VII	Stacking of Mineral Rejects & Disposal of Waste	———	Modified
X	Mineral Processing	———	Modified
XI	Environment Management Plan	———	Modified
XII	Progressive Mine Closure Plan	———	Modified

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CHAPTER–I

GENERAL

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CHAPTER – I
GENERAL

1.a Name & address of Applicant:

M/s Jindal Steel & Power Limited,
241/B, Road No. 2,
Ashok Path, Ashok Nagar,
Ranchi – 834 002 (Jharkhand)
Phone – 0651 – 2242362
Fax - 0651 – 2242363

Registered Office: O.P. Jindal Marg, Hissar – 125005 (Haryana)
Corporate Office: Jindal Centre, 12, Bhikaji Cama Place, New Delhi – 110 066
Nominated Owner: Shri Arun Kumar Mukherjee.

1.b Status of Applicant:

It is a Public Limited Company primarily dealing in Steel manufacturing having its plants at Raigarh in Chhatisgarh and Patratu in Ramgarh district of Jharkhand. The Name and address of Board of Directors is given in **Annexure – II.**

1.c Mineral which are occurring in the area and which the applicant intends to mine:

The applicant intends to mine Iron Ore, which is occurring in the area.

1.d Period for which the mining lease is granted:

The State Government has consented to grant the mining lease for Iron Ore for a period of thirty (30) years vide letter no. 1600/M, dated 18th September 2007 **(Annexure - III).**

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1.e Name of the RQP preparing Mining Plan:

P.K. Sen
Kali Mandir Road,

P.O.	:	Doranda
Dist	:	Ranchi
State	:	Jharkhand
PIN	:	834 002
Phone No.	:	0651 – 2481110
Registration No.	:	RQP/CG-RNC/010/87/A
Date of grant of Renewal	:	26.11.2001
Valid up to	:	27.11.2011.

Photocopy of R.Q.P. Certificate valid up to 27/11/2011 is enclosed in **Annexure – II.**

1.f Name of Prospecting Agency:

M/s Jindal Steel & Power Limited,
241/B, Road No. 2,
Ashok Path, Ashok Nagar,
Ranchi – 834 002 (Jharkhand)
Phone – 0651 – 2242362
Fax - 0651 – 2242363

1.g Reference No. & Date of consent letter from the State Government:

The applicant company is holding a mining lease for Iron ore in TRB Iron ore Mines, Village - Tensa in Sundergarh district, Orissa for an area of 209 Hectares. Other than this lease the applicant company does not have any mining lease.

The State Government has consented to grant the mining lease for Iron Ore for a period of thirty (30) years vide letter no. 1600/M. dated 18th September 2007 **(Annexure - III).**

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Similarly Central Government under section 5(1) of the Mines and Mineral (Development and Regulation) Act, 1957 has conveyed the prior approval for the grant of mining lease in favour of M/s Jindal Steel & Power Ltd. For a period of 30 years, The central Government has instructed the State Government to ensure the compliance of the amended provisions of the Act & Rules and other applicable Act and Rules including Forest (Conservation) Act, 1980 and Environmental Notification dated 27/01/1994 as issued and amended by Ministry of Environment and Forests.

The Mining Plan is prepared as per Rule 22 of M.C.R., 1960 and Rule 23 B of M.C.D.R., 1988 and also to fulfill the requirement to obtain the forest clearance and Environmental clearance.

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CHAPTER–II

LOCATION

&

ACCESSIBILITY

CHAPTER – II
LOCATION & ACCESSIBILITY

2.a Details of Area (with Location Map)

District & State : West Singhbhum, Jharkhand.

Taluka : Gua,

Mouza : Jereldaburu

Khata No. /Plot No. etc. : Land schedule of the area is as under.

Sl. No.	Compartment No.	Area in Ha.	Nature of Land
1.	13	95.85	Ghatkuri Reserve Forest
2.	14	184.09	Ghatkuri Reserve Forest
3.	15	19.17	Ghatkuri Reserve Forest
4.	17	57.51	Ghatkuri Reserve Forest
5.	Kashiya Pecha P.F. No. XXVI	180.38	Kashiya Pecha P.F.
7.	Total Lease Area	537.00	R.F. and P.F.

Whether the Area is Recorded to be in forest : Entire area is under Ghatkuri Reserve Forest and Kashiya Pecha Protected Forest.

Ownership / Occupancy : State Government

Existence of Public Road / Railway Line if any nearby and approximate distance:

The area is situated towards east of Kasiya – Pecha at a distance of about 10 km from Gua Rail Railway station. It is the nearest railway head towards south. The area is approachable by metalled road via Chaibasa –BaraJamda - Gua. Iron ore deposit is also connected from Manoharpur, which is located at a distance of 45 Km from the Jereldaburu deposit via Roam and Chiria More and connected by a motorable road.

The area is situated in between latitudes $22^0$15'00" to $22^0$17'00" N & longitude $85^0$22'42" E to 85^0 24' 21"E of topo sheet no: 73 F/7 of Survey of India. The area forms a part of Ghatkuri reserve forest and a small part is covered under Kasiya pecha PF.

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There are no infrastructural facilities available at the site except the metalled approach road.

Topo Sheet No. with Latitude and Longitude:

The area is situated in between latitudes 22°15'00" to 22°17'00" N & longitude 85°22'42" E to 85° 24' 21"E of topo sheet no. 73 F/7 of Survey of India.

Land Use Pattern (Forest, Agricultural, Grazing, Barren etc):

The Entire proposed area comes under the Kasia – Pecha Protected Forest and Ghatkuri Reserve Forest.

The Forest Compartment wise break up of land is as under:

Sl. No.	Compartment No.	Area in Ha.	Nature of Land
1.	13	95.85	Ghatkuri Reserve Forest
2.	14	184.09	Ghatkuri Reserve Forest
3.	15	19.17	Ghatkuri Reserve Forest
4.	17	57.51	Ghatkuri Reserve Forest
5.	Kashiya Pecha P.F. No. XXVI	180.38	Kashiya Pecha P.F.
7.	Total Area	537.00	R.F. and P.F.

2.b General Location And Vicinity map

Location Map:

Key Plan showing the location of the area forming a part of Topo sheet No. 73 F/7 (Part) is given in **Plate No. 1.**

Lease Area Plan:

Lease Area Plan or Khasra Plan, on a scale of 1:4000 forming a part of forest block map, showing the leasehold area and the forest blocks located therein is given in Plate **No. 2.**

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CHAPTER–III

GEOLOGY

&

EXPLORATION

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CHAPTER – III
GEOLOGY AND EXPLORATION

3.a TOPOGRAPHY

Information regarding topography of the area should be given. It may be noted that the information given in different documents in this regard is at variance, which may be reconciled.

The above modification regarding topography of the area is given below:

The area is a hilly terrain with moderate to steep slope and flat- top. The highest contour within the area is 750m MSL in the southwest part of the area and lowest being 340m MSL towards Northern part of the area.

The perennial water source - River Karo is at a distance of 1km towards NE and around 2km towards East of the area. The area forms a part of Ghatkuri reserve forest and a small part is covered under Kasiya pecha PF. There are no villages within the area.

The tree density within the area is about 0.3 - 0.4. There are no endangered species of flora and fauna found in the area.

There are four distinctive hillocks within the leasehold area. The one in the extreme north eastern part is trending in NNE – SSW, while the second one in western part is trending in

N - S, both these hillock are within Ghatkuri Reserve Forest. The third one within Ghatkuri reserve forest is trending in east-west direction, and the fourth one is near western boundary in NW-SE. All the hillocks have gently sloping topography.

CHAPTER–IV

MINING

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CHAPTER – IV
MINING

4.b Quantum of development and production tonnage and stripping ratio for Zone I (insitu ore body).

Production Targets:

The Iron Ore production target (calculated on the basis of sections X-Y & A-B) for the next five years, along with the target for removal of OB and waste is given below:

Year	Overburden (m^3) (Weathered Iron Ore/Laterite	Quarry wastes (m^3)	Total Wastes (m^3)	R.O.M. in tonnes.	Stripping Ratio Ore (t): Wastes (m^3)
1st Year	241997	20642	262639	1176594	1:0.22
2nd Year	NIL	45994	45994	2621658	1:0.02
3rd Year	NIL	48929	48929	2788953	1:0.02
4th Year	NIL	78450	78450	4475050	1:0.02
5th Year	NIL	107297	107297	6115929	1:0.02
Total :	**241997**	**301312**	**543309**	**17178184**	**1:0.03**

The mine will be worked on three shifts a day. The average number of working days in the year would be 300.

It is proposed to form proper benches in OB and ore and during the next five years of working about 17178184 tonnes of R.O.M. will be produced and this will involve removal of about 543309 m^3 of waste.

4.e Conceptual Mining Plan up to the life of the mine (Lease Period) (Refer Plate No.9, 10A – 10B) :

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At the end of the five-year plan period, the iron ore extraction would be continued from the proposed area in massive ore zone area. The concurrent backfilling and reclamation would not be possible as per the topography of the area as the ore bearing

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12/8/09

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Controller of Mines (Central Zone)
भारतीय खान ब्यूरो

areas are situated either on top of hillock or in the slope of the ore and the mining work will be done by the slicing method. So, OB dump shall be kept within the lease area.

The details of proposed production during the five-year plan of the mine are given in following table and the conceptual plan.

FIVE-YEAR PRODUCTION PLAN

Year	Total Iron Ore in tonnes.
1st Year	1176594
2nd Year	2621658
3rd Year	2788953
4th Year	4475050
5th Year	6115929
Total :	17178184

The production target of ore 6th year onward shall be 6 million tonnes per annum up to the life of the mine.

After the conceptual mining period, on the basis of proposed production planning and available reserve position, the ultimate pit area, ultimate pit depth, ultimate generation of waste, final pits slope, afforestation programme is given in the following table:

Ultimate pit area for Iron Ore	3231800 m^2
Ultimate working depth for Iron Ore for massive and laminated ore from the top of the hillock.	50 m
Ultimate working depth for Iron Ore for float ore	5 m
Ultimate working depth for Iron Ore for lateritic and massive ore with float ore	10 m
Ultimate generation of waste in Iron Ore section	First Five years – 543309 m^3 After five years Up to the life of the mine 3615744 m^3 Total 4159053 m^3 (About 301312 cu.m per annum from 6th year onward)
Compensatory Afforestation programme	10000 saplings per year

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Ultimate dump capacity during Iron Ore mining –

Topsoil stack yard: During the 6th year onward some quantity of soil shall be generated during the excavation of ore. The soil shall be stacked separately near the crushing & screening plant. An area of 2.0 hectares is earmarked for dumping of soil during the conceptual plan period.

Waste Dump: During the course of mining activity in Iron ore, waste dump will be formed. The concurrent backfilling and reclamation would not be possible as per the topography of the area and on the basis of present exploratory data, reserve as estimated, and the ore bearing areas are situated either on top of hillock or in the slope of the area and the mining work will be done by the top slicing method. So, OB dump shall be kept within lease area during the life of the mine.

During this plan period as well as in conceptual period, OB dump shall be created near the northwestern corner of the proposed leasehold area where the topography is almost flat. About 36.15 hect. area will be required for OB dumps during the conceptual plan period and the maximum height of the dump would be 30m. Thus, the ultimate dump capacity would be about 5.12 million cu.m including swelling factor @ 20% of the total production.

The waste dump will be stabilized with coir matting and also planted with various species of saplings. The coir matting shall be started from the northern part of the dump as soon as it reaches the height of 30m. Garland drain and retaining wall will be constructed at the toe of the dump to prevent wash off from the dump.

Year	Total generation of wastes after during the course of excavation of ore. (m^3)
1st	262639
2nd	45994
3rd	48929
4th	78450
5th	107297
6th	301312

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Year	Total generation of wastes after during the course of excavation of ore. (m^3)
7th	301312
8th	301312
9th	301312
10th	301312
11th	301312
12th	301312
13th	301312
14th	301312
15th	301312
16th	301312
17th	301312
Total	4159053
After considering 20 % swelling factor total waste	5120000

Ore Fine dumps: An area of 30.1 hectares is earmarked for dumping of ore fine dump including the safety measures adopted during the conceptual plan period at the southwestern corner of the area. This fine dump shall be created during the course of crushing and screening of the ore. Out of the total ROM production after crushing and screening about 50% recovery of sized ore is anticipated and the rest ore fines (-5mm). Total sized ore shall be dispatched to railway siding for onward transportation to plant. Out of the total fines generated about 80% is planned for pelletization annually and rest 20% shall be stacked. An area of about 30.1 Ha is required for this fines dump. However these fines shall be consumed in future. At the toe of the dump built up in each year a series of temporary parapet wall shall be created to prevent wash off. A series of parapet wall shall be created at the slope of the hill with a garland drain which shall be of permanent nature. The proposed year wise generation of ore fines is given below:

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Year	Total ROM production (MillionTonnes)	Total recovery of Ore fines (-5mm) after crushing & screening @50% (MillionTonnes)	Ore fines after crushing & screening to be dispatched @80% of the total fines. (MillionTonnes)	Ore fines after crushing & screening to be stacked @20% of the total fines. (MillionTonnes)
1st	1.18	0.59	0.47	0.12
2nd	2.62	1.31	1.05	0.26
3rd	2.79	1.40	1.12	0.28
4th	4.47	2.24	1.79	0.45
5th	6.11	3.05	2.44	0.61
6th	6.00	3.00	2.40	0.60
7th	6.00	3.00	2.40	0.60
8th	6.00	3.00	2.40	0.60
9th	6.00	3.00	2.40	0.60
10th	6.00	3.00	2.40	0.60
11th	6.00	3.00	2.40	0.60
12th	6.00	3.00	2.40	0.60
13th	6.00	3.00	2.40	0.60
14th	6.00	3.00	2.40	0.60
15th	6.00	3.00	2.40	0.60
16th	6.00	3.00	2.40	0.60
17th	6.00	3.00	2.40	0.60
Total	89.17	44.59	35.67	2.44

Low grade/sub grade Ore dump:

During the first five years of working no low grade/sub grade ore shall be generated, as the excavation work during this period shall be confined in the massive ore zone. But during the excavation of ore in the 6th year onward there may be possibility of

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generation of low grade or sub grade ore (-55% Fe + 45% Fe) at the tune of 5% per annum and this needs to be stacked separately near the waste dump yard in the north central part of the area for future use or blending with high grade ore and for the stacking of such low grade /sub grade mineral an area of 15.78 hectares is earmarked. The protective measures like parapet wall and garland drain is proposed for this dump. The year wise proposed generation of low grade/sub grade or is given in the following table :

Year	Total generation of low grade/ sub grade ore during the course of excavation of ore. (million tonnes)
6th	0.3
7th	0.3
8th	0.3
9th	0.3
10th	0.3
11th	0.3
12th	0.3
13th	0.3
14th	0.3
15th	0.3
16th	0.3
17th	0.3
Total	3.6
After considering 20 % swelling factor total low grade/ sub grade ore	4.3

Reclamation and rehabilitation - During the course of mining activity in Iron ore, waste dump will be formed. The concurrent backfilling and reclamation would not be possible as per the topography of the area as the ore bearing areas are situated either

on top of hillock or in the slope of the area and the mining work will be done by the top slicing method. So, OB dump shall be kept within lease area.

However, during the first five years of working detailed exploration shall be carried out in the area, the depth continuity of the deposit shall be established by that time and after that the details and schedule of backfilling shall be proposed in the scheme of mining for the second five years of working.

During this plan period as well as in conceptual period, OB dump will be created near the north western corner of the area where the topography is almost flat an area of 6.06 hectares shall be covered by the waste dump during the first five years of plan period and about 36.15 hect. area will be required for OB dump during the conceptual plan period. Thus, the ultimate dump capacity would be about 5.12 million cu.m. including swelling factor @ 20% of the total production.

The waste dump will be stabilized by coir matting and also planted by different saplings. Garland drain and retaining wall will be constructed at the toe of the dump to prevent wash off from the dump.

During the conceptual plan period bench plantation shall be done over the benches left out after exploitation of mineral with suitable species to maintain the aesthetic beauty of the area.

LAND USE PATTERN AT THE END OF FIRST FIVE YEARS OF WORKING

During the five year plan period a total area covered by the mining excavation would be 26.81 hectares with an average depth of 27 m. Out of the total 85.82 hectares area, 26.81 hectares will be used as quarry purpose where as 6.06 hectares of land shall be

used for OB dump during the plan period. During the plan period 15.10 hectares area shall be occupied by roads and 7.27 hectares area shall be utilized for office, garage and work shop etc, 17.08 hects. area shall be used as crusher, screening plant, ROM

stack and crushed ore stack etc. Out of the total area in use 5.00 hectares area will be used for Magazine with safety zone. About 2.2 hect shall be used as water reservoir, 1.8 hect shall be used for settling tanks & silt check dams and 8.16 hect. shall be used for ore fines dump area including safety measures.

PARTICULARS	AREA (HECTARES)
Excavated area	26.81
Overburden Dump	6.06
ROM stack, crushed ore stack, Crusher & screening plant, etc	17.06
Roads	15.10
Magazine with safety zone	5.00
Office building, workshop, etc	7.27
Water reservoir	2.2
Settling tank & silt check dam	1.8
Ore fines dump	8.16
Total	**89.48**

LAND USE PATTERN AT THE END OF THE LIFE OF THE MINE

During the five-year plan period a total area covered by the mining excavation would be 323.18 hectares area with an average depth of 50 m for massive and laminated ore, 5m for float ore and 10m for lateritic ore. Out of the total 537 hectares area, 323.18 hectares will be used as quarry purpose where as 36.15 hectares of land shall be used for OB/waste dump during the plan period. During the plan period 15.10 hectares area shall be occupied by roads, 2.00 hectares area shall be occupied by topsoil dump; 30.1 hectares area shall be used for ore fines dump including safety measures, 1.0 hectares area shall be used for crushed ore stack, 3.04 hectares area for ROM stack for uncrushed ore, 15.78 hectares area for low grade/sub grade mineral stacking for future use and 7.27 hectares area shall be utilized for office, garage and work shop etc, 13.04

hects. area shall be used as crushing & screening plant etc. Out of the total area in use 5.00 hectares area will be used for Magazine with safety zone. About 2.2 hect shall be used as water reservoir, 1.8 hect shall be used for settling tanks & silt check dams. Land for future mining after exploration shall be 54.77 hectares and rest 26.57 hectares area shall be used for green belt.

The land use pattern after the conceptual plan period would be as under:

S.No.	Pattern of utilisation proposed in Ha	Total area in hectares.
1	Mining	323.18
2	ROM stack for uncrushed ore	3.04
3	Low-grade mineral stacking for future use / blending	15.78
4	Top soil stack yard for use in plantation	2.00
5	Dumping of O.B /Waste	36.15
6	Water reservoir	2.2
7	Settling tank & silt check dam	1.8
8	Rest shelter & First Aid station	2.1
9	Ore fines dump	30.1
10	Crushed ore stack	1.0
11	Construction of mine roads.	15.10
12	Magazine with safety zone	5.00
13	Mobile & fixed Crushing & Screening plant, stores, repair shop etc	13.04
14	Laboratory, power house & site office	1.72
15	Exploration equipment shed	0.61
16	Administrative office, canteen, STP, security, work shop garage for HEMM, HSD store, oil trap, sub station, weigh bridge and First Aid Room	2.84
17	Land for future use in mining	54.77
17	Green Belt	26.57
	TOTAL	537.00

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CHAPTER–VI

MINE DRAINAGE

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MINE DRAINAGE

6.a LIKELY DEPTH OF WATER TABLE

Mining is often set with the problem of controlling the surface and aquifer water due to its very occurrence. Iron Ore mineralization in the area occurs on the hill range RL 750 m. surrounding the plain land. The major drainage channel of the area is Karo River, which is located in the N-E and Eastern side, far outside the leasehold area, and is flowing from North to south.

The area represents a steep terrain and there is good forest growth. Formations available may provide for some perched water table depending upon the location of such formations and also the infiltration of water precipitation.

However from the wells nearby Kasia pecha village the water table is at about 10-12m below the surface (RL 390m). Thus there is no possibility of water encountering water table up to a depth of 100m from the hill top surface.

6.b EXPECTED DEPTH OF WORKING

As all the proposed pits of the Jereldaburu Iron ore mine are located either at the hill top or hill slope, therefore there is no chance of inundation of pits from such water. The work will be restricted up to depth of 50 meters from the top of hill.

For the protective measures to prevent the wash off from the dump retaining wall and Garland drain is proposed with settling tanks.

The dimension of drain will be 1.5 m deep & 2 meter wide. Before dumping in the proposed dump area two seasonal nala, which is passing through the area, shall be diverted to the main course of nala. Silt check dams and settling tanks shall be provided at suitable locations to arrest silt flowing out.

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6.c QUALITY AND QUANTITY OF WATER

6.c.1 Rain fall

The lease hold area is located in the West Singhbhum district of Jharkhand and the area in general receives appreciable amount of rain fall, which is in the range of 123.5 – 298.7 mm. per month, most of the precipitation goes on surface run off and finally discharge into the Karo Nala through innumerable water cut channels. The active mining pits shall be on the top of the hill for 5 years period; hence no accumulation of water is likely to remain within the pit.

6.d. The details of first order streams emanating from the mine lease area and impact of the proposed project on the same and thereby on the hydrology of the area.

- The watershed area falls under South Karo river basin.
- The watershed area is bound between Lat - 22° 15' 1"N to 22° 16' 46"N and Long. 85° 22' 58"E to 85° 24' 16"E.
- Three seasonal nalas having independent flow line exists in the area, which is separated by hillocks.
- The first order streams are seasonal only (23 first order streams).

Marking of nalas	Length traveling in the mines area (Km.)	Catchment Area (Sq.Km.)	Design Discharge (cumecs)
X - A	2.75	1.3	13
D - B	1.88	1.3	13
S - C	3.40	1.5	15

Map showing drainage of the Mining Lease Area is given in Annexure.

- The mining operation will be carried out by slicing method and after mining the excavated profile will match to the existing profile of the land.

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- Though the NSL (Natural Surface Level) will be depressed (lower) than the existing levels but the overall drainage and general hydrology will not be affected.
- The first order streams have been studied. These are seasonal only and are of minor in nature having varied small catchments. They ultimately drain out in the main tapping streams marked as "A, B & C". They are situated on high altitudes and are likely to be disturbed during mining operation. As the operation is to be done by slicing method the natural slope of the area will remain more or less the same and thus the drainage & the general hydrology of the area will remain unaltered. There may be slight variation in the existing alignment of these streams during mining process but will be replaced by new first order streams. The overall impact on surface water flow and its drainage to the main carriers will not upset the stability of the area.
- The existing course of the main tapping streams will remain more or less the same. The exit points of these streams at the mine boundary will remain unaltered.

6.e. **A written commitment that no red water will be discharged into the river and the proposed safeguard measures for the same.**

- Silt check dams will be constructed on the 3 main water carriers flowing along the valley in the lease area.
- Dumping areas earmarked for collection and storage of overburdens will be protected by outer retaining walls. Rainwater carriers along the boundary of the dumping area have been provided to meet the main water carriers.
- A detailed design of 3 nos. Silt Check Dams on 3 main carriers has been prepared by M/s Sigma Consultants, Ranchi.
- After treatment it will be ensured that no red water will flow out of leasehold area.

Impacts :

- All three nalas are flowing from South to North in available gradient.
- Mining will involve removal of overburden and dumping.

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- Silt may fall in the streambed, which may be carried during monsoon period away from the mine area.
- The excavation and quarry operation will be done in the banks and bed of these nalas to extract mineral ores.
- This will create temporary depression and cuts along the rivulet.
- The ultimate flow of the silt along with water will be started from the boundary of the mining lease area.

Proposed preventive measures:

- To arrest the silt and debris within the quarry area, construction of 3 nos. silt trap check dams will be done on the three main streams flowing in the mining lease area as shown in the plan at points A, B & C.
- The slicing method of mining will also arrest silt & debris in the lower portions and will arrest part of the overburden and debris.
- The silt trap check dams will be constructed near the boundary line of mining lease area to arrest silt within the mining lease area and allowing clean water to flow down without polluting the outflow. Necessary provision of outlets for flowing out the clean water has been made in the check dams.
- De-silting of the area U/s of the check dam will be done periodically to maintain the effectiveness of silt trapping arrangements in the mining lease areas.
- Provision of dump area has been made within the mining lease area as shown in the plan.
- To arrest silt from the dump area, construction of series of parapet walls at the boundary of the dump area and construction of garland drains out side all along the boundary will be done. The drain will be connected to the nalas U/s of proposed silt check dams.
- After treatment with some chemicals it will be ensured that no red water will flow out of leasehold area.
- The discharge water will be analysed on quarterly basis.

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CHAPTER–VII

STACKING OF MINERAL REJECTS & DISPOSAL OF WASTES

CHAPTER – VII
STACKING OF MINERAL & DISPOSAL OF WASTES

7a NATURE AND QUANTITY OF SOIL, OVERBURDEN/ WASTE AND MINERAL REJECTS.

7.a.1 Top Soil

During the first five years of working no topsoil shall be encountered

7.a.2 Overburden

There is overburden of laterite & weathered Iron ore.

7.a.3 Quarry waste

During the mining operation quarry waste in the form of inter burden will be generated as per schedule of operations as per the table given below:

Year	Overburden in cubic meter (Weathered Iron Ore/Laterite	Quarry wastes in cubic meter	Total Wastes in cubic meter
1st Year	241997	20642	262639
2nd Year	NIL	45994	45994
3rd Year	NIL	48929	48929
4th Year	NIL	78450	78450
5th Year	NIL	107297	107297
Total :	**241997**	**301312**	**543309**

7.b LAND CHOSEN FOR DISPOSAL OF WASTE

Location of proposed dumpsite has been shown in **plate no. 7 – 7E**. The sites were selected after considering various alternative locations based on the following:-

On the basis of surface exposures of litho unit the possibility of ore body is less and before undertaking the dump operation a few bore hole through will be given for proving the possibility of ore mineralization.

- Lies within the lower most area.
- Comparatively flatter area so that maximum quantities can be accommodated within shorter space.

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- Easily approachable.
- For the protective measures to prevent the wash off from the dump retaining wall and Garland drain is proposed with settling tanks.
- The dimension of drain will be 1.5 m deep & 2 meter wide. Before dumping in the proposed dump area two seasonal nala that is passing through the area shall be diverted to the main course of nala.

7.c **Maximum height and spread of Dumps (Refer Plate No.7 – 7E):**

Maximum height of 30 m for OB dump may be considered reasonable for the type of overburden and terrain condition that may be encountered at this mine. The area is slightly undulating and there is variation in height from 402m to 403.5 m RL at different places where dumping is proposed. For initial dump formation at the proposed location a ramp will be formed by gradual dumping of overburden/pit waste and forming an approach at a gradient not exceeding 1 in 16 so as to reach up to a height of 415 m RL. After attaining at 415m RL, dump is to be extended towards North, East and West direction maintaining a uniform level. From the mine, usually dumpers carrying overburden/waste would be unloaded at the dump, and thereafter the materials are pushed mechanically on the down slope side to maintain a uniform level. At the slope, the material would remain intact following the angle of repose of dump material. (Say 28^0 in the case of general waste). Due to movement of dumper at the top, the material would be compacted and shall remain as hard as compact mass. In this way the first level (Dump-1) at 415 m RL shall be formed. Final dump height shall be about 430m RL. In this way dump during the first five years will be created in two stages. The wastes during the first five years of working shall occupy an area of 6.06 hectares with a height of 30m.

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During active stage of dump, the slope would be made stable by coir matting in the northern part of the dump and planting shrubs and grasses and after completion of dump, the entire area including the top surfaces would be planted with local varieties of trees after spreading top soil over it.

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7.d Stacking of Sub-grade (Low grade) material:

Low grade / sub grade ore dump : During the first five years of working no low grade/sub grade ore shall be generated as the excavation work during this period shall be confined in the massive ore zone.

Ore Fine dumps: An area of 8.16 hectares is earmarked for dumping of ore fine dump including the safety measures adopted during the [illegible] plan period at the southwestern corner of the area. This fine dump shall be created during the course of crushing and screening of the ore. Out of the total ROM production after crushing and screening about 50% recovery of sized ore is anticipated and the rest ore fines (-5mm). Total sized ore shall be dispatched to railway siding for onward transportation to plant. Out of the total fines generated about 80% is planned for pelletization annually and rest 20% shall be stacked. An area of about 8.16 Ha is required for this fines dump. The height of the dump would be 15 m. However, these fines shall be consumed in future. At the toe of the dump built up in each year a series of temporary parapet wall shall be created to prevent wash off. A series of parapet wall shall be created at the slope of the hill with a garland drain, which shall be of permanent nature. The proposed year wise generation of ore fines is given below:

Year	Total ROM production (MillionTonnes)	Total recovery of Ore fines (-5mm) after crushing & screening @50% (MillionTonnes)	Ore fines after crushing & screening to be dispatched @80% of the total fines. (MillionTonnes)	Ore fines after crushing & screening to be stacked @20% of the total fines. (MillionTonnes)
1st	1.18	0.59	0.47	0.12
2nd	2.62	1.31	1.05	0.26
3rd	2.79	1.40	1.12	0.28
4th	4.47	2.24	1.79	0.45
5th	6.11	3.06	2.44	0.61

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CHAPTER–X

MINERAL PROCESSING

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CHAPTER – X
MINERAL PROCESSING

10.1 A screen will be installed to separate gangue from ore during first two years power will not be available, as the power line has to be sanctioned after DRP clearance. Hence power will be supplied by 1500 KVA DG Set. Another DG set of 50 KVA of capacity will be provided for use during non-working shifts.

A full-fledged crushing & screening plant will be commissioned in third year of operation after opening of mines. It will have a capacity of 1500 TPH. Initially, a mobile crusher having capacity of 400TPH will be installed.

Flow sheet of crushing & screening is given in FIG. 2.

For transportation of ore, 35 MT capacity dumpers or higher will be used from mines to crushing plant. Conveyor Belt will transport the sized Ore from crushing & screening plant to Gua Railway siding. It will be transported by rail to the captive plant situated at Patratu.

10.2 **Mineral Beneficiation :**

Initially only crushing and screening of ore will be done at mine site. ROM grade ore as such cannot be sent directly to the plant. ROM ore will be subjected to crushing and dry screening.

Out of the total ROM production after crushing and screening about 50% recovery of sized ore is anticipated and the rest ore fines (-5mm). Total sized ore shall be dispatched to railway siding for onward transportation to plant. Out of the total fines generated about 80% is planned for pelletization annually and rest 20% shall be stacked. An area of about 8.16 Ha is required for this fines dump. However these fines shall be consumed in future. The crusher will be equipped with dust suppression system and there will be dry screening. The dispatch grade of ore will be maintained as per the requirement of captive plant.

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In future if need be a permanent ore beneficiation plant (wet) will be constructed for maximum utilization of low-grade ores available with in the lease and enhance the quality of the ore to the extent possible.

Material balance chart will be provided after opening the mines and testing the plant.

10.3 **Proposed R & D studies:**

In the first year of working during the first five year of plan period, characterization study for mining waste to assess the extent of iron ore associated with lateritic and clayey gangue and studies on amenability for beneficiation for ROM for higher recoveries shall be carried out.

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CRUSHING AND SCREENING PLANT

FLOW SHEET

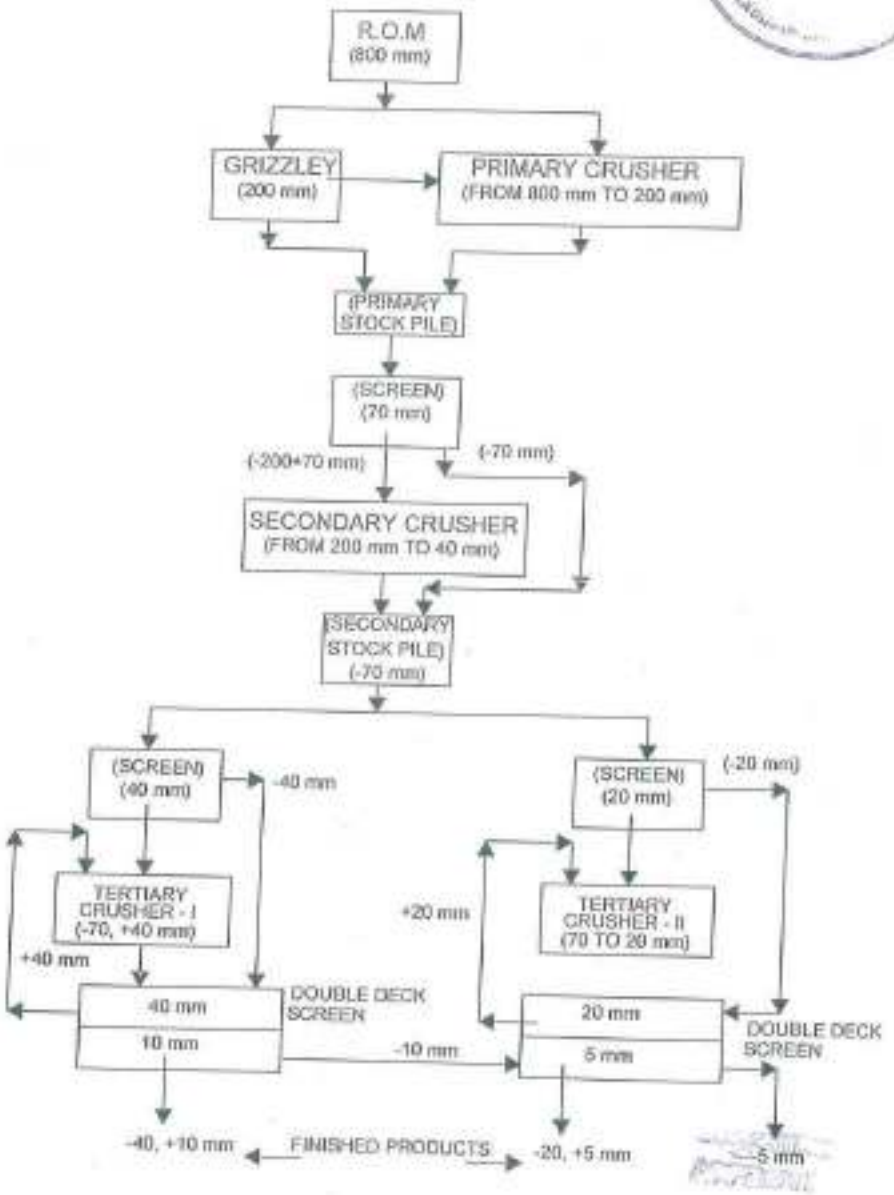

FIG -2

CHAPTER–XI

ENVIRONMENT MANAGEMENT PLAN

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CHAPTER – XI
ENVIRONMENT MANAGEMENT PLAN

11.a A Key Plan as per Rule 28(5)(a) on a scale of 1:50000 has been prepared incorporating boundary of the mining lease and adjoining area lying within five kilometers there of contours, natural drainage system, roadways, forests, village boundary, predominant wind direction n **(Refer Plate No. 1)**.

An Environment Plan of the area of mining lease inclusive of the adjoining area within five hundred meters of the boundary of the lease area on 1:5000 scale incorporating the boundary of the mining lease, contour lines, roadways, forests, predonminant wind direction, air and water sampling point has been prepared under Rule 28(5)(b) – **(Refer Plate No. 8)**.

Base line data generation will be completed within January 2007 and the lessee will submit the EIA & EMP within six months. However, Base line data generated for Jereldaburu Iron Ore deposit. is enclosed as Annexure- VI.

11.a.1 Existing Land Use Pattern :

The area occupies an undulating topography having elevation difference of 410m between 340m –750m RL and surrounded by plain country. Within the lease, the area occupied by reserve forest and protected forest land etc.

Sl. No.	Compartment No.	Area in Ha.	Nature of Land
1.	13	95.85	Ghatkuri Reserve Forest
2.	14	184.09	Ghatkuri Reserve Forest
3.	15	19.17	Ghatkuri Reserve Forest
4.	17	57.51	Ghatkuri Reserve Forest
5.	Kashiya Pecha P.F. No. XXVI	180.38	Kashiya Pecha P.F.
7.	Total Area	537.00	R.F. and P.F.

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11.a.2 Water Regime :

Mines are on the western limb of the famous Horseshoe shaped synclinorium. In this mine, there are dry nalas running from north to south. The highest point of the deposit is at 750 meters above M.S.L. In the southern part, within forest area, there are small dry nalas. There are fluctuations in Ground water table, which is observed in the well situated in village Jereldaburu.

11.a.3 Human Settlement and Demographic Profile:

Population:

The nearest town Barajamda is 16kms. away by road. Within 5 Km radius of the lease hold area, a population of about 7584 resides mainly in Kashiya Pecha, Pecha Hattu, Ghatkuri, Gangda, Bara Gangda, Lipunga, Raika, etc.

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

Demographic profile of the area is annexed.

11.a.4 Employment & Occupation :

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

11.a.5 Water Supply :

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

11.a.6 Health Care :

SAIL's Gua Hospital is located about 10 km away from the mine. Apart from the above hospitals, a health center is also located at Barajamda.

11.a.7 Education :

The area is having the following moderate facilities for schooling.

Primary School	At Gangda Village.
High School	At Gua.
College	At Gua

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11.a.8 Other Infrastructural Facilities :

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

11.a.9 Public Building etc :

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

11.a.10 Water Quality and Air :

Quality of Ambient Air:

M/s Bhagavati Analab has carried out ambient quality monitoring in the area for the preparation of REIA and data is available for this area. Ambient air quality is monitored at different locations around the proposed area and the ambient air quality (AAQ) data is annexed as **Annexure-V.**

Information on baseline AAQ data particularly the SPM, RSPM, NOx and the contribution of the proposed project :

Baseline AAQ Monitoring Results (98th Percentile Values)

Location Code	Location	Unit: µg/m3			
		SPM	RSPM	SO2	NOX
A1	Core Zone-1	89.1	29.6	9.5	13.1
A2	Core Zone-2	90.6	32.6	9.8	13.1
A3	Pechahatu	92.6	33.3	10.2	17.4
A4	Lambera	90.9	32.0	10.4	15.4
A5	Ghatkuri	108.3	46.9	10.3	15.9
A6	Raika	93.4	39.7	11.2	15.8
A7	Lipunga	107.8	42.5	11.2	15.3
A8	Hamsada	143.2	56.9	12.7	18.0
A9	Rajabera	95.0	33.5	10.1	14.4
A10	Nuia	143.7	72.5	12.1	18.6

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Overall Scenario

	SPM (µg/m3)		NOX (µg/m3)	
	Core Zone	Buffer Zone	Core Zone	Buffer Zone
Baseline Concentration	90.70	146	13.30	18.7
Predicted Increase	60.44	< 2.0	6.03	2.0
Overall Scenario	151.14	148	19.33	20.70

Isopleths of SPM and Isopleths of NOX (Transportation of 2.61 Million Tons during 2nd Year) is studied and given in Annexure – V.

Water Quality:

M/s Bhagavati Analab has carried out Water quality monitoring in the area for the preparation of REIA and data is available for this area. Water quality is monitored at different locations around the proposed area and the Water quality data is annexed as **Annexure-VI.**

11.a.11 Flora & Fauna:

The Jereldaburu Iron Ore Mines is a part of Ghatkuri Reserve Forest of West Singhbhum district, here all types of Timber yielding plants are present and they are as follows. :

Shoree robusta (sal), Pterocarpus marsupium, (Bija & piasal), Terminalia tomentosa (asan), Anogeissus latifolia (dhaura), Ardina Crodifolia (Karam), Gmelia arborea (Gamhar). Besides above timber yielding plants at this mine, there are Terminalia chebula (herra), Terminalia belarica (Behera), Madhuca Indica (Mohua), Scheibechera trijuga (Kusum), Ficus bengalensis (Banyan) etc.

The fruit yielding plants found within M.L. area are Diospyros metanexylon (kendu), Anthocephalus cadamba (Kadam), syzygeium jambolana (Jamum), Aeglemarelos (Bail), with Zizyphus jujube (Bair) and Phyllanthusembica (aonla).

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Also there are shrubs and bushes within target area. It is observed that within this mine there are 132 trees of 1 ft. girth & above per acres, or 226 trees per hectares. So, the density of Forest growth as observed is less than one may be 0.2.

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

11.a.12 Climatic Condition :

As Jereldaburu Iron Ore Mines is situated about 750 m above M.S.L. and it has a salubrious climate- April to Mid June, being summer months, the temperature rises up to 42^0 C (max.). In severe winter month of December, January, the temperature has recorded up to 7.5^0 C (min.). Monsoon lasts for about 5 months from mid-June to October. The average annual rainfall is about 200 cms. The wind speed rises to 40 kms/hour with wind direction from Southeast to North West. However, vagaries of the nature are felt through out the year.

11.a.13 Whether the area comes under notified area under Water Act, 1974 :

In fact, entire State of Jharkhand notified as the Pollution Control area under the Water Act, 1974. By virtue of its location, the area falls under the notified area under the Water Act, 1974.

11. b. Environment Impact Assessment:

Open pit mining of any dimension is likely to cause some amount of unbalance to the existing environment. Further, any amount of chance in the existing environment brings some change in the surrounding vegetation, animal and human life. The complexity of assessment of these changes is increase by the fact that the group adversely affected are often no the same group, who are benefited by it. There fore while assessing the impact, a balance between the odes and benefits should be drawn properly with the background of over all perspective of the project.

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The mining operation proposed in this mine will be mechanized open cast mining. Considering the proposed scale of operation and assessing the base line data on physical environment (existing land use pattern, water regime, climate conditions like rain fall/temperature, ambient air quality, noise level etc), ecological environment (population, occupation, education are has brought some positive effect on life, better employment potentiality, better health care, better living, water supply and sanitation conditions, better educational facilities etc.).

The major adverse/negative affects are definitely due to deforestation and land degradation that will be temporary, as the area will be reclaimed by suitable reclamation scheme in future. The impact of mining on various important environmental parameters is given below:

11.b.1 Land Environment :

Landscape due to mining activity will be affected during future mining operation.

Quarries will be formed during mining activity and overburden will be dumped. These will create ugly scar on earth surface.

11.b.2 Aesthetic Environment:

Open – cast mining results in change of aesthetic environment.

11.b.3 Soil and Land Use Pattern:

There is no topsoil generation in the area. Present and post land use pattern are given below :

Land Use Pattern:

It is broadly assessed that the land use in the pre – operational stage was as under :

Sl. No.	Compartment No.	Area in Ha.	Nature of Land
1.	13	95.85	Ghatkuri Reserve Forest
2.	14	184.09	Ghatkuri Reserve Forest
3.	15	19.17	Ghatkuri Reserve Forest
4.	17	57.51	Ghatkuri Reserve Forest
5.	Kashiya Pecha P.F. No. XXVI	180.38	Kashiya Pecha P.F.
7.	Total Area	537.00	R.F. and P.F.

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Land Use after five years of working:

During the mining operation, the land will be acquired for mining activity and other infrastructure. The post operational land use pattern will be as under:

PARTICULARS	AREA (HECTARES)
Excavated area	26.81
Overburden Dump	6.06
ROM stack, crushed ore stack, Crusher & screening plant, etc	17.08
Roads	15.10
Magazine	5.00
Office building, workshop, etc	7.27
Water reservoir	2.2
Settling tank & silt check dam	1.8
Ore fines dump	8.16
Total	**89.48**

11.b.4 Forest:

The entire area is under reserve and protected forest. A forest diversion proposal is prepared and after the approval of mining plan it will be submitted to the concerned authority.

11.b.5 Vegetation:

There are no. of vegetation is found within the proposed area & during the time of diversion of forest land this vegetation will be cut after enumerated by the forest department. At this stage it is difficult to count the number of trees to be cut for carrying out mining operation and allied activities

11.b.6 Agriculture:

No Agricultural land will be affected due to mining operation, as the entire area is forest land.

11.b.7 Public Building, Places, and Monuments:

There is no public building, places or monuments near the leasehold area; hence no impact will be noticed for that.

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11.b.8 Water Environment:

Surface Water:

There are few seasonal nalas flowing within lease. As the deposit is in hilly terrain and mining will be by top slicing method, the change in topography is not likely to have an impact on the hydrology of the area. Rain water flowing through the exposed mine cuts may carry sediments of aluminous laterites. These are found to be non-toxic element. Surface runoff water from mines has only high turbidity during monsoon. Settling tanks and silt check dams of sufficient capacity shall be constructed at suitable locations to arrest silt from flowing out. Domestic effluents, being of less volume would contribute nothing to pollution. However, an STP (sewage treatment plant) of sufficient capacity shall be provided to take care of domestic effluents.

Impacts of red water :

- All three nalas are flowing from South to North in available gradient.
- Mining will involve removal of overburden and dumping.
- Silt may fall in the streambed that may be carried during monsoon period away from the mine area.
- The excavation and quarry operation will be done in the banks and bed of these nalas to extract mineral ores.
- This will create temporary depression and cuts along the rivulet.
- The ultimate flow of the silt along with water will be started from the boundary of the mining lease area.

Ground Water Source :

The area is having ample ground water as evident by the presence of well and tube-well in the villages down the hill. There will be no impact on ground water due to mining operation, as the ultimate depth of working does not intersect ground water table.

Water Quality:

No change will be noticed due to mining operation as the source of drinking water is far away from the area.

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11.b.9 Air Environment:

Noise:

Noise will produce due to movement of vehicles, drilling and blasting, loading and unloading and sound of working tools, which will be used during mining operation.

Air:

Emission of dust due to movement of vehicles, loading, unloading, drilling and blasting will produce impact on air.

11.b.10 Climatic Condition:

No climatic change will be observed due to mining operation in the area.

11.b.11 Socio – economic Environment:

Social and Demographic Profile:

Literacy in the area is very low and cultivation is the only source of income and the people of the area are used to live in hardship. Due to mining operation, their livelihood will be uplifted and literacy could be observed more in the surrounding area because of employment generation due to mining activity directly or indirectly. Thus, due to mining operation, their traditional culture could be changed but financial condition would be improved by getting employment in the mine and in allied work.

Occupation Health and Safety:

There will be no change in occupational health and safety due to mining activity.

Human Settlement:

There is no human settlement within or near working area so, no change could be observed due to mining operations.

Recreation Facility:

Mining activity in the area does not affect the recreation facility of the local inhabitants. They get facility of recreation by mobile movie and other cultural programmes provided by local authority and mine owners.

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11.c. ENVIRONMENT MANAGEMENT PLAN (Refer Plate No. 11)

Based on the base line information possible environment impact due to mining activities has to be identified and to be assessed it may be suggested that the adverse impact can also be controlled, if proper environmental control measures are to be implemented. The major mitigation measures are proposed to be minimized the environmental degradation in respect of each effected area during operation of the mine are discussed below:

11.c.1 Land Scape:

During the course of mining activity in the first five years of mining, the area will be developed by making quarry and this will change the landscape of the area. During the mining plan period, it is not possible to carry out backfilling process, due to continuity of Ore in depth as assumed. It is suggested that whatever overburden and wastes will be removed it will be dumped in the dumping yard during this period.

11.c.2 Waste dump management:

- Total overburden generation during the first five year plan period will be around 0.54 million cum.
- Surface dumping will be carried out within mine lease area.
- The sides are required to be sloped inwardly. The tops as well as the sides are to be kept stable by regular planting of sapling of local verities as well as shrubs and grass in between the plants. In both the above cases plants are also required to be planted at the foot of the lower level of the dump to arrest any possible rolling down of boulders from the top level while dumping.
- Dumps will be rehabilitated by biological remediation like coir matting etc.
- Dump height will be 30 mtrs. In 2 stages of 15 mtrs each with 28° overall dump slope.
- The dump will be protected with lateritic parapet wall.
- Dump will be afforested for stabilization.

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- Garland drains will be constructed around the dumps of 2.0m wide X 1.5m deep beyond the dry wall to hold dump wash off if any, coming out of the dry wall and to allow clear water to drain off.
- Garland drains will be linked to series of settling tanks & silt check dams to arrest silt flow outside lease boundary.

Dust Suppression:

Generation of dust due to mining activates may cause health hazard, but at this area considering large scale of operation of mining activities to achieve targeted production. It is anticipated that the generation of dust due to mining and handling of materials will be minimum and it will have least adverse effect on surrounding environment due to encircling of mining zone by green belt and distant locality of human settlement. The test results will be conducted by drawing air samples from strategic points of mine.

However more precautions will be taken to minimize the generation of dust particularly during and blasting operation by use dust extractor (for drilling) and by proper steaming for blasting. Dust Mask will be provided to the operators.

11.c.3 Aesthetic Environment:

Aesthetic environment can be maintained only after backfilling and reclamation of the area. After reclamation, the area will be afforested by suitable species of plants. However, in this plan period, this process cannot be adopted, and the scheme of backfilling will be proposed in the scheme of mining after the exploration in the area during the first five years of plan period.

11.c.4 Soil and Land Use Pattern:

There is no topsoil. So, there will be no requirement of precautionary measure at this stage.

It is broadly assessed that the land use in the post operational stage will be as under :

Land Use after five years of working:

During the mining operation, the land will be acquired for mining activity and other infrastructure. The post operational land use pattern will be as under:

PARTICULARS	AREA (HECTARES)
Excavated area	26.81
Overburden Dump	6.06
ROM stack, crushed ore stack, Crusher & screening plant, etc	17.08
Roads	15.10
Magazine	5.00
Office building, workshop, etc	7.27
Water reservoir	2.2
Settling tank & silt check dam	1.8
Ore fines dump	8.16
Total :	89.48

11.c.5 Agriculture:

No agricultural land will be disturbed due to mining operation.

11.c.6 Afforestation Programme:

The entire area is under reserve and protected forest .A forest diversion proposal is prepared and submitted with a copy of approved mining plan to the concerned authority and it is under process.

Compensatory afforestation will be carried out at proposed site in Latehar, Giridih, and Gumla districts of Jharkhand, which are acquired for this. Considering a grid of 2.5m x 2.5m about 31.25 hectares area, the total number of saplings will be 50000. So every year Approx 10000 numbers of sapling of different species, mainly fruit – bearing plants like Mahua, Mango, Jackfruit, Sakhua (as per availability) will be planted.

Year	No. of saplings to be planted	Type of saplings	Rate of survival
1st Year	10000	Chakunda, Akasia, Karanj, Mango and Neem	80%
2nd Year	10000	Chakunda, Akasia, Karanj, Mango and Neem	80%
3rd Year	10000	Chakunda, Akasia, Karanj, Mango and Neem	80%
4th Year	10000	Chakunda, Akasia, Karanj, Mango and Neem	80%
5th Year	10000	Chakunda, Akasia, Karanj, Mango and Neem	80%

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11.c.7 Water Environment:

- It will be a 'Zero Discharge Mine'.
- Dry process crushing will be adopted.
- Construction of garland drains all around the pit and dump area.
- Providing sufficient gully checks & check dams to protect surface run-off in the valleys.
- De-silting of check dams after monsoon and will be stacked in OB dump.
- Provision of retention walls at the foot of the dumps.
- Provision of soak pit for canteen, office
- Provision of Oil & grease trap for workshop/garage
- After proper mitigation measure such as PC compound addition in water for sprinkling, use of drip irrigation for permanent plantation, etc.
- During monsoon the rain water from screening plant as well as from other sources will be collected in to siltation pond and discharge to the natural course of water after dosing of Micah Flock as flocculating agent to control the contamination of red water due to run off.

Water Conservation & Harvesting Management Plan :

Plan for Core Zone

- Construction of fines collection tank.
- Construction of hard stone bunding around waste dump as barrier.
- Construction of Retention walls at the foot of the dumps.
- Shifting type rain water harvesting structure at mining site
- Construction of silt catcher earthen drains
- Construction of Siltation Pond

Plan for buffer Zone

- Construction of rain water harvesting tank.
- Construction of boulders wrapped by galvanized chain gabion.
- Construction of gully plugs across the streams.
- Construction of earthen contour trench to reduce surface runoff.
- Construction of vegetative barrier across the gully.

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- Construction of Rain water harvesting structure
- Once Pipe conveyor for ore transportation and rapid loading system for railway loading are commissioned, water requirement for dust suppression will reduce.

Proposed preventive measures for red water discharge:

- To arrest the silt and debris within the quarry area, construction of 3 nos. silt trap check dams will be done on the three main streams flowing in the mining lease area as shown in the plan at points A, B & C.
- The slicing method of mining will also arrest silt & debris in the lower portions and will arrest part of the overburden and debris.
- The silt trap check dams will be constructed near the boundary line of mining lease area to arrest silt within the mining lease area and allowing clean water to flow down without polluting the outflow. Necessary provision of outlets for flowing out the clean water has been made in the check dams.
- De-silting of the area U/s of the check dam will be done periodically to maintain the effectiveness of silt trapping arrangements in the mining lease areas.
- Provision of dump area has been made within the mining lease area as shown in the plan.
- To arrest silt from the dump area, construction of series of parapet walls at the boundary of the dump area and construction of garland drains out side all along the boundary will be done. The drain will be connected to the nalas U/s of proposed silt check dams.
- After treatment with some chemicals it will be ensured that no red water will flow out of leasehold area.
- The discharge water will be analysed on quarterly basis.

11.c.8 Air Environment:

(i) Noise:

Jereldaburu Iron Ore Mine of JSPL will adopt the following control measures to reduce noise levels due to mining :

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Mines

- **Drilling**
  - Sharp drill bits
  - Acoustic enclosure for compressure
  - Silencer in exhaust
- **Blasting**
  - Avoid blasting in high wind condition
  - Controlled blasting using NONEL
  - No secondary blasting
- **Crushing & Screening**
  - Acoustic enclosure
  - Dampers in foundation structures
  - Covered conveyors within the plant area
  - Polyurethane screen cloth for noise reduction
  - Poly liners at chutes and hopper
  - Haul road design with proper gradient (1/16) and super elevation
  - Periodic maintenance
- **Excavation**
  - Sound enclosures in engine
  - Sharp teeth
  - Periodic maintenance
- **Besides all these**
  - It will be advised to use PPE at work place.
  - Green belt in and around the mine
  - Vibration study on equipment will be carried out periodically
  - Preventive maintenance of HEMM (Condition Based Monitoring)

(ii) Air:

Air pollution can be reduced by :

Controlling Dust Levels

- **Drilling**
  - Wet drilling to arrest dust at source
  - Dust extractor with bag filters
  - Sharp drill bits
- **Blasting**
  - Avoid blasting in high wind condition
  - High pressure fog canon to arrest fumes & dusts during blasting
  - Blasting during afternoon
  - No secondary blasting, hydraulic rock breaker will be deployed
- **Crushing & Screening**
  - Dry fogging at hopper, transfer points
  - Dust extractors and Bag Filters
  - Atomized sprinkling along conveyor wherever applicable
  - Covered conveyors within the plant area
  - Control in loading to dumpers to avoid spillages
  - Haul road design with proper gradient (1/16) and super elevation
  - Emission standards meeting Bharat Stage II norms
- Transportation of Ore to Railway Siding
  - For the initial ramp up period, by covered trucks (Preferably with high capacity units to reduce no. of trips)
  - Mobile water tankers on road
  - Strengthening, widening & repair of road
  - A study was conducted to explore the feasibility of ore shipment by pipe conveyor. For DPR, an expert agency has been engaged.
  - Rapid-load-out system for rake loading (20000 TPD)
  - Sharp teeth
- General measures :
  - Dust masks will be provided to all workers.
  - Afforestation (1600 / ha) for control of dust.

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(Plantation of trees and tall grass along approach roads and on safety barrier zones will be done to help suppress the dust)

Ambient air quality will be monitored for one year in three seasons (excluding rainy season). In each season, monitoring will be carried out for one month on two days in a week with three eight-hourly samples being collected on each day.

11.c.9 Socio – economic Environment:

(i) **Social and Demographic Profile:**

As social and demographic profile will be improved by mining activity, taking any remedial measure does not arise.

(ii) **Occupational Health and Safety:**

As there will no change in the occupational health and safety, no safeguard has been proposed. However, the lessee will take care of the workers and their family and villagers in respect of their health and safety.

(iii) **Human Settlement:**

As there is no village within the leasehold area, disturbances due to mining activity do not arise. Rather, it improves the life style and socio – economic condition of the near by villagers by giving them employment.

(iv) **Protection of Sites of Religious / Historical and Tourist Place:**

There are no such places near the leasehold area. No effect due to mining activity is inferred. Therefore taking of any remedy to protect the above does not arise.

CHAPTER–XII

PROGRESSIVE MINE CLOSURE PLAN

CHAPTER – XII
PROGRESSIVE MINE CLOSURE PLAN
UNDER RULE 23 B (2) OF M.C.D.R., 1988

12.1. **Introduction:**

The name of the lessee, the location and extent of lease area, the type of lease area (forest, non-forest etc) the present land-use pattern, the method of mining & mineral processing operations:

Name & address of Applicant:

M/s Jindal Steel & Power Limited,
241/B, Road No. 2,
Ashok Path, Ashok Nagar,
Ranchi – 834 002 (Jharkhand)
Phone – 0651 – 2242362
Fax - 0651 – 2242363

The extent of the area:

Details of the land covered under the area **(Refer Plate No. 2).**

1. District & State : West Singhbhum, Jharkhand
2. Taluka : Kolhan, Chaibasa.

Sl. No.	Compartment No.	Area in Ha.	Nature of Land
1.	13	95.85	Ghatkuri Reserve Forest
2.	14	184.09	Ghatkuri Reserve Forest
3.	15	19.17	Ghatkuri Reserve Forest
4.	17	57.51	Ghatkuri Reserve Forest
5.	Kashiya Pecha P.F. No. XXVI	180.38	Kashiya Pecha P.F.
7.	Total Area	537.00	R.F. and P.F.

Method of Mining :

It is already discussed under Chapter – IV para 4.f of the mining plan.

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Mineral Processing:

It is already discussed under Chapter – X para 10.0 of the mining plan.

12.1.1 **Reasons for Closure** :

The reasons for closure of mining operations in relation to exhaustion of mineral lack of demand, uneconomic operations, natural calamity, directives from statutory organization or court etc.

The area is virgin and more exploration proposal is given for the entire area for proper and better, systematic and scientific development of the area as such there will be no such closure in the area.

12.1.2 **Statutory Obligations** :

The legal obligations, if any which the lessee is bound to implement like special conditions imposed while execution of lease deed, approval of mining plan, directives issued by the Indian Bureau of Mines, conditions imposed by the Ministry of Environment & Forests, State or Central Pollution Control Board or by any other organization describing the nature of conditions and compliance position there of :

All Specific permissions from I.B.M. under M.C.D.R. 1980, DGMS under MMR – 1961, Ministry of Environment and Forest, State or Central Pollution Control Board or by any other organization will be obtained before commencing actual mining operation.

12.1.3 **Closure Plan Preparation** :

The names and addresses of the applicant and recognized qualified person who prepared the Mine Closure Plan and the name of the executing agency should be furnished. A copy of the resolution of the board of Directors or any other appropriate administrative authority as the case may be on the decision of closure of mine should be submitted.

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Name & address of Applicant:

M/s Jindal Steel & Power Limited,
241/B, Road No. 2,
Ashok Path, Ashok Nagar,
Ranchi – 834 002 (Jharkhand)
Phone – 0651 – 2242362
Fax - 0651 – 2242363
Registered Office – O.P. Jindal Marg, Hissar – 125005 (Haryana)
Corporate Office – Jindal Centre, 12, Bhikaji Cama Place, New Delhi – 110 066
Nominated Owner –Shri Arun Kumar Mukherjee.

Name of the RQP preparing Mining Plan:

P.K. Sen
Kali Mandir Road,

P.O.	:	Doranda
Dist	:	Ranchi
State	:	Jharkhand
PIN	:	834 002
Phone No.	:	0651 – 2481110
Registration No.	:	RQP/CG-RNC/010/87/A
Date of grant of Renewal	:	26.11.2001
Valid up to	:	27.11.2011.

The name of the executing agency : M/s Jindal Steel and Power Limited.

12.2 **Mine Description :**

12.2.1 **Geology :**

Briefly describe the topography and general geology indicating rock types available, the chemical constituents of the rocks / minerals including toxic elements if any, at the mine site.

Geology including physiography of the area as well as on regional scale is briefly discussed under Chapter – III of the mining plan.

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12.2.2 Reserves :

Indicate the mineral reserves available category wise in the lease area estimated in the last mining plan / mining scheme approved along with the balance mineral reserves at the proposed mine closure including its quality available (for final mine closure plan only).

Based on the method of estimation of reserve as mentioned above, the details of geological reserve of Iron Ore of Jereldaburu Iron ore mine is given in as under :

Iron Ore :

Geological Reserve	Category	Reserve (Million Tonne)	Grade	UNFC CODE
	Proved Reserve	74.13	+60% Fe	111
	Probable Reserve	49.19	+60% Fe	122
	Total	123.32	+60% Fe	111 & 122

Mineable Reserve	Category	Reserve (Million Tonne)	Grade	UNFC CODE
	Proved Reserve	49.36	+60% Fe	111
	Probable Reserve	40.08	+60% Fe	122
	Total	89.44	+60% Fe	111 & 122

Considering an average production 3.43 million ton of Iron Ore per annum in the first five years and 6 million tones in the rest of the period of 12 years, the total reserve will last for 17 years. After proposed exploration the reserve figure may be enhanced and accordingly the life of mine may increase.

12.2.3 Mining Method :

Describe in brief the mining method followed to win the mineral, extent of mechanization, mining machinery deployed, production level etc.

It is already discussed under Chapter – IV, Para 4.f of the mining plan.

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12.2.4 Mineral Beneficiation :

Describe in brief the mineral beneficiation practice if any indicating the process description in short. Indicate discharge details of any tailings / middling and their disposal / utilization practice followed.

It is already discussed under Chapter – X para 10.0 of the mining plan.

12.3 Review of Implementation of Mining Plan / Scheme of Mining Including five years Progressive Closure Plan up to the final closure of Mine :

Indicate in detail the various proposals committed with special emphasis on the proposals for protection of environment in the approved Mining Plan / Scheme of Mining including five years Progressive Closure Plan up to the closure of mine vis-à-vis their status of implementation. Highlight the areas, which might have been contaminated by mining activities and type of contaminants that might be found there. The reasons for deviation from the proposals if any with corrective measures taken should also be given.

The area is newly granted and as such, there is no review implementation of mining plan/ mining scheme previously. Thus the mining plan along with progressive mine closure plan is prepared by the applicant for getting approval and subsequently mining operation will be started accordingly after the grant of mining lease.

12.4 Closure Plan :

12.4.1 Mined-Out Land :

Describe the proposals to be implemented for reclamation and rehabilitation of mined-out land including the manner in which the actual site of the pit will be restored for future use. The proposals should be supported with relevant plans and sections depicting the method of land restoration / reclamation / rehabilitation.

During the course of mining activity in Iron ore, waste dump will be formed. The concurrent backfilling and reclamation would not be possible as per the topography of the area as the ore bearing areas are situated either on top of hillock or in the slope of

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the area and the mining work will be done by the top slicing method. So, OB dump shall be kept within lease area.

However, during the first five years of working detailed exploration shall be carried out in the area, the depth continuity of the deposit shall be established by that time and after that the details and schedule of backfilling shall be proposed in the scheme of mining for the second five years of working.

During this plan period as well as in conceptual period, OB dump will be created near the north western corner of the area where the topography is almost flat an area of 6.06 hectares shall be covered by the waste dump during the first five years of plan period and about 36.15 hect. area will be required for OB dump during the conceptual plan period. Thus, the ultimate dump capacity would be about 5.12 million cu.m. including swelling factor @ 20% of the total production.

The waste dump will be stabilized by coir matting and also planted by different saplings. Garland drain and retaining wall will be constructed at the toe of the dump to prevent wash off from the dump.

During the conceptual plan period bench plantation shall be done over the benches left out after exploitation of mineral with suitable species to maintain the aesthetic beauty of the area.

LAND USE PATTERN AT THE END OF FIRST FIVE YEARS OF WORKING

During the five-year plan period a total area covered by the mining excavation would be 26.81 hectares with an average depth of 27 m. Out of the total 85.82 hectares area, 26.81 hectares will be used as quarry purpose where as 6.06 hectares of land shall be used for OB dumps during the plan period. During the plan period 15.10 hectares area shall be occupied by roads and 7.27 hectares area shall be utilized for office, garage

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and work shop etc, 17.08 hects. area shall be used as crusher, screening plant, ROM stack and crushed ore stack etc. Out of the total area in use 5.00 hectares area will be used for Magazine with safety zone. About 2.2 hect shall be used as water reservoir, 1.8 hect shall be used for settling tanks & silt check dams and 8.16 hect. shall be used for ore fines dump area.

PARTICULARS	AREA (HECTARES)
Excavated area	26.81
Overburden Dump	6.06
ROM stack, crushed ore stack, Crusher & screening plant, etc	17.08
Roads	15.10
Magazine with safety zone	5.00
Office building, workshop, etc	7.27
Water reservoir	2.2
Settling tank & silt check dam	1.8
Ore fines dump	8.16
Total	89.48

12.4.2 Water Quality Management :

Describe in detail the existing surface and ground water bodies available in the lease areas and the measures to be taken for protection of the same including control of erosion, sedimentation, siltation, and water treatment, diversion of water treatment, diversion of water courses, if any, measures for protection of contamination of ground water from leaching etc. Quantity and quality of surface water bodies should also be indicated and corrective measures proposed to meet the water quality conforming the permissible limits should also be described. Report of hydrological study carried out in the area may also be submitted. The water balance chart should be given. If there is potential of Acid Mine Drainage the treatment method should be given:

- It will be a 'Zero Discharge Mine'.
- Dry process crushing will be adopted.
- Construction of garland drains all around the pit and dump area.
- Providing sufficient gully checks & check dams to protect surface run-off in the valleys.
- De-silting of check dams after monsoon and will be stacked in OB dump.
- Provision of retention walls at the foot of the dumps.
- Provision of soak pit for canteen, office
- Provision of Oil & grease trap for workshop/garage
- After proper mitigation measure such as PC compound addition in water for sprinkling, use of drip irrigation for permanent plantation, etc.
- During monsoon the rain water from screening plant as well as from other sources will be collected in to siltation pond and discharge to the natural course of water after dosing of Micah Flock as flocculating agent to control the contamination of red water due to run off.

Water Conservation & Harvesting Management Plan :

Plan for Core Zone

- Construction of fines collection tank.
- Construction of hard stone bunding around waste dump as barrier.
- Construction of Retention walls at the foot of the dumps.
- Shifting type rain water harvesting structure at mining site
- Construction of silt catcher earthen drains
- Construction of Siltation Pond

Plan for buffer Zone

- Construction of rain water harvesting tank.
- Construction of boulders wrapped by galvanized chain gabion.
- Construction of gully plugs across the streams.
- Construction of earthen contour trench to reduce surface runoff
- Construction of vegetative barrier across the gully.
- Construction of Rain water harvesting structure

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- Once Pipe conveyor for ore transportation and rapid loading system for railway loading are commissioned, water requirement for dust suppression will reduce.

Quarterly monitoring of Ground water and effluent water will be done during operation of Mines.

Impacts of red water :

- All three nalas are flowing from South to North in available gradient.
- Mining will involve removal of overburden and dumping.
- Silt may fall in the stream bed, which may be carried during monsoon period away from the mine area.
- The excavation and quarry operation will be done in the banks and bed of these nalas to extract mineral ores.
- This will create temporary depression and cuts along the rivulet.
- The ultimate flow of the silt along with water will be started from the boundary of the mining lease area.

Proposed preventive measures for red water discharge:

- To arrest the silt and debris within the quarry area, construction of 3 nos. silt trap check dams will be done on the three main streams flowing in the mining lease area as shown in the plan at points A, B & C.
- The slicing method of mining will also arrest silt & debris in the lower portions and will arrest part of the overburden and debris.
- The silt trap check dams will be constructed near the boundary line of mining lease area to arrest silt within the mining lease area and allowing clean water to flow down without polluting the outflow. Necessary provision of outlets for flowing out the clean water has been made in the check dams.
- De-silting of the area U/s of the check dam will be done periodically to maintain the effectiveness of silt trapping arrangements in the mining lease areas.
- Provision of dump area has been made within the mining lease area as shown in the plan.
- To arrest silt from the dump area, construction of series of parapet walls at the boundary of the dump area and construction of garland drains out side all along

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the boundary will be done. The drain will be connected to the nalas U/s of proposed silt check dams.

- After treatment with some chemicals it will be ensured that no red water will flow out of leasehold area.
- The discharge water will be analysed on quarterly basis.

12.4.3 **Air Quality Management :**

Describe the existing air quality status. The corrective measures to be taken for prevention of pollution of air should be described :

The existing air quality status is given in **Annexure – V.**

The corrective measures to be taken for prevention of pollution of air will be as under :

Air pollution can be reduced by :

Controlling Dust Levels

- **Drilling**
  - Wet drilling to arrest dust at source
  - Dust extractor with bag filters
  - Sharp drill bits
- **Blasting**
  - Avoid blasting in high wind condition
  - High pressure fog canon to arrest fumes & dusts during blasting
  - Blasting during afternoon
  - No secondary blasting, hydraulic rock breaker will be deployed
- **Crushing & Screening**
  - Dry fogging at hopper, transfer points
  - Dust extractors and Bag Filters
  - Atomized sprinkling along conveyor wherever applicable
  - Covered conveyors within the plant area
  - Control in loading to dumpers to avoid spillages
  - Haul road design with proper gradient (1/16) and super elevation
- Emission standards meeting Bharat Stage II norms

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- Transportation of Ore to Railway Siding
  - For the initial ramp up period, by covered trucks (Preferably with high capacity units to reduce no. of trips)
  - Mobile water tankers on road
  - Strengthening, widening & repair of road
  - A study was conducted to explore the feasibility of ore shipment by pipe conveyor. For DPR, an expert agency has been engaged.
  - Rapid-load-out system for rake loading (20000 TPD)
  - Sharp teeth
- General measures :
  - Dust masks will be provided to all workers.
  - Afforestation (1600 / ha) for control of dust.

(Plantation of trees and tall grass along approach roads and on safety barrier zones will be done to help suppress the dust)

Ambient air quality will be monitored for one year in three seasons (excluding rainy season). In each season, monitoring will be carried out for one month on two days in a week with three eight-hourly samples being collected on each day.

12.4.4 Waste Management :

Describe the type, quality and quantity of overburden, mineral reject etc. available and their disposal practice. If no utilization of waste material is proposed, the manner in which the waste material will be stabilized should be described. The protective measures to be taken for prevention of siltation, erosion and dust generation from these waste materials should also be described. If toxic and hazardous elements present in the waste material the protective measures to be taken for prevention of their dispersal in the air environment, leaching in the surface and ground water etc should be described:

During the mining operation, overburden of laterite & weathered iron ore and quarry waste in the form of inter burden will be generated as per the schedule of excavation as given below:

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Year	Overburden in cubic meter (Weathered Iron Ore/Laterite	Quarry wastes in cubic meter	Total Wastes in cubic meter
1st Year	241997	20642	262639
2nd Year	NIL	45994	45994
3rd Year	NIL	48929	48929
4th Year	NIL	78450	78450
5th Year	NIL	107297	107297
Total :	241997	301312	543309

LAND CHOSEN FOR DISPOSAL OF WASTE

Location of proposed dumpsite has been shown in plate no. 7 – 7E. The sites were selected after considering various alternative locations based on the following:-

On the basis of surface exposures of litho unit the possibility of ore body is less and before undertaking the dump operation a few bore hole through will be given for proving the possibility of ore mineralization.

- Lies within the lower most area.
- Comparatively flatter area so that maximum quantities can be accommodated within shorter space.
- Easily approachable.
- For the protective measures to prevent the wash off from the dump retaining wall and Garland drain is proposed with settling tanks.
- The dimension of drain will be 1.5 m deep & 2 meter wide. Before dumping in the proposed dump area two seasonal nala that is passing through the area shall be diverted to the main course of nala.

Maximum height and spread of Dumps (Refer Plate No.7 – 7E):

Maximum height of 30 m for OB dump may be considered reasonable for the type of overburden and terrain condition that may be encountered at this Mine. The area is slightly undulating and there is variation in height from 402m to 403.5 m RL at different places where dumping is proposed. For initial dump formation at the proposed location

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a ramp will be formed by gradual dumping of overburden/pit waste and forming an approach at a gradient not exceeding 1 in 16 so as to reach up to a height of 415 m RL. After attaining at 415m RL, dump is to be extended towards North, East and West direction maintaining a uniform level. From the mine, usually dumpers carrying overburden/waste would be unloaded at the dump, and thereafter the materials are pushed mechanically on the down slope side to maintain a uniform level. At the slope, the material would remain intact following the angle of repose of dump material. (Say 28° in the case of general waste). Due to movement of dumper at the top, the material would be compacted and shall remain as hard as compact mass. In this way the first level (Dump-1) at 415 m RL shall be formed. Final dump height shall be about 430m RL. In this way dump during the first five years will be created in two stages. The wastes during the first five years of working shall occupy an area of 6.06 hectares with a height of 30m.

During active stage of dump, the slope would be made stable by coir matting in the northern part of the dump and planting shrubs and grasses and after completion of dump, the entire area including the top surfaces would be planted with local varieties of trees after spreading top soil over it.

Stacking of Sub-grade (Low grade) material:

Low grade / sub grade ore dump : During the first five years of working no low grade/sub grade ore shall be generated as the excavation work during this period shall be confined in the massive ore zone.

Ore Fine dumps: An area of 8.16 hectares is earmarked for dumping of ore fine dump including the safety measures adopted during the plan period at the southwestern corner of the area. This fine dump shall be created during the course of crushing and screening of the ore. Out of the total ROM production after crushing and screening about 50% recovery of sized ore is anticipated and the rest ore fines (-5mm). Total sized ore shall be dispatched to railway siding for onward transportation to plant. Out of the total fines generated about 80% is planned for pelletization annually and rest

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20% shall be stacked. At the toe of the dump built up in each year a series of temporary parapet wall shall be created to prevent wash off. A series of parapet wall shall be created at the slope of the hill with a garland drain, which shall be of permanent nature. An area of about 8.16 Ha is required for this fines dump. The height of the dump would be 15 m. However, these fines shall be consumed in future. The proposed year wise generation of ore fines is given below:

Year	Total ROM production (MillionTonnes)	Total recovery of Ore fines (-5mm) after crushing & screening @50% (MillionTonnes)	Ore fines after crushing & screening to be dispatched @80% of the total fines. (MillionTonnes)	Ore fines after crushing & screening to be stacked @20% of the total fines. (MillionTonnes)
1st	1.18	0.59	0.47	0.12
2nd	2.62	1.31	1.05	0.26
3rd	2.79	1.40	1.12	0.28
4th	4.47	2.24	1.79	0.45
5th	6.11	3.05	2.44	0.61

The overburden/wastes to be generated during mining activities will be dumped away from quarry faces. For proper dumping of waste and minimum degradation of environment due to such dumping following precaution has to be taken:

- Total overburden generation during the first five year plan period will be around 0.54 million cum.
- Surface dumping will be carried out within mine lease area.
- The sides are required to be sloped inwardly. The tops as well as the sides are to be kept stable by regular planting of sapling of local verities as well as shrubs and grass in between the plants. In both the above cases plants are also

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required to be planted at the foot of the lower level of the dump to arrest any possible rolling down of boulders from the top level while dumping.

- Dumps will be rehabilitated by biological remediation like coir matting etc.
- Dump height will be 30 mtrs. in 2 stages of 15 mtrs each with 28° overall dump slope.
- The dump will be protected with lateritic parapet wall.
- Dump will be afforested for stabilization.
- Garland drains will be constructed around the dumps of 2.0m wide X 1.5m deep beyond the dry wall to hold dump wash off if any, coming out of the dry wall and to allow clear water to drain off.
- Garland drains will be linked to series of settling tanks & silt check dams to arrest silt flow outside lease boundary.

12.4.5 Topsoil Management :

There is no topsoil available at the site. Hence, topsoil management is not discussed. However, during the 6th year onward some quantity of soil shall be generated during the excavation of ore. The soil shall be stacked separately near the crushing & screening plant. An area of 2.0 hectares is earmarked for dumping of soil during the conceptual plan period.

12.4.6 Tailing Dam Management :

The steps to be taken for protection and stability of tailing dam, stabilization of tailing material and its utilization, periodic desalting measures to prevent water pollution from tailings etc, arrangement for surplus water overflow along with detail design, structural stability studies, the embankment seepage loss into the receiving environment and ground water contaminant if any should be described :

Presently there will be no washing and processing plant at Jereidaburu Iron ore Mines, hence there will not be any tailing dam in the lease area. In near future if there will be any provision to set up a washing plant or beneficiation plant in the area necessary precaution will be taken for tailings etc.

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12.4.7 Infrastructure :

The existing infrastructural facilities available such as roads, aerial ropeways, conveyer belts, railways, power lines, buildings & structures, water treatment plant, transport, water supply sources in the area etc and their future utilization should be evaluated on case-to-case basis.

If retained, the measures to be taken for their physical stability and maintenance should be described. If decommissioning proposed, dismantling and disposal of building structures, support facilities and other infrastructure like electric transmission line, water line, gas pipeline, water works, sewer line, telephone cables, underground tanks, transportation infrastructure like roads, rail, bridges, culverts etc, electrical equipments and infrastructures like electrical cables, transformers to be described in connection with restoring land for further use :

(a) Road:

The area is well connected by jeepable road from Gua 10 km from the area.

(b) Railway:

The nearest Railway head is Gua 10 km, where rack-loading facilities for dispatch of ore is available. Besides goods train, a Passenger train links Jamshedpur with Barbil via Barajamda, Chaibasa and Rajkharswan junction.

(c) Port:

Nearest Port is Paradeep

(d) Electricity:

Power supply is available up to Gua. From Gua the power line will be constructed up to the mine site in future if required. However, it is not required at this moment.

(e) Water:

Initially the water requirement will be fulfilled from Karo River flowing at a distance of one kilometer from the area. In future, the general requirement of water will be met by digging bore wells.

(f) Medical facilities:

This is a primary Health Centre at Gua. A fully equipped hospital is available at Barajamda (16 km.). There is a good hospital run by SAIL. All these health center/hospital cater to the medical requirement of mine aided by an ambulance.

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This is a virgin area. After execution of mining lease infrastructure will be developed like, road, electricity, tube conveyor, water supply etc. and during the lease period there is no chance to decommission the infrastructure.

(g) Educational facilities:

Primary school, high school and college is available Gua (10 km.) from the area. Police station, Post office, telephone, telegraph, bank facilities, daily and weekly market etc. are available at Gua.

At present, there will be no closure of the mine. The lessee will provide so all infrastructural facilities to the mine worker. At the end of the life of the mine, the lessee will provide some infrastructure like electric line, quarter, water supply system etc. for the benefit of local public for their residential and other purpose.

Details of proposed infrastructure are as follows:

(1) Electric line – It will be retained after closure for pubic benefit.

(2) Office & Other building – It will be retained after closure for public benefit.

(3) Water supply system - - do –

(4) Medical facility & Education system - - do –

(5) Magazine/Rest Shelter - Will be demolished /shifted.

12.4.8 Disposal of Mining Machinery :

The decommissioning of mining machineries and their possible post mining utilization, if any, to be described:

As the mining operation is proposed in the area by mechanized open cast mining method, different mining machineries will be deployed within the leasehold area. During next five years, there is no chance of any type of closure of the mines. However, in future, if there is any closure of the mines at the end of the life of the mines, the machineries, which will be present at that time, will be shifted out side the leasehold.

If there will be any possibility of closure in the area the entire machineries will be shifted to other mines of the same company.

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12.4.8.1 Safety & Security :

Explain the safety measures implemented to prevent access to surface openings; excavations etc and arrangements proposed during the mine abandonment plan and up to the site being opened for general public should be described:

The size of the working benches will be maintained as per Reg. 106 of MMR, 1961 and D.G.M.S. approved Safety shoes and helmets are being provided to the all workmen. Earmuffs are being provided to the drillers. During proposed plan period there is no proposal to close the mine.

At the time of final closure of the mines, the abandoned pits shall be fenced properly and signboards indicating depth of the waterlogged pits shall be provided as a safety measure.

Till such time, the infrastructure (i.e. houses, sheds etc.) is handed over to the local authority/ forest authority/village panchayat.

Security guards are engaged for security and safety of workers colony, officer's colony, office, workshop, stores and magazine.

12.4.9 Disaster Management and Risk Assessment :

The working will be carried out at shallow depth; so heavy blasting will not be required. Hence no risk assessment or disaster management is required.

High risk factors such as earthquake, landslide, subsidence flood, fire, tailing dam failure etc are not encountered nor anticipated during proposed five years plan period. As such, emergency plan for quick evacuation, protective measures are not proposed. Also, no local habitant exists as the working area is far away from the locality.

12.4.10 Care and maintenance during temporary discontinuance :

For every five yearly review (as given in the mining scheme), an emergency plan for the situation of temporary discontinuance or incomplete programme due to court order or due to statutory requirements or any other unforeseen circumstances, should include a plan indicating measures of care, maintenances, and monitoring of status of unplanned discontinued mining operations expected

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to re-open in near future. This should detail item wise status monitoring and maintenance with periodicity and objective.

Due to unforeseen reason, if the mine will be a closed temporarily, then proper care of workers and staffs will be taken. Temporary discontinuance notice in the prescribed form D1 under rule 24 of M.C.D.R., 1988 will be sent to the concerned authority of Indian Bureau of Mines as well as in the prescribed form under MMR, 1961 to the authority of D.G.M.S., concerned State Government and concerned Labour Department within the stipulated time.

Security guards will take care of the infrastructure and they shall be kept under the roll of the management in case of any temporary discontinuation.

All the facility will be provided to the workers to maintain their livelihood, education to the children, medical facility etc.

12.5. Economic Repercussions of closure of mine and manpower retrenchments :

Manpower retrenchment, compensation to be given, socio – economic repercussions and remedial measures consequent to the closure of mines should be described, specifically stating the following.

12.5.1 Number of local residents employed in the mine, status of the continuation family occupation and scope of joining the occupation back.

During the first five years of mining operation, total 225 number people will work as Staffs within this proposed mine. At this stage, there shall be no chance of abandonment of the mines. For this reason, there shall be no chance of any retrenchment of any worker of the mine in near future.

12.5.2 Compensation given or to be given to the employees connecting with sustenance of himself and their family members.

During the plan period of five years, as there is no closure of the mine, it is not necessary to pay any type of compensation to any worker. In near future on closure of

the mine due to any reason the company will provide necessary compensation as per the rate at that time.

12.5.3 Satellite occupations connected to the mining industry – number of persons engaged therein – continuance of such business after mine closes.

Mine is under development and this stage it is not required during this period. In near future on closure of the mine due to any reason the company will provide necessary satellite occupations connected to the mining industry.

12.5.4 Continued engagement of employees in the rehabilitated status of mining lease area and any other remnant activities.

During five years of mining operation, there is no chance of any mine closure, for this reason, engagement of employees in the rehabilitated status of mining lease and any other remnant activities shall not arise.

12.5.5 Envisaged repercussions on the expectation of the society around due to closure of mine.

As there is no mine closure at present, there will be no repercussions on the expectation of the society around.

12.6 Time Scheduling for Abandonment :

The details of time schedule of all abandonment operations as proposed in Para – 4 should be described here. The manpower and other resources required for completion of proposed job should be described. The schedule of such operations should also be supplemented by PERT (Programme Evaluation & Review Technique), bar chart etc.

Time schedule of all abandonment operations as proposed is given below in self-explanatory bar chart.

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Activities	Tentative time frame for completion of jobs for mine closure operation (in months) from date of cessation.											
	1	2	3	4	5	6	7	8	9	10	11	12
Reclamation & Rehabilitation of mined out land	During the course of mining activity in Iron ore, waste dump will be formed. The concurrent backfilling and reclamation would not be possible as per the topography of the area as the ore bearing areas are situated either on top of hillock or in the slope of the area and the mining work will be done by the top slicing method. So, OB dump shall be kept within lease area. However, during the first five years of working detailed exploration shall be carried out in the area, the depth continuity of the deposit shall be established by that time and after that the details and schedule of backfilling shall be proposed in the scheme of mining for the second five years of working.											
Waste management	Waste dumping at external dump will be concurrently with mining operation.											
Decommissioning of infrastructure												
Safety & Security												
Monitoring of air & water												
Disposal of mining m/c.												

12.7 Abandonment Cost :

Cost to be estimated based on the activities required for implementing the protective and rehabilitation measures including their maintenance and monitoring programme.

Cost has been estimated based on activities discussed in Para 12.1 is explained in the following self-explanatory table:

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Description	Quantum of work to be done	Approx. total cost of process (in Rs. Lac.)
Reclamation and Rehabilitation of excavated pits	No reclamation or rehabilitation will be carried out at this Stage	Nil
Waste dump Management	Entire overburden and wastes will be dumped at the dumping site in a proper manner and scientifically and it will be stabilized by coir matting. Stone pitching/ parapet wall and garland drain will be made around the dump and green belt	433 lacs for dump stabilization, for Stone pitching/ parapet wall and garland drain and coir matting etc.
Air and water Quality monitoring	One year every month in 8 location for air and 3 location for water	50 Lacs.
Decommissioning of infrastructure	No decommissioning of infrastructure shall be done.	Nil
Disposal of mining machineries	At this stage it is not required	Nil
Tentative cost of abandonment		Rs. 483 Lacs.

12.8 **Financial Assurance** :

The financial assurance can be submitted in different forms as stated in Rule 23(F) (2) of Mineral Conservation and Development (amendment) Rules, 2003. In the mine closure plan, the manner in which financial assurance has been submitted and its particulars have to be indicated. The total break up of the post operational stage land use will be as under and given below for arriving financial assurance.

PARTICULARS	AREA (HECTARES)
Excavated area	26.81
Overburden Dump	6.06
ROM stack, crushed ore stack, Crusher & screening plant, etc	17.08
Roads	15.10
Magazine	5.00
Office building, workshop, etc	7.27
Water reservoir	2.2
Settling tank & silt check dam	1.8
Ore fines dump	8.16
Total	89.48

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Sl. No	Head	Area put on use at start of plan Ha.	Additional requirement during plan period Ha.	Total Ha.	Area considered as fully reclaimed & rehabilitated Ha.	Net area considered for calculation Ha.
A	B	C	D	E E=(C+D)	F	G G= (E-F)
1.	Area to be excavated	NIL	26.81	26.81	NIL	26.81
2.	Storage for top soil	NIL	NIL	NIL	NIL	NIL
3.	Overburden / dump	NIL	6.06	6.06	NIL	6.06
4.	Ore fines, ROM stack and sized crushed Lump ore stack, storage	NIL	12.2	12.2	NIL	12.2
5.	Infrastucture (Workshop, administrative building)	NIL	7.27	7.27	NIL	7.27
6.	Roads	NIL	15.10	15.10	NIL	15.10
7.	Railways	NIL	NIL	NIL	NIL	NIL
8.	Green belt	NIL	NIL	NIL	NIL	NIL
9.	Tailing pond	NIL	NIL	NIL	NIL	NIL
10.	Effluent treatment plant	NIL	NIL	NIL	NIL	NIL
11.	Mineral separation plant	NIL	13.04	13.04	NIL	13.04
12.	Township area	NIL	NIL	NIL	NIL	NIL
13.	Others to specify Magazine with safety zone, etc	NIL	9.00	9.00	NIL	9.00
	Total	NIL	89.48	89.48	NIL	89.48

Computation for financial assurance:

Balance area under use - 89.48 Hectares

Rate - Rs. 25000/- per hects.

Amount for financial assurance – 89.48 Hects. X Rs. 25000/-

= Rs. 2237000/-

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Financial assurance in the form of Bank Guarantee for Rs. 2237000/-(Rupees twenty two lakh thirty seven thousand) only will be submitted before the execution of mining lease to The Regional Controller of Mines, Indian Bureau of Mines, Kolkata Region.

12.9 Certificate :

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

The above certificates are enclosed at the beginning of the mining plan.

12.10 Plans, sections etc :

The chapters at 1, 2, 3 and 4 should be supported with Plans & Sections. The Closure Plan may also be submitted depicting photographs, satellite images on compact disc etc. wherever possible.

Progressive mine closure plan and section is enclosed as plate No 12 with this mining plan.

****

अनुमोदित
APPROVED

सहा. नियंत्रक (मध्यांचल)
Controller of Mines (Central Zone)
भारतीय खान ब्यूरो
Indian Bureau of Mines

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ANNEXURES

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GOVERNMENT OF INDIA
MINISTRYT OF MINES
INDIAN BUREAU OF MINES
MCCM CENTRAL ZONE

No. 314(3)/2008-MCCM (CZ)/MP-2 Nagpur, the 12 Aug 2008

To,
M/s Jindal Steel & Power Ltd.,
P.B. No. 16, Kharsia Road,
Raigarh – 496001 (Chhattisgarh)

Sub: Approval of Mining Plan alongwith Progressive Mine Closure Plan in respect of Jeraldaburu iron ore deposit over an area of 537 ha. of M/s Jindal Steel & Power Ltd., in District West Singhbhum of Jharkhand State submitted for grant of mining lease under Rule 22 of MCR, 1960..

Reference:- 1.Your RQP's letter No. Nil dated 19/02/2008.
2.This office letter of even number dated 30/04/2008.
3.Your RQP's letter No. Nil dated 30/05/2008
4.This office letter of even number dated 01/07/2008.
5.Your RQP's letter No. Nil dt 30/07/2008.

Sir,

In exercise of the powers conferred by Clause (b) of Sub-Section (2) of Section 5 of Mines & Minerals (Development & Regulation) Act, 1957 read with Government of India Order No. S.O.445(E) dated 26.4.1987, I hereby approve the above said mining plan. This approval is subject to the following conditions :-

i) This mining plan is approved without prejudice to any other laws applicable to the mine/area from time to time whether made by the Central Government, State Government or any other authority.

ii) It is clarified that this approval of mining plan does not, in any way, imply the approval of the Government in terms of any other provisions of the Mines & Minerals (Development & Regulation) Act, 1957 or the Mineral Concession Rules, 1960 and any other laws including the Forest Conservation Act, 1980.

iii) It is further clarified that this approval of mining plan under Rule 22 of MCR 1960 is subject to the provisions of Forest (Conservation) Act, 1980, Forest Conservation Rules, 1981, and other relevant statues orders and guidelines as may be applicable to the lease area from time to time.

iv) The provisions of Mines Act, 1952 and Rules and Regulations made there under including submission of notice of opening, appointment of Manager and other statutory officials as required by the Mines Act, 1952 shall be complied with.

v) The mining plan is approved without prejudice to any other order or direction from the court of competent jurisdiction.

vi) Your attention is invited to the Supreme Court interim order in W.P. (C) No.202 dated 12-12-96 for compliance. The approval of mining plan is, therefore, issued without prejudice to and is subject to the said directions of the Supreme Court as applicable.

vii) The details of grant of the lease by the State Government, whenever such an order is passed, may be intimated to the Regional Controller of Mines, Indian Bureau of Mines, Kolkata.

APPROVED

6th Floor, 'D' Block, Indira Bhawan, Civil Lines, Nagpur – 440001
Email : ccm-ibm.mah@nic.in - Fax : (0712) 2565800 Telephone : (0712) 2565833

viii) This approval for mining operations and associated activities is restricted to the mining lease area only.

ix) A copy of Environment Impact Assessment – Environment Management Plan (EIA-EMP) as approved by MOEF (Ministry of Environment & Forest) shall be submitted to IBM within a month of approval alongwith a copy of their approval letter.

x) If anything is found to be concealed as required by the Mines Act in the content of the mining plan and the proposals for rectification has not been made, the approval shall be deemed to have been withdrawn with immediate effect.

xi) The department does not undertake any responsibility regarding correctness of the boundaries of the lease area shown on the ground with reference to lease map & other plans furnished by the applicant/lessee.

xii) Yearly report as required under rule 23E(2) of MCDR'88 setting forth the extent of protection and rehabilitation works carried out as envisaged in the approved progressive mine closure plan and if there is any deviations, reasons thereof shall be submitted before 1st July of every year to the Regional Controller of Mines, Indian Bureau of Mines, Kolkata.

xiii) The lessee should submit the financial assurance to the Regional Controller of Mines, Indian Bureau of Mines, Kolkata before executing the mining lease deed as per rule 23(F)(3) of Mineral Conservation & Development Rules, 1988.

xiv) The Environmental Monitoring Cell shall be established by the company. This Environmental Monitoring Cell of the company, shall continue monitoring ambient air quality, dust-fall rate, water quality, soil sample analysis and noise level measurements at various stations established for the purpose both in the core zone and buffer zone as per requirement of Environment Guidelines and keeping in view IBM's circular No. 3/92 & 2/93 season-wise every year or by engaging the services of an Environmental Laboratory approved by MOEF/CPCB. The data so generated shall be maintained in a bound paged register kept for the purpose and the same shall be made available to the inspecting officer, on demand.

Yours faithfully,

Encl. : Two copies of approved mining plan

12/8/08

(Ranjan Sahai)
Controller of Mines (CZ)

अनुमोदित
APPROVED

JINDAL STEEL & POWER LIMITED

Regd. Office: O. P. Jindal Marg, Hisar (Haryana) - 125 005

List of Directors of Jindal Steel & Power Ltd. as on 02.04.2060

Sl. No.	Name	Father's / Husband name	Dt of Birth	Official address	PAN No.
1	Smt. Savitri Jindal (Chairperson)	Late O.P. Jindal	30.03.1949	O. P. Jindal Marg,Hisar, Haryana-125005 PH#: 01662 - 222471-83	ACPPJ1030M
2	Shri Ratan Jindal (Director)	Late O.P. Jindal	31.07.1961	O. P. Jindal Marg,Hisar, Haryana-125005 PH#: 01662 - 222471-83	AASPJ0852D
3	Shri Naveen Jindal (Executive Vice Chairman & Managing Director)	Late O.P. Jindal	08.03.1970	Jindal Centre, 12, Bhikaji Cama Place, New Delhi – 110066, Ph No. : 26188345-60	AALPJ2123N
4	Shri Vikrant Gujral (Vice Chairman & CEO)	Late P.D. Gujral	20.08.1941	Jindal Centre, 12, Bhikaji Cama Place, New Delhi – 110066, Ph No. : 26188345-60	AEXPG3402M
5	Shri Anand Goel (Deputy Managing Director)	Late C.R.Goel	03.11.1952	Jindal Centre, 12, Bhikaji Cama Place, New Delhi – 110066, Ph No. : 26188345-60	AAAPG2341J
6	Shri Ashok Alladi (Additional Director)	Shri A.R. Pandurang	27.01.1951	No.656, 11A Main Road, Jayanagar, 5th Block, Bangalore – 560041 PH#:9886796251	AAMPA6527C
7	Shri S. Ananthakrishnan (Director Nominee – IDBI Ltd.)	Late A. Sankaranarayanan	10.03.1953	Large Corporate Branch (LCB), Industrial Development Bank of India Limited (IDBI), 9th Floor, IDBI Tower, WTC Complex, Cuffe Parade, Mumbai – 400 005 PH : 022 – 5655 3355, 2218 9111	AOZPS4667N
8	Shri Arun Kumar Purwar Director	Late Anant Ram Purwar	14.05.1946	Nicholas Piramal Tower, Ganpatrao Kadam Marg, Lower Parel, Mumbai 400 013 PH# : 022 - 3046641	ADXPP9783F
9	Shri R. V. Shahi (Additional Director)	Shri Ram Ekbal Shahi	05.01.1945	Energy Infratech Pvt. Ltd. 2nd Floor, NBCC Tower, 15, Bhikaji Cama Place, New Delhi - 110066 PH# 01146519700	AAVPS3892F
10	Ms. Rami Nirula (Nominee Director - ICICI Bank Ltd.)	Shri Deepak Nirula	27.05.1952	ICICI Bank Ltd. ICICI Bank Tower NBCC Place Bhishma Pitamah Marg Pragati Vihar New Delhi - 110003	AAJPB9065B
11	Shri Sushil Maroo (Wholetime Director)	Shri N. S. Maroo	05.07.1951	Jindal Centre, 12, Bhikaji Cama Place, New Delhi – 110066, Ph No. : 26188345-60	ADLPM7745M
12	Shri A. K. Mukherji (Wholetime Director)	Late Amalendu Mukherji	02.06.1947	Jindal Steel & Power Ltd. P.B. No. 16, Kharsia Road, Raigarh C.G.- 496001	ABSPM8802B

By Speed Post

No. J-11015/1208/2007-IA.II(M)
Government of India
Ministry of Environment & Forests

Paryavaran Bhavan,
C.G.O. Complex, Lodi Road,
New Delhi-110 003.

Dated the 23rd April, 2009

To

M/s Jindal Steel & Power Ltd.
241B, Road No. 2, Ashok Path,
Ashok Nagar,
Ranchi-834 002
Jharkhand
E-mail: jsplranchi@yahoo.co.in

Subject: Jereldaburu Iron Ore Mining Project of M/s Jindal Steel & Power Ltd., located in Village Jereldaburu, Tehsil Gua, District West Singhbhum, Jharkhand - environmental clearance regarding

Sir,

Reference is invited to the discussions held during the Expert Appraisal Committee (Mining) meeting on 18th -20th March, 2009 regarding the above-mentioned project. As already pointed out during the meeting, the Committee had desired information on the following:-

(i) Details of the pipe conveyor including its route, the details of land requirement (ROW) for laying the pipe conveyor, R&R involved therein, if any, nature of land etc. The status of land acquisition / ROW for the same should also be given.

(ii) Details of high pressure canon system proposed to be deployed for control of pollution should be provided. Its effectiveness in control of pollution should also be given. It may also be indicated as to which of the mines are using this technology internationally.

(iii) The data contained in the filled in Questionnaire should be reconciled and the corrected Questionnaire so filled should be furnished.

(iv) Information regarding topography of the area should be given. It may be noted that the information given in different documents in this regard is at variance, which may be reconciled.

(v) The details of first order streams emanating from the mine lease area and impact of the proposed project on the same and thereby on the hydrology of the area.

..2/

(vi) Details and schedule of backfilling.

(vii) Details of external OB dump, if any.

(viii) The mine plan should be inconformity with the proposed scheme of waste management i.e. the backfilling schedule and external OB dump proposed in the project should be duly integrated and incorporated into the approved mining plan. Wherever necessary, the mine plan should be modified and got approved and submitted.

(ix) Keeping in view the schedule of backfilling and external OB dump, the post mine land use should be modified accordingly and submitted.

(x) Information on baseline AAQ data particularly the SPM, RSPM, NOx and the contribution of the proposed project should be given.

(xi) Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife corridors, Tiger/Elephant reserves (existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated. A location map duly authenticated by Chief Wildlife Warden should be provided in this regard. Necessary clearance, if any, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above should be obtained from the State Wildlife Department/ Chief Wildlife Warden under the Wildlife (Protection) Act, 1972 and copy furnished. It being a green field project to be located in the Singhbhum Elephant Reserve, NOC from Chief Wildlife Warden and the necessary mitigation measures required, if any, should be furnished. Status of forestry clearance should also be provided.

(xii) Action plan to address the issues raised during public hearing along with financial allocation.

(xiii) Wind rose and isopleths to be rechecked and reconfirmed.

(xiv) A written commitment that no red water will be discharged into the river and the proposed safeguard measures for the same.

(xv) A copy of the approved Wildlife Conservation Plan specific to the project should be submitted.

It is requested that the requisite information as mentioned above may be furnished to this Ministry at the earliest, within 30 days from the date of issue of this letter to enable us to take further necessary action in the matter. If no response is received within the specified time limit, we will be constrained to close the file for non-receipt of the requisite information.

Yours faithfully,

(SATISH.C.GARKOTI)
Additional Director(S)

ANNEXURE - II

CERTIFICATE OF RECOGNITION AS QUALIFIED PERSON TO PREPARE MINING PLANS

(Under Rule 22 (c) of Mineral Concession Rules 1960)

Shri Pradip Kumar Sen resident

of C/O Prof. D.K. Gangopta, Kalimandir Road, Doranda P.O. 834002 and

of Shri H.C. Sen, having given satisfactory

evidence of his qualifications and experience is hereby granted recognition

under Rule 22 (c) of the Mineral Concession Rules, 1960 as a Qualified

Person to prepare Mining Plans.

His registration number is RQP/CG-RNC/016/87/A

This recognition is valid for a period of two years

ending 27th November 1989

Renewed up to 26th Nov. 1991

25 NOV 1991

Place: Nagpur

Date: 28th Nov. 1987

(D.N. Bhargava)
Controller-General
Indian Bureau of Mines

PRADIP KUMAR SEN

Received up to

Regional Controller of Mints

Renewed upto 22.11.97.

Regional Controller of Mints

APPROVED

Regional Controller of Mints

Regional Controller of Mints

the boundary will be done. The drain will be connected to the nalas U/s of proposed silt check dams.

- After treatment with some chemicals it will be ensured that no red water will flow out of leasehold area.
- The discharge water will be analysed on quarterly basis.

12.4.3 Air Quality Management :

Describe the existing air quality status. The corrective measures to be taken for prevention of pollution of air should be described :

The existing air quality status is given in **Annexure – V.**

The corrective measures to be taken for prevention of pollution of air will be as under :

Air pollution can be reduced by :

Controlling Dust Levels

- **Drilling**
  - Wet drilling to arrest dust at source
  - Dust extractor with bag filters
  - Sharp drill bits
- **Blasting**
  - Avoid blasting in high wind condition
  - High pressure fog canon to arrest fumes & dusts during blasting
  - Blasting during afternoon
  - No secondary blasting, hydraulic rock breaker will be deployed
- **Crushing & Screening**
  - Dry fogging at hopper, transfer points
  - Dust extractors and Bag Filters
  - Atomized sprinkling along conveyor wherever applicable
  - Covered conveyors within the plant area
  - Control in loading to dumpers to avoid spillages
  - Haul road design with proper gradient (1/16) and super elevation
  - Emission standards meeting Bharat Stage II norms

P.K.SEN
RQP/CG-RNC/010/97/A

झारखण्ड सरकार
खान एवं भूतत्व विभाग

III (B)

पत्रांक..... /एम० राँची, दिनांक.....

प्रेषक,
बी० बी० सिंह
प्रभारी, खान निदेशालय

सेवा में,
जिला खनन पदाधिकारी,
चाईबासा।

विषयः पश्चिमी सिंहभूम अन्तर्गत गाँजा–जेरालदाबुरु, घाटकुडी स्थित वन क्षेत्र में 537 हेक्टेयर क्षेत्र पर सर्वश्री जिन्दल स्टील एंड पावर लि० को 30 वर्षों की अवधि के लिए लौह अयस्क के खनन पट्टा की स्वीकृति के संबंध में।

महाशय,
उपर्युक्त विषय के संदर्भ में कहना है कि प्राप्त आवेदन पत्र के निष्पादन हेतु निम्नांकित सूचनाओं की आवश्यकता है –

1. वन एवं पर्यावरण मंत्रालय, भारत सरकार का पूर्वानुमति।
2. पर्यावरणीय स्वच्छता प्रमाण पत्र ।
3. आवेदक के पक्ष में 537 हेक्टेयर क्षेत्र का सत्यापित मानचित्र ट्रेसिंग क्लॉथ पर (अनुशंसित मानचित्र की प्रति संलग्न)।
4. सत्यापित मानचित्र के आलोक में सत्यापित भूमि सूची।
5. भूमि सूची के आलोक में अंचलाधिकारी, वन प्रमंडल पदाधिकारी का अनापत्ति पत्र।

अतः अनुरोध है कि वांछित सूचनाएं जिला स्तर/ आवेदक कंपनी से प्राप्त कर अपने मंतव्य के साथ अतिशीघ्र उपलब्ध कराई जाए ताकि अग्रेतर कार्रवाई की जा सके।

APPROVED

विश्वासभाजन,
ह0/–
(बी० बी० सिंह)
प्रभारी, खान निदेशालय

ज्ञापांक – 170 /एम० सी० राँची, दिनांक 06·09·07

प्रतिलिपि – सर्वश्री जिन्दल स्टील एंड पावर लि०, खरसिया रोड, रायगढ़ को सूचनार्थ एवं आवश्यक कार्रवाई हेतु प्रेषित।

(बी० बी० सिंह)
प्रभारी, खान निदेशालय

जिला खनन पदाधिकारी चाईबासा का कार्यालय,
(प0) सिंहभूम।

पत्रांक 1680 /एम०
दिनांक 18.9.2007

सेवा में,

सर्वश्री जिन्दल स्टील एण्ड पावर लि०
डारसिया रोड, रायगढ़–496001
जिन्दल सेन्टर, 12 भिकाजी कामा प्लेस
नई दिल्ली–110066

विषय :– प० सिंहभूम जिलान्तर्गत मौजा जोराबुरू (घाटकुडी आर.एफ.) के 537.00 हेक्टर क्षेत्र पर सर्वश्री जिन्दल स्टील एण्ड पावर लि० को 30 वर्षों की अवधि के लिए लौह अयस्क के खनन पट्टा की स्वीकृति के संबंध में।

प्रसंग :– प्रभारी खान निदेशालय के पत्रांक 170/एम०सी०, राँची दिनांक 06.09.2007

उपर्युक्त विषय एवं प्रसंग में प्रभारी खान निदेशालय खान एवं भूतल, झारखण्ड राँची द्वारा अनुशंसित मानचित्र 537.00 हेक्टर की सत्यापित प्रति संलग्न करते हुए अनुरोध है कि निम्नांकित कागजात एवं सूचनाएं दाखिल करें :–

1. वन संरक्षण अधिनियम की धारा 2 के अन्तर्गत भारत सरकार के [illegible] मंत्रालय का पूर्वानुमति पत्र।

1.1 इण्डियन ब्यूरो ऑफ माईन्स द्वारा अनुमोदित माईनिंग प्लान (भारत सरकार के पत्र एवं वन मंत्रालय का गाईड लाईन पत्र सं० 5-5/86-FC(Pt) दिनांक [illegible]

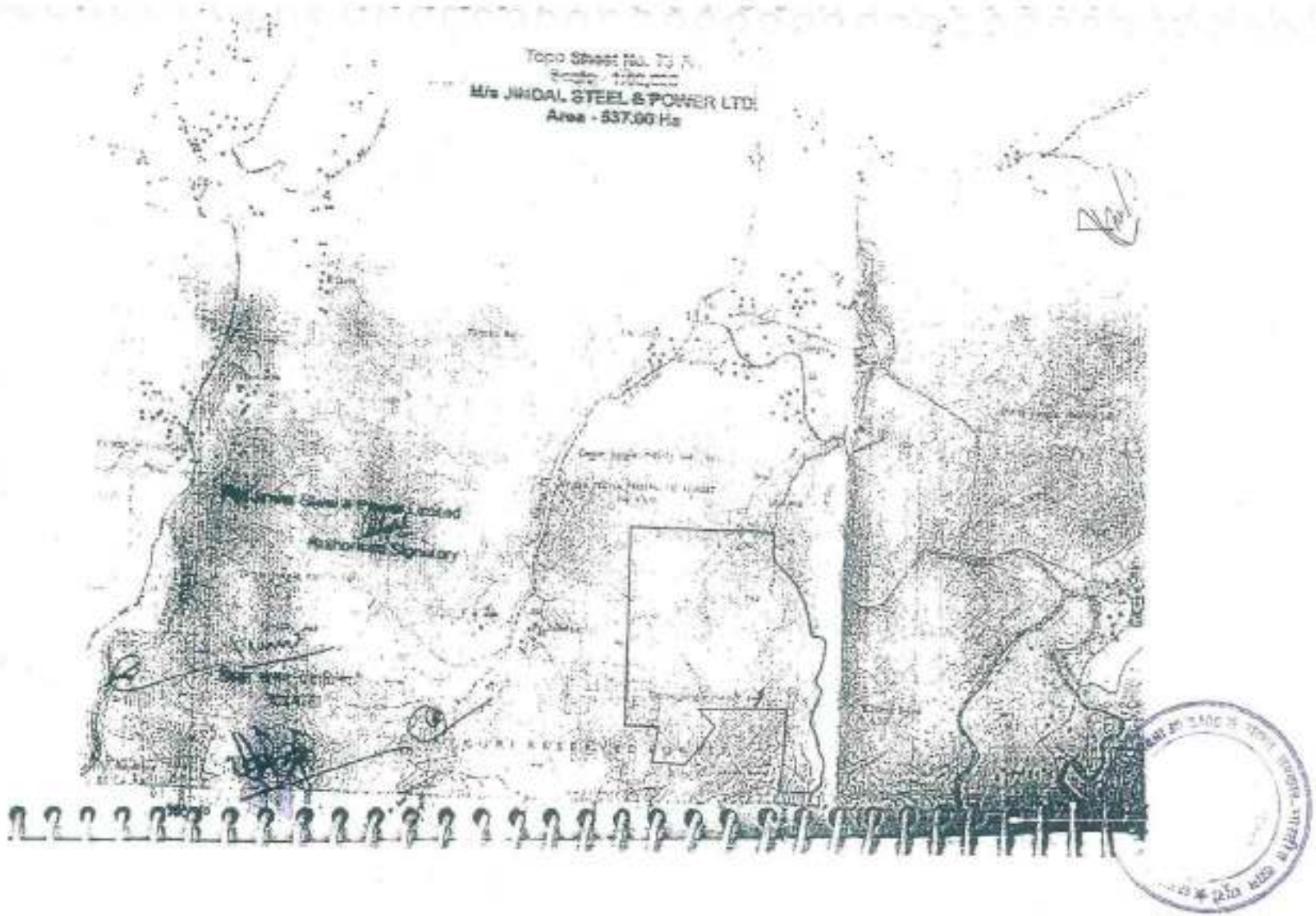
2. भारत सरकार द्वारा जारी पर्यावरणीय स्वच्छता प्रमाण [illegible]

3 अनुशंसित सत्यापित मानचित्र के आलोक में सत्यापित [illegible] 537 हेक्टर क्षेत्र का।

4. भूमि सूची के आलोक में अंचलाधिकारी/वन प्रमण्डल पदाधिकारी का [illegible]

जिला खनन पदाधिकारी
चाईबासा।

APPROVED


Topo Sheet No. 73 A
M/s JINDAL STEEL & POWER LTD
Area - 537.00 Ha
Authorised Signatory

CERTIFICATE OF RECOGNITION AS QUALIFIED PERSON TO PREPARE MINING PLANS

(Under Rule 22 (c) of Mineral Concession Rules 1960)

Shri Pradip Kumar Sen resident of C/O Prof. D.K. Sengupta, Kalimandir Road, Purulia P.O. Ranchi-834002 son of Shri N.C. Sen, having given satisfactory evidence of his qualifications and experience is hereby granted recognition under Rule 22 (c) of the Mineral Concession Rules, 1960 as a Qualified Person to prepare Mining Plans.

His registration number is RQP/CG-RNC/016/87/A

This recognition is valid for a period of two years ending 27th November 1989 अनुमोदित APPROVED

Renewed up to 26th May, 1991

Date: 28th Nov. 1987

(O.N. Bhargava)
Controller-General
Indian Bureau of Mines

Annexure - 9

P.T.O.

AMBIENT AIR QUALITY

Annexure-V

S.No.	Month	Week	Day	SPM	RSPM	Station: At. Core Zone-I								HC	CO
						SO_2 (µg/m³)				NO_x (µg/m³)					
				µg/m³	µg/m³	06 - 14 hrs	14 - 22 hrs	23 - 06 hrs	24 hrs Average	06 - 14 hrs	14 - 22 hrs	23 - 06 hrs	24 hrs Average	PPM	PPM
1	September 2007	I	1st	88	29	8.0	7.7	6.5	7.4	9.9	8.6	6.9	8.4	<1	<1
2			2nd	83	27	7.6	6.8	6.2	6.9	13.1	11.5	9.8	11.5	<1	<1
3		II	1st	75	24	8.8	9.4	7.6	8.6	13.6	11.3	9.6	11.3	<1	<1
4			2nd	90	29	7.9	7.5	6.4	7.3	13.0	11.8	10.1	11.6	<1	<1
5		III	1st	84	27	9.0	8.7	7.7	8.5	13.8	12.7	11.0	12.5	<1	<1
6			2nd	89	29	8.5	8.7	7.0	8.1	13.0	11.6	9.9	11.5	<1	<1
7		IV	1st	88	28	8.8	7.2	5.3	6.4	13.7	12.5	10.6	12.3	<1	<1
8			2nd	78	25	9.1	8.6	8.0	8.6	13.5	12.4	10.7	12.4	<1	<1
1	October 2007	I	1st	92	29	9.7	9.3	8.2	9.1	8.6	7.4	5.7	7.2	<1	<1
2			2nd	87	28	8.8	8.5	7.4	8.2	14.3	12.7	11.0	12.7	<1	<1
3		II	1st	82	26	7.8	8.0	5.6	7.3	11.9	10.6	8.9	10.5	<1	<1
4			2nd	85	27	9.4	9.0	7.9	8.8	13.4	12.2	10.5	12.0	<1	<1
5		III	1st	81	26	9.3	8.7	8.0	8.7	14.1	13.0	11.3	12.8	<1	<1
6			2nd	88	28	8.7	8.9	7.2	8.3	13.2	11.9	10.2	11.8	<1	<1
7		IV	1st	91	29	9.0	9.4	7.5	8.6	13.4	12.2	10.5	12.0	<1	<1
8			2nd	81	26	9.4	8.9	8.3	8.5	13.7	12.2	10.5	12.2	<1	<1
1	November 2007	I	1st	85	27	8.6	8.0	6.7	7.8	9.3	8.1	6.4	7.9	<1	<1
2			2nd	82	26	9.1	8.6	7.5	8.4	14.6	13.0	11.3	13.0	<1	<1
3		II	1st	85	27	7.7	8.3	6.5	7.5	12.1	10.8	9.1	10.7	<1	<1
4			2nd	87	28	8.5	8.1	7.0	7.9	12.5	11.3	9.8	11.1	<1	<1
5		III	1st	82	26	8.7	8.1	7.4	8.1	13.5	12.4	10.7	12.2	<1	<1
6			2nd	85	27	7.6	7.8	6.1	7.2	12.2	10.8	9.1	10.7	<1	<1
7		IV	1st	80	26	7.7	8.1	6.2	7.3	13.3	12.1	10.4	11.9	<1	<1
8			2nd	83	27	8.2	7.7	7.1	7.7	13.3	11.8	10.1	11.8	<1	<1

Station: A2, Core Zone-2																
S.No.	Month	Week	Day	SPM	RSPM	SO_2 (µg/m³)				NO_x (µg/m³)				NC	CO
				µg/m³	µg/m³	06 - 14 hrs	14 - 22 hrs	22 - 06 hrs	24 hrs Average	06 - 14 hrs	14 - 22 hrs	22 - 06 hrs	24 hrs Average	PPM	PPM
1	September 2007	I	1st	70	21	6.0	5.2	4.5	5.2	12.0	10.8	9.1	10.6	<1	<1
2			2nd	77	23	6.6	5.4	5.2	5.7	10.1	8.5	6.8	8.5	<1	<1
3		II	1st	90	27	7.2	4.8	3.8	5.3	11.0	9.7	8.0	9.6	<1	<1
4			2nd	80	24	6.8	6.4	4.8	6.0	10.4	9.2	7.5	9.0	<1	<1
5		III	1st	84	25	6.9	6.3	5.6	6.3	12.3	11.2	9.5	11.0	<1	<1
6			2nd	82	25	7.3	7.2	5.8	6.9	13.9	12.5	10.8	12.4	<1	<1
7		IV	1st	90	27	5.6	6.0	4.1	5.3	8.6	7.4	5.7	7.2	<1	<1
8			2nd	78	23	8.3	7.7	7.1	7.7	12.5	11.0	9.3	11.0	<1	<1
1	October 2007	I	1st	88	26	8.4	7.6	6.8	7.6	13.7	12.5	10.8	12.3	<1	<1
2			2nd	85	26	7.8	6.6	6.4	6.9	11.3	9.7	8.0	9.7	<1	<1
3		II	1st	82	25	6.5	7.1	5.3	6.3	10.3	9.0	7.3	8.9	<1	<1
4			2nd	88	26	7.2	6.8	5.7	6.6	10.8	9.6	7.9	9.4	<1	<1
5		III	1st	87	26	9.0	8.4	7.7	8.4	12.6	11.5	9.8	11.3	<1	<1
6			2nd	85	26	7.6	7.8	6.1	7.2	14.6	13.2	11.5	13.1	<1	<1
7		IV	1st	87	26	9.6	10.0	8.1	9.2	9.8	8.6	6.9	8.4	<1	<1
8			2nd	85	26	8.0	7.5	6.9	7.5	10.6	9.1	7.4	9.0	<1	<1
1	November 2007	I	1st	82	22	9.1	8.3	7.6	8.3	13.0	11.8	10.1	11.6	<1	<1
2			2nd	89	33	8.1	6.9	6.7	7.2	11.6	10.0	8.3	10.0	<1	<1
3		II	1st	83	25	6.7	7.3	5.5	6.5	10.5	9.3	7.5	9.1	<1	<1
4			2nd	87	26	8.6	8.2	7.1	8.0	9.9	8.7	7.0	8.5	<1	<1
5		III	1st	90	27	8.4	7.8	7.1	7.8	12.0	10.9	9.2	10.7	<1	<1
6			2nd	88	31	6.5	6.7	5.0	6.1	14.0	12.6	10.9	12.5	<1	<1
7		IV	1st	90	27	9.5	9.9	8.0	9.1	9.7	13.4	11.7	11.6	<1	<1
8			2nd	85	26	7.6	7.1	6.5	7.1	10.2	8.7	7.0	8.6	<1	<1

S.No.	Month	Week	Day	SPM	RSPM	Station: A3, Pocharam									
						SO_2 (µg/m³)				NO_x (µg/m³)				HC	CO
				µg/m³	µg/m³	06 - 14 hrs	14 - 22 hrs	22 - 06 hrs	24 hrs Average	06 - 14 hrs	14 - 22 hrs	22 - 06 hrs	24 hrs Average	PPM	PPM
1	September 2007	I	1st	85	20	10.0	9.2	8.5	9.2	10.5	15.6	13.9	13.3	<1	<1
2			2nd	88	26	8.6	7.4	7.2	7.7	12.7	11.1	9.4	11.1	<1	<1
3		II	1st	90	27	9.7	10.3	8.5	9.5	14.8	13.5	11.8	13.4	<1	<1
4			2nd	92	28	10.4	10.0	8.9	9.8	15.9	14.7	13.0	14.5	<1	<1
5		III	1st	87	26	8.8	8.3	7.5	8.2	13.5	12.4	10.7	12.2	<1	<1
6			2nd	84	25	7.9	8.1	6.4	7.6	13.0	8.9	7.2	9.7	<1	<1
7		IV	1st	87	26	9.3	9.7	7.8	8.9	14.2	13.0	11.3	12.9	<1	<1
8			2nd	82	25	8.0	7.5	6.9	7.5	12.6	11.1	9.4	11.0	<1	<1
1	October 2007	I	1st	90	27	10.6	9.8	9.1	9.8	17.7	16.5	14.8	16.3	<1	<1
2			2nd	92	28	9.8	8.6	8.4	8.9	11.8	16.7	15.0	14.5	<1	<1
3		II	1st	84	25	9.0	9.0	7.8	8.6	14.1	12.8	11.1	12.7	<1	<1
4			2nd	90	27	10.8	10.4	9.3	10.2	16.3	15.1	13.4	14.9	<1	<1
5		III	1st	84	25	9.1	8.5	7.8	8.5	13.8	12.7	11.0	12.5	<1	<1
6			2nd	88	26	8.7	8.9	7.2	8.3	13.3	11.9	10.3	11.8	<1	<1
7		IV	1st	84	25	9.0	9.4	7.5	8.6	13.9	12.7	11.0	12.6	<1	<1
8			2nd	90	27	7.8	7.3	6.7	7.3	18.4	16.9	15.2	16.8	<1	<1
1	November 2007	I	1st	85	17	8.4	7.8	6.9	7.6	12.5	11.3	9.6	11.1	<1	<1
2			2nd	87	26	10.1	8.9	8.7	9.2	12.1	9.7	8.0	9.9	<1	<1
3		II	1st	91	27	9.2	9.8	8.0	9.0	14.3	13.0	11.2	12.9	<1	<1
4			2nd	92	28	9.9	9.5	8.4	9.3	15.4	14.2	12.5	14.0	<1	<1
5		III	1st	89	27	8.5	7.9	7.2	7.9	13.2	12.1	10.4	11.9	<1	<1
6			2nd	94	29	9.3	9.5	7.8	8.9	14.3	12.9	11.2	12.8	<1	<1
7		IV	1st	87	26	8.9	9.3	7.4	8.5	15.6	14.4	12.7	14.2	<1	<1
8			2nd	87	26	8.9	8.4	7.8	8.4	18.0	16.9	14.8	16.4	<1	<1

AMBIENT AIR QUALITY

Station: A4, Lembore

S.No.	Month	Week	Day	SPM	RSPM	SO_2 (µg/m³)				NO_x (µg/m³)				HC	CO
				µg/m³	µg/m³	06 - 14 hrs	15 - 22 hrs	23 - 06 hrs	24 hrs Average	06 - 14 hrs	15 - 22 hrs	23 - 06 hrs	24 hrs Average	PPM	PPM
1	September' 2007	I	1st	70	21	8.7	7.9	7.2	7.9	8.7	7.5	5.8	7.3	<1	<1
2			2nd	85	20	7.2	6.0	5.8	6.3	11.0	9.4	7.7	9.4	<1	<1
3		II	1st	68	20	7.7	8.3	6.5	7.5	11.8	10.5	8.6	10.3	<1	<1
4			2nd	88	18	9.4	9.0	7.9	8.8	14.4	13.2	11.5	13.0	<1	<1
5		III	1st	80	24	10.4	9.8	9.1	9.8	15.9	14.8	13.1	14.6	<1	<1
6			2nd	81	20	8.4	8.6	6.9	8.0	12.8	11.5	9.8	11.4	<1	<1
7		IV	1st	85	25	7.0	7.4	5.5	6.6	10.7	14.9	13.2	12.9	<1	<1
8			2nd	77	23	8.4	7.9	7.3	7.9	12.9	10.7	15.0	14.9	<1	<1
1	October' 2007	I	1st	80	24	9.8	9.0	8.3	9.0	10.4	9.2	7.5	9.0	<1	<1
2			2nd	87	26	8.4	7.2	7.0	7.5	12.2	10.6	8.9	10.6	<1	<1
3		II	1st	88	26	7.0	7.6	5.8	6.8	13.7	11.2	9.5	11.5	<1	<1
4			2nd	90	24	8.4	8.0	6.9	7.8	14.8	13.6	11.9	13.4	<1	<1
5		III	1st	88	26	10.7	10.1	9.4	10.1	16.2	15.6	13.9	15.2	<1	<1
6			2nd	82	30	8.7	8.9	7.2	8.3	13.2	11.8	10.1	11.7	<1	<1
7		IV	1st	82	25	6.9	7.1	5.2	6.3	10.4	14.6	12.9	12.6	<1	<1
8			2nd	88	26	9.0	8.5	7.9	8.5	12.7	11.2	9.5	11.1	<1	<1
1	November' 2007	I	1st	80	28	10.5	9.7	9.0	9.7	9.6	8.4	6.7	8.3	<1	<1
2			2nd	82	32	8.7	7.5	7.3	7.8	12.5	10.9	9.2	10.9	<1	<1
3		II	1st	85	26	7.2	7.8	6.0	7.0	13.9	12.6	10.9	12.5	<1	<1
4			2nd	90	31	8.9	8.5	7.4	8.3	16.0	14.8	13.1	14.6	<1	<1
5		III	1st	88	26	10.6	10.0	9.3	9.0	15.6	14.5	12.8	14.3	<1	<1
6			2nd	89	31	7.6	7.8	6.1	7.2	12.1	10.7	9.0	10.6	<1	<1
7		IV	1st	90	27	6.6	7.0	5.1	6.2	10.3	12.7	11.0	11.3	<1	<1
8			2nd	87	26	7.8	7.3	6.7	7.3	12.3	10.8	9.1	10.7	<1	<1

AMBIENT AIR QUALITY

S.No.	Month	Week	Day	SPM	RSPM	Station: AS, Ghatkuri								HC	CO
						SO_2 (µg/m³)				NO_x (µg/m³)					
				µg/m³	µg/m³	06 - 14 hrs	14 - 22 hrs	22 - 06 hrs	24 hrs Average	06 - 14 hrs	14 - 22 hrs	22 - 06 hrs	24 hrs Average	PPM	PPM
1	September 2007	I	1st	79	27	7.3	6.5	5.8	6.5	13.7	12.5	10.6	12.3	<1	<1
2			2nd	90	32	6.8	5.6	5.4	5.9	10.3	8.7	7.0	8.7	<1	<1
3		II	1st	92	29	5.9	6.5	4.7	5.7	9.1	7.8	6.1	7.7	<1	<1
4			2nd	98	37	7.8	7.4	6.3	7.1	11.8	10.7	9.0	10.5	<1	<1
5		III	1st	100	42	8.8	8.2	7.5	8.1	14.5	13.4	11.7	13.2	<1	<1
6			2nd	107	30	6.2	6.4	4.7	5.8	9.5	8.1	5.4	8.0	<1	<1
7		IV	1st	102	41	8.5	8.9	7.0	8.1	17.8	16.4	14.7	16.3	<1	<1
8			2nd	100	45	9.4	8.9	8.3	8.8	16.4	14.9	13.2	14.8	<1	<1
1	October 2007	I	1st	105	36	7.4	6.8	5.9	6.7	12.5	11.3	9.6	11.1	<1	<1
2			2nd	98	35	8.0	6.8	6.6	7.1	11.9	9.9	8.2	9.9	<1	<1
3		II	1st	102	32	5.2	5.8	4.0	5.0	8.4	7.1	5.4	7.0	<1	<1
4			2nd	100	38	8.2	7.8	6.7	7.5	12.3	11.1	9.4	10.9	<1	<1
5		III	1st	96	45	9.1	8.5	7.8	8.4	16.8	15.5	13.8	15.3	<1	<1
6			2nd	105	29	10.6	10.8	9.1	10.2	9.8	8.4	6.7	8.3	<1	<1
7		IV	1st	108	43	8.2	8.6	6.7	7.8	13.7	12.5	10.8	12.3	<1	<1
8			2nd	102	47	9.2	8.7	8.1	8.6	15.8	14.1	12.4	14.0	<1	<1
1	November 2007	I	1st	106	36	8.1	7.3	6.6	7.4	13.2	12.0	10.3	11.8	<1	<1
2			2nd	98	35	8.3	7.1	6.9	7.4	11.8	10.2	8.5	10.2	<1	<1
3		II	1st	100	31	5.4	6.0	4.2	5.2	9.6	7.3	5.6	7.2	<1	<1
4			2nd	103	39	7.3	4.9	3.8	5.0	11.4	10.2	8.5	10.0	<1	<1
5		III	1st	102	43	8.5	7.9	7.2	7.8	14.8	13.7	12.0	13.5	<1	<1
7			2nd	97	27	9.5	9.7	8.0	9.1	8.7	7.3	5.6	7.2	<1	<1
8		IV	1st	102	41	8.1	8.5	6.6	7.7	14.4	13.2	11.5	13.0	<1	<1
			2nd	100	40	8.8	8.3	7.7	8.2	15.2	13.7	12.0	13.6	<1	<1

AMBIENT AIR QUALITY

S.No.	Month	Week	Day	SPM	RSPM	Station: A8 , Raika								HC	CO
						SO_2 (µg/m³)				NO_x (µg/m³)					
				µg/m³	µg/m³	06 - 14 hrs	14 - 22 hrs	22 - 06 hrs	24 hrs Average	06 - 14 hrs	14 - 22 hrs	22 - 06 hrs	24 hrs Average	PPM	PPM
1	September 2007	I	1st	63	18	7.0	5.8	5.5	6.1	10.7	9.5	7.8	9.3	<1	<1
2			2nd	75	37	8.4	6.1	7.0	7.2	12.9	11.3	9.6	11.3	<1	<1
3		II	1st	80	22	11.0	11.6	9.8	10.8	16.8	15.5	13.8	15.4	<1	<1
4			2nd	87	32	8.0	5.9	6.5	6.8	8.0	11.0	9.3	9.4	<1	<1
5		III	1st	87	38	9.7	9.1	8.4	9.1	14.8	13.7	12.0	13.5	<1	<1
6			2nd	84	25	8.9	9.1	7.4	8.5	13.6	12.0	10.3	12.0	<1	<1
7		IV	1st	87	35	7.3	7.7	5.8	6.9	11.1	9.9	8.2	9.7	<1	<1
8			2nd	82	19	7.3	6.8	6.2	6.8	11.2	9.7	8.0	9.6	<1	<1
1	October 2007	I	1st	90	28	8.0	7.2	6.5	7.2	8.9	7.7	6.0	7.5	<1	<1
2			2nd	79	17	9.6	8.4	8.2	8.7	14.1	12.5	10.8	12.4	<1	<1
3		II	1st	83	23	10.8	10.6	8.8	9.8	16.1	14.8	13.1	14.7	<1	<1
4			2nd	88	24	8.9	8.5	7.4	8.3	8.4	7.2	5.5	7.0	<1	<1
5		III	1st	84	17	7.7	7.1	6.4	7.1	15.1	14.0	12.3	13.8	<1	<1
6			2nd	93	28	10.0	10.2	8.5	9.6	13.9	12.5	10.8	12.4	<1	<1
7		IV	1st	84	40	7.0	7.4	5.5	6.6	10.8	9.6	7.9	9.4	<1	<1
8			2nd	90	21	10.0	9.5	8.9	9.5	11.0	14.4	12.7	12.7	<1	<1
1	November 2007	I	1st	93	27	9.6	8.8	8.1	8.8	12.8	11.6	9.9	11.4	<1	<1
2			2nd	82	17	9.9	8.7	8.5	9.0	14.4	12.8	11.1	12.7	<1	<1
3		II	1st	91	25	10.2	10.9	9.0	10.0	16.3	15.0	13.3	14.9	<1	<1
4			2nd	87	23	8.8	8.4	7.3	8.2	7.5	13.6	11.9	11.0	<1	<1
5		III	1st	89	18	9.0	8.4	7.7	8.4	14.5	13.4	11.7	13.2	<1	<1
6			2nd	84	25	10.5	10.7	9.0	10.1	12.8	11.6	9.9	11.4	<1	<1
7		IV	1st	87	35	6.9	7.3	5.4	6.5	10.7	8.5	7.8	9.3	<1	<1
8			2nd	85	20	8.0	7.5	6.9	7.5	15.7	14.2	12.5	14.1	<1	<1

AMBIENT AIR QUALITY

S.No.	Month	Week	Day	SPM	RSPM	Station: A7, Lipsinga								MC	CO
						SO_2 (µg/m³)				NO_x (µg/m³)					
				µg/m³	µg/m³	06 - 14 hrs	15 - 22 hrs	23 - 05 hrs	24 hrs Average	06 - 14 hrs	15 - 22 hrs	23 - 05 hrs	24 hrs Average	PPM	PPM
1	September 2007	I	1st	92	21	6.8	6.0	5.3	6.0	10.4	9.2	7.5	9.0	<1	<1
2			2nd	77	16	7.7	6.5	6.3	6.8	11.8	10.2	8.5	10.1	<1	<1
3		II	1st	92	25	7.4	8.0	6.2	7.2	9.6	7.3	5.6	7.2	<1	<1
4			2nd	98	26	9.0	8.6	7.5	8.4	13.8	12.6	10.9	12.4	<1	<1
5		III	1st	100	20	10.2	9.6	8.9	9.6	15.6	14.3	12.8	14.3	<1	<1
6			2nd	107	32	6.7	6.9	5.2	6.3	10.2	8.8	7.1	8.7	<1	<1
7		IV	1st	94	38	7.8	8.2	6.3	7.5	12.0	10.8	9.1	10.6	<1	<1
8			2nd	100	23	7.2	6.7	6.1	6.7	11.0	9.5	7.8	9.4	<1	<1
1	October 2007	I	1st	105	30	6.3	5.9	4.8	5.6	9.2	15.0	13.3	12.5	<1	<1
2			2nd	98	21	8.9	7.7	7.3	8.0	13.0	11.4	9.7	11.3	<1	<1
3		II	1st	102	29	6.7	7.3	5.5	6.5	6.8	7.5	5.8	7.4	<1	<1
4			2nd	100	27	9.4	9.0	7.9	8.8	14.2	13.0	11.3	12.8	<1	<1
5		III	1st	96	19	11.0	10.4	9.7	10.4	15.9	14.8	13.1	14.6	<1	<1
6			2nd	109	32	7.0	7.2	5.5	6.6	10.5	17.8	16.1	14.8	<1	<1
7		IV	1st	108	43	7.5	7.9	6.0	7.2	11.7	10.5	8.8	10.3	<1	<1
8			2nd	102	23	8.6	8.1	7.5	8.1	10.8	9.3	7.6	9.2	<1	<1
1	November - 2007	I	1st	106	31	10.8	10.0	9.3	10.0	9.6	18.9	17.2	15.2	<1	<1
2			2nd	98	21	9.2	8.0	7.8	8.3	13.3	11.7	10.0	11.6	<1	<1
3		II	1st	100	28	9.3	9.9	8.1	9.1	9.8	8.5	6.8	8.4	<1	<1
4			2nd	103	28	10.0	9.6	8.5	9.4	14.3	12.1	10.4	11.9	<1	<1
5		III	1st	102	20	10.8	10.2	9.5	10.2	15.2	14.2	12.5	14.0	<1	<1
6			2nd	97	29	8.6	8.8	7.1	8.2	9.4	12.3	10.6	10.8	<1	<1
7		IV	1st	102	41	7.4	7.8	5.9	7.1	11.6	10.4	8.7	10.2	<1	<1
8			2nd	100	23	9.0	8.5	7.9	8.5	10.4	8.9	7.2	8.8	<1	<1

AMBIENT AIR QUALITY

Station: All, Hansada

Sl.No.	Month	Week	Day	SPM	RSPM	SO_2 (µg/m³)				NO_x (µg/m³)				HC	CO
				µg/m³	µg/m³	06 - 14 hrs	15 - 22 hrs	23 - 05 hrs	24 hrs Average	06 - 14 hrs	15 - 22 hrs	23 - 05 hrs	24 hrs Average*	PPM	PPM
1	September' 2007	I	1st	131	38	7.9	7.1	6.4	7.1	9.8	8.6	6.9	8.4	<1	<1
2			2nd	129	27	8.5	7.3	7.1	7.6	13.0	11.4	9.7	11.3	<1	<1
3		II	1st	125	33	7.3	7.9	6.1	7.1	14.0	12.7	11.0	12.6	<1	<1
4			2nd	128	35	7.3	6.8	5.7	6.6	12.7	11.5	9.8	11.3	<1	<1
5		III	1st	130	26	7.8	7.2	6.5	7.2	11.9	10.8	9.1	10.6	<1	<1
6			2nd	132	40	8.3	8.5	6.8	7.9	12.6	11.2	9.5	11.1	<1	<1
7		IV	1st	123	49	10.3	10.7	8.8	9.9	15.7	14.5	12.8	14.3	<1	<1
8			2nd	134	31	9.6	9.1	8.3	9.1	14.7	13.2	11.5	13.2	<1	<1
1	October' 2007	I	1st	138	40	12.6	11.8	11.1	11.8	18.6	17.4	16.7	17.6	<1	<1
2			2nd	140	29	9.7	8.9	8.3	8.8	14.2	12.6	10.9	12.6	<1	<1
3		II	1st	137	38	6.8	7.2	5.4	6.4	13.3	12.0	10.3	11.9	<1	<1
4			2nd	133	36	7.6	7.2	6.1	7.0	13.1	11.9	10.2	11.7	<1	<1
5		III	1st	137	27	8.6	8.0	7.3	8.0	12.2	11.1	9.4	10.9	<1	<1
6			2nd	135	41	8.6	8.8	7.1	8.1	12.9	11.5	9.8	11.4	<1	<1
7		IV	1st	140	56	10.0	10.4	8.5	9.6	15.4	14.2	12.5	14.0	<1	<1
8			2nd	138	32	9.4	8.9	8.3	8.9	14.5	13.0	11.3	13.0	<1	<1
1	November' 2007	I	1st	135	39	13.3	12.5	11.8	12.5	19.3	18.3	16.6	18.1	<1	<1
2			2nd	133	28	10.0	8.8	8.6	9.1	18.7	14.0	15.8	16.4	<1	<1
3		II	1st	140	39	6.8	7.4	5.6	6.6	13.5	12.2	10.5	12.1	<1	<1
4			2nd	136	37	6.7	6.3	5.2	6.1	17.7	16.5	14.8	16.3	<1	<1
5		III	1st	135	27	8.4	7.8	7.1	7.8	11.6	10.8	17.1	15.8	<1	<1
6			2nd	142	43	7.5	7.7	6.0	7.0	11.6	14.3	12.6	12.9	<1	<1
7		IV	1st	143	37	9.9	10.3	8.4	9.5	15.3	14.1	12.4	13.9	<1	<1
8			2nd	141	32	9.0	8.5	7.9	8.5	14.1	12.8	10.9	12.6	<1	<1

AMBIENT AIR QUALITY

S.No.	Month	Week	Day	SPM	RSPM	Station: AS, Rajasans								HC	CO
				µg/m³	µg/m³	SO_2 (µg/m³)				NO, (µg/m³)					
						06 - 14 hrs	14 – 22 hrs	23 – 06 hrs	24 hrs Average	06 - 14 hrs	14 - 22 hrs	23 - 06 hrs	24 hrs Average	PPM	PPM
1	September' 2007	I	1st	89	31	7.4	6.6	5.9	6.6	8.7	7.5	5.8	7.3	<1	<1
2			2nd	82	25	6.5	5.3	5.1	5.6	9.9	8.3	6.6	8.3	<1	<1
3		II	1st	85	28	7.7	8.3	6.5	7.5	11.8	10.5	8.6	10.3	<1	<1
4			2nd	81	24	7.2	6.0	5.7	6.3	11.0	9.2	7.5	9.2	<1	<1
5		III	1st	80	24	6.5	5.9	5.2	5.9	9.9	8.8	7.1	8.6	<1	<1
6			2nd	83	25	8.4	8.6	6.9	8.0	12.9	11.5	9.8	11.4	<1	<1
7		IV	1st	88	26	7.0	7.4	5.5	6.6	10.7	9.5	7.8	9.3	<1	<1
8			2nd	90	27	8.4	7.9	7.3	7.9	12.9	11.4	9.7	11.3	<1	<1
1	October' 2007	I	1st	84	25	9.8	9.0	8.3	9.0	7.5	6.3	4.6	6.1	<1	<1
2			2nd	85	23	7.7	6.5	6.5	6.8	11.1	9.5	7.8	9.5	<1	<1
3		II	1st	88	26	7.0	7.6	5.8	6.8	13.7	12.4	10.7	12.3	<1	<1
4			2nd	91	27	6.4	6.0	4.9	5.8	11.4	10.3	8.5	10.0	<1	<1
5		III	1st	92	28	6.8	6.2	5.5	6.2	10.2	9.1	7.6	8.9	<1	<1
6			2nd	87	26	8.7	8.9	7.2	8.3	13.2	11.8	10.1	11.7	<1	<1
7		IV	1st	82	22	6.7	7.1	5.2	6.3	10.4	9.2	7.5	9.0	<1	<1
8			2nd	85	20	9.0	8.5	7.9	8.5	12.7	11.2	9.5	11.1	<1	<1
1	November 2007	I	1st	81	28	10.5	9.7	9.0	9.7	8.2	7.0	5.3	6.8	<1	<1
2			2nd	90	37	8.0	6.8	6.6	7.1	11.4	9.8	8.1	9.8	<1	<1
3		II	1st	91	37	7.2	7.8	6.0	7.0	13.9	12.6	10.9	12.5	<1	<1
4			2nd	94	28	8.9	8.5	7.4	8.3	16.0	14.8	13.1	14.6	<1	<1
5		III	1st	95	22	10.8	10.0	9.3	9.0	9.6	8.5	6.8	8.3	<1	<1
6			2nd	82	25	7.6	7.8	6.1	7.2	12.1	10.7	8.9	10.6	<1	<1
7		IV	1st	85	21	6.6	7.0	5.1	6.2	10.3	9.1	7.4	9.0	<1	<1
8			2nd	87	26	7.8	7.3	6.7	7.3	12.3	10.8	8.9	10.7	<1	<1

AMBIENT AIR QUALITY

Station: A10, Nala															
S.No.	Month	Week	Day	SPM	RSPM	SO_2 (µg/m³)				NO_x (µg/m³)				HC	CO
				µg/m³	µg/m³	06 – 14 hrs	15 – 22 hrs	23 – 06 hrs	24 hrs Average	06 - 14 hrs	15 - 22 hrs	23 - 06 hrs	24 hrs Average	PPM	PPM
1	September 2007	I	1st	184	55	7.4	6.6	5.9	6.6	8.6	7.4	5.7	7.2	<1	<1
2			2nd	198	59	10.3	9.1	8.9	9.4	15.8	9.0	7.3	10.7	<1	<1
3		II	1st	203	61	9.7	10.3	8.5	9.5	14.8	13.5	11.8	13.4	<1	<1
4			2nd	196	59	8.2	6.0	6.9	7.0	12.9	9.2	7.5	9.7	<1	<1
5		III	1st	165	50	10.0	9.4	8.7	9.4	15.3	12.6	10.9	12.9	<1	<1
6			2nd	175	53	8.4	8.6	6.9	8.0	12.9	11.5	9.8	11.4	<1	<1
7		IV	1st	188	56	12.6	13.0	11.1	12.2	15.3	13.0	11.3	14.5	<1	<1
8			2nd	207	62	11.7	11.2	10.8	11.2	15.6	14.1	12.4	14.0	<1	<1
1	October 2007	I	1st	191	57	9.8	9.0	8.3	9.0	19.8	18.6	16.9	18.4	<1	<1
2			2nd	198	59	11.5	10.3	10.1	10.6	13.4	11.8	10.1	11.8	<1	<1
3		II	1st	180	54	9.0	9.6	7.8	8.8	13.7	12.4	10.7	12.3	<1	<1
4			2nd	175	53	8.6	8.2	7.3	8.0	12.9	11.7	10.0	11.6	<1	<1
5		III	1st	197	59	10.3	9.7	9.0	9.7	15.6	14.5	12.8	14.3	<1	<1
6			2nd	201	60	8.7	8.9	7.2	8.3	13.2	11.8	10.1	11.7	<1	<1
7		IV	1st	209	63	12.3	12.7	10.8	11.9	19.0	17.8	16.1	17.6	<1	<1
8			2nd	189	57	9.0	8.5	7.9	8.5	15.4	13.9	12.2	13.8	<1	<1
1	November 2007	I	1st	188	38	10.5	9.7	9.0	9.7	10.4	9.2	7.5	9.0	<1	<1
2			2nd	191	78	10.0	9.7	9.5	10.0	13.7	12.1	10.4	12.1	<1	<1
3		II	1st	187	56	12.0	12.6	10.8	11.8	13.9	12.6	10.9	12.5	<1	<1
4			2nd	198	59	8.9	8.5	7.4	8.3	16.0	13.7	12.0	13.9	<1	<1
5		III	1st	178	53	10.6	10.0	9.3	9.0	18.8	17.7	16.0	17.5	<1	<1
6			2nd	187	65	10.3	10.5	8.8	9.9	14.1	10.7	9.0	10.6	<1	<1
7		IV	1st	194	58	12.2	12.6	10.7	11.8	18.6	17.7	16.0	17.5	<1	<1
8			2nd	198	59	9.8	9.3	8.7	9.3	15.0	13.5	11.8	13.4	<1	<1

ANNEXURE-VI

WATER QUALITY

No.	Parameters	GW-1 Pechahatu Handpump	GW-2 Lembera Handpump	GW-3 Ghatkuri Handpump
I.	**Essential Characteristics**			
1.	Colour (Hazen Units)	10	<5	<5
2.	Odour	Un-objectionable	Un-objectionable	Un-objectionable
3.	Taste	Agreeable	Agreeable	Agreeable
4.	Turbidity, NTU	6	1	2
5.	pH	6.28	6.81	6.62
6.	Total Hardness as $CaCO_3$, mg/l	51	230	205
7.	Iron as Fe, mg/l	0.4	0.12	0.12
8.	Chlorides as Cl, mg/l	9	14	18
9.	Residual free, Chlorine, mg/l	Nil	Nil	Nil
II.	**Desirable Characteristics**			
1.	Dissolved Solids, mg/l	86	360	310
2.	Calcium as Ca, mg/l	14	64	60
3.	Magnesium as Mg, mg/l	3.9	17	13
4.	Copper as Cu, mg/l	<0.01	<0.01	<0.01
5.	Manganese as Mn, mg/l	0.02	<0.01	<0.01
6.	Sulphate as SO_4, mg/l	5	29	12
7.	Nitrate as NO_3, mg/l	6	2	5
8.	Fluoride as F, mg/l	0.25	0.40	0.30
9.	Phenolic Compounds as C_6H_5OH, mg/l	<0.001	<0.001	<0.001
10.	Mercury as Hg, mg/l	<0.001	<0.001	<0.001
11.	Cadmium as Cd, mg/l	<0.01	<0.01	<0.01
12.	Selenium as Se, mg/l	<0.01	<0.01	<0.01
13.	Arsenic as As, mg/l	<0.01	<0.01	<0.01
14.	Cyanide as CN, mg/l	<0.01	<0.01	<0.01
15.	Lead as Pb , mg/l	<0.01	<0.01	<0.01
16.	Zinc as Zn, mg/l	<0.01	<0.01	<0.01
17.	Chromium as $Cr6^+$, mg/l	<0.01	<0.01	<0.01
18.	Mineral Oil, mg/l	Absent	Absent	Absent
19.	Alkalinity , mg/l	41	215	196
20.	Aluminium as Al, mg/l	<0.01	<0.01	<0.01
21.	Boron as B, mg/l	0.03	0.04	0.04

WATER QUALITY

S.No.	Parameters	GW-4 Raika Handpump	GW-5 Lipunga Handpump	GW-6 Rajabera Handpump
I.	**Essential Characteristics**			
1.	Colour (Hazen Units)	<5	<5	15
2.	Odour	Un-objectionable	Un-objectionable	Un-objectionable
3.	Taste	Agreeable	Agreeable	Agreeable
4.	Turbidity, NTU	3	1	18
5.	pH	6.24	6.51	6.15
6.	Total Hardness as $CaCO_3$, mg/l	195	190	55
7.	Iron as Fe, mg/l	0.2	0.15	0.5
8.	Chlorides as Cl, mg/l	19.5	18	5
9.	Residual free, Chlorine, mg/l	Nil	Nil	Nil
II.	**Desirable Characteristics**			
1.	Dissolved Solids, mg/l	300	290	98
2.	Calcium as Ca, mg/l	58	56	14.8
3.	Magnesium as Mg, mg/l	12	12	4.4
4.	Copper as Cu, mg/l	<0.01	<0.01	<0.01
5.	Manganese as Mn, mg/l	0.01	<0.01	0.02
6.	Sulphate as SO_4, mg/l	8	7	2
7.	Nitrate as NO_3, mg/l	9	8	6
8.	Fluoride as F, mg/l	0.35	0.30	0.25
9.	Phenolic Compounds as C_6H_5OH, mg/l	<0.001	<0.001	<0.001
10.	Mercury as Hg, mg/l	<0.001	<0.001	<0.001
11.	Cadmium as Cd, mg/l	<0.01	<0.01	<0.01
12.	Selenium as Se, mg/l	<0.01	<0.01	<0.01
13.	Arsenic as As, mg/l	<0.01	<0.01	<0.01
14.	Cyanide as CN, mg/l	<0.01	<0.01	<0.01
15.	Lead as Pb , mg/l	<0.01	<0.01	<0.01
16.	Zinc as Zn, mg/l	<0.01	<0.01	<0.01
17.	Chromium as $Cr6^+$, mg/l	<0.01	<0.01	<0.01
18.	Mineral Oil, mg/l	Absent	Absent	Absent
19.	Alkalinity', mg/l	184	180	56
20.	Aluminium as Al, mg/l	<0.01	<0.01	<0.01
21.	Boron as B, mg/l	0.03	0.03	0.02

WATER QUALITY

No.	Parameters	GW-7 Nuta Handpump	SW-1	SW-2
I.	**Essential Characteristics**			
1.	Colour (Hazen Units)	<5	10	5
2.	Odour	Un-objectionable	Un-objectionable	Un-objectionable
3.	Taste	Agreeable	Agreeable	Agreeable
4.	Turbidity, NTU	1	5	3
5.	pH	6.26	6.82	6.89
6.	Total Hardness as $CaCO_3$, mg/l	100	65	67
7.	Iron as Fe, mg/l	0.12	0.45	0.2
8.	Chlorides as Cl, mg/l	11	5	7
9.	Residual free, Chlorine, mg/l	Nil	Nil	Nil
II.	**Desirable Characteristics**			
1.	Dissolved Solids, mg/l	150	100	106
2.	Calcium as Ca, mg/l	28	18.4	18.8
3.	Magnesium as Mg, mg/l	7.3	4.6	4.9
4.	Copper as Cu, mg/l	<0.01	<0.01	<0.01
5.	Manganese as Mn, mg/l	<0.01	0.02	0.01
6.	Sulphate as SO_4, mg/l	3	4	5
7.	Nitrate as NO_3, mg/l	1	<1	<1
8.	Fluoride as F, mg/l	0.25	0.20	0.20
9.	Phenolic Compounds as C_6H_5OH, mg/l	<0.001	<0.001	<0.001
10.	Mercury as Hg, mg/l	<0.001	<0.001	<0.001
11.	Cadmium as Cd, mg/l	<0.01	<0.01	<0.01
12.	Selenium as Se, mg/l	<0.01	<0.01	<0.01
13.	Arsenic as As, mg/l	<0.01	<0.01	<0.01
14.	Cyanide as CN, mg/l	<0.01	<0.01	<0.01
15.	Lead as Pb , mg/l	<0.01	<0.01	<0.01
16.	Zinc as Zn, mg/l	<0.01	<0.01	<0.01
17.	Chromium as $Cr6^+$, mg/l	<0.01	<0.01	<0.01
18.	Mineral Oil, mg/l	Absent	Absent	Absent
19.	Alkalinity , mg/l	85	63	65
20.	Aluminium as Al, mg/l	<0.01	<0.01	<0.01
21.	Boron as B, mg/l	0.03	0.02	0.02

1 : Karo River upstream, near Lepang
2 : Karo River down stream, near Gangda

WATER QUALITY

I.No.	Parameters	SW-3	SW-4
I.	**Essential Characteristics**		
1.	Colour (Hazen Units)	5	5
2.	Odour	Un-objectionable	Un-objectionable
3.	Taste	Agreeable	Agreeable
4.	Turbidity, NTU	4	3
5.	pH	6.98	7.04
6.	Total Hardness as $CaCO_3$, mg/l	51	56
7.	Iron as Fe, mg/l	0.25	0.20
8.	Chlorides as Cl, mg/l	5	5
9.	Residual free, Chlorine, mg/l	Nil	Nil
II.	**Desirable Characteristics**		
1.	Dissolved Solids, mg/l	80	86
2.	Calcium as Ca, mg/l	14.4	15.2
3.	Magnesium as Mg, mg/l	3.6	4.4
4.	Copper as Cu, mg/l	<0.01	<0.01
5.	Manganese as Mn, mg/l	0.01	0.01
6.	Sulphate as SO_4, mg/l	2	3
7.	Nitrate as NO_3, mg/l	<1	<1
8.	Fluoride as F, mg/l	0.25	0.20
9.	Phenolic Compounds as C_6H_5OH, mg/l	<0.001	<0.001
10.	Mercury as Hg, mg/l	<0.001	<0.001
11.	Cadmium as Cd, mg/l	<0.01	<0.01
12.	Selenium as Se, mg/l	<0.01	<0.01
13.	Arsenic as As, mg/l	<0.01	<0.01
14.	Cyanide as CN, mg/l	<0.01	<0.01
15.	Lead as Pb , mg/l	<0.01	<0.01
16.	Zinc as Zn, mg/l	<0.01	<0.01
17.	Chromium as $Cr6^+$, mg/l	<0.01	<0.01
18.	Mineral Oil, mg/l	Absent	Absent
19.	Alkalinity , mg/l	45	48
20.	Aluminium as Al, mg/l	<0.01	<0.01
21.	Boron as B, mg/l	0.02	0.03

3 : Koina River upstream, near Rajabera
4 : Koina River downstream,near Lembera

APPROVED

ANNEXURE - VI

NOISE LEVELS [in dB (A)]

Time	N1	N2	N3	N4	N5	N6	N7	N8	N9	N10
16:00	35.2	36	35.2	40.7	38.6	37.9	37.8	40.9	37.8	40.6
17:00	36.4	36.7	38	37.2	41.2	41.6	38	42.2	40.6	43.3
18:00	37.7	38.3	37.7	38.5	39.1	43.2	39.3	40.4	41.4	48.7
19:00	41.3	41.4	41.3	42.1	40.4	40.5	40.6	40.7	40.6	45.7
10:00	43.7	40.7	43.7	42	41.6	42.1	41.7	41.2	44.8	51.6
11:00	44	42.3	44	42.6	42.8	44.6	40.6	43.4	43.8	48
12:00	44.4	39.7	41.2	43	42.8	42.6	42.2	42.2	42.4	47.5
13:00	41	44.7	41	48.9	46.6	43	42.4	45	42	44.8
14:00	43	42.6	43	43.4	43.8	41.7	45.9	44.2	44.6	52.6
15:00	41.8	42.2	41.8	44.2	44.6	40.3	41.7	42.1	41.7	50.5
16:00	44	44.2	45.6	41.6	41.8	45.8	40	43	45.5	48.7
17:00	40.6	44.6	40	40.9	40.5	42.2	41	46.7	41.2	44
18:00	38.7	40.8	37.6	41.5	40.8	47.6	42	41.5	40.8	40.6
19:00	39.2	38.6	38.3	42.6	42.2	42.2	40.4	41.8	41.4	43.4
10:00	38	37.9	40.2	40.7	38.9	42.7	43	45.7	44	44.3
11:00	36.4	40.7	36.4	40.9	37.6	40.4	41.2	39.9	41.4	41.5
12:00	36.2	37.2	37.8	39.8	35.8	38.6	39.6	42	38.6	40.8
23:00	37	38.1	35.9	37.6	36.7	36.6	41.9	35.6	37.9	39.7
10:00	38	37.6	37	36.6	40	38.6	37.7	40.6	36.4	40
11:00	36.4	37.7	38	37.2	37.4	38.1	37.8	37.1	36.6	36.5
12:00	35.6	38.1	38.6	40.6	37.1	37.1	38.6	41	38.4	37
13:00	38.8	39.7	41.7	38.4	38	37.8	37.2	37.8	37.5	41.2
14:00	40	36.3	40.9	41.3	38.3	40.5	38	38.7	40	43.3
15:00	36.6	39.8	38.8	40.2	39.3	40.7	38.4	40	39.7	40.8

Dmin	35.2	36.0	35.2	37.2	37.6	37.9	37.8	39.9	37.8	40.6
Dmax	44.4	44.7	45.6	48.9	46.6	47.6	45.9	46.7	45.5	52.6
Nmin	35.6	36.3	35.9	36.6	35.8	36.6	36.0	36.6	36.4	36.5
Nmax	40.0	39.8	41.7	41.3	40.0	40.7	41.9	42.0	40.0	43.3

NOISE MONITORING LOCATIONS

Code	N-1	N-2	N-3	N-4	N-5
Locations	Mine Site-1	Mine Site-2	Pechahatu	Lembera	Ghatkuri

Code	N-6	N-7	N-8	N-9	N-10
Locations	Raika	Lipunga	Hamsada	Rajabera	Nela

SOIL QUALITY

PARAMETER	RESULTS		
	S-1 Core Zone (Mine Area)	S-2 Pechahatu	S-3 Lembera
Colour	Red	Red	Red
pH (1.2 Soil Water Extract)	5.10	5.0	4.90
E.C (μ mhos) (1:2 Soil water Extract)	56	68	130
Available Nitrogen, Kg/Hec	540	110	620
Available Phosphorous as P_2O_5, Kg/Hec	108	34	126
Available Potassium as K_2O, Kg/Hec	340	190	370
Sodium as Na, ppm	35	25	30
Calcium as Ca, ppm	1040	760	940
Magnesium as Mg, ppm	320	240	260
Chloride as Cl, ppm	14	14	28
Organic Carbon,%	1.00	0.30	1.18
Texture	Sandy loam	Sandy clay loam	Sandy clay loam
a) Sand, %	60	50	47
b) Silt, %	24	27	28
c) Clay, %	16	23	25

SOIL QUALITY

PARAMETER	RESULTS		
	S-4 Ghatkuri	S-5 Raika	S-6 Lipunga
Colour	Red	Light brown	Red
pH (1.2 Soil Water Extract)	5.40	4.60	5.40
E.C (μ mhos) (1:2 Soil water Extract)	140	100	92
Available Nitrogen, Kg/Hec	520	580	280
Available Phosphorous as P_2O_5, Kg/Hec	98	114	72
Available Potassium as K_2O, Kg/Hec	420	540	270
Sodium as Na, ppm	40	45	25
Calcium as Ca, ppm	960	1040	840
Magnesium as Mg, ppm	290	340	270
Chloride as Cl, ppm	28	21	21
Organic Carbon, %	0.96	1.10	0.60
Texture	Silt clay loam	Sandy loam	Silt clay
a) Sand, %	29	50	25
b) Silt, %	40	35	41
c) Clay, %	21	15	34

SOIL QUALITY

Sl.	PARAMETER	RESULTS	
		S-7 Rajabera	S-8 Nuia
	Colour	Red	Red
	pH (1.2 Soil Water Extract)	4.60	4.90
	E.C (μ mhos) (1:2 Soil water Extract)	58	64
	Available Nitrogen, Kg/Hec	290	210
	Available Phosphorous as P_2O_5, Kg/Hec	72	28
	Available Potassium as K_2O, Kg/Hec	320	190
	Sodium as Na, ppm	20	25
	Calcium as Ca, ppm	760	820
	Magnesium as Mg, ppm	240	230
	Chloride as Cl, ppm	14	14
	Organic Carbon, %	0.68	0.43
	Texture	Silt loam	Sandy clay loam
	a) Sand, %	39	51
	b) Silt, %	43	23
	c) Clay, %	18	26

ANNEXURE IX

PROPOSAL FOR ITEM NO.12.6 & 12.7 OF PMCP FOR THE 1ST YEAR (JERELDABURU IRON ORE DEPOSIT)

ITEMS	DETAILS	AREA (HECT.)	QUANTITY	EXPENDITURE (Rs)	REMARKS
		PROPOSED	PROPOSED	PROPOSED	
(A) RECLAMATION & REHABILITATION OF MINED OUT LAND/AREA	(i)Backfilling	NIL	NIL	NIL	NIL
	(ii)Afforestation on the backfilled area	NIL	NIL	NIL	NIL
	(iii) Other (please specify) e.g. Afforestation on exhausted benches.	NIL	NIL	NIL	NIL
	(iv)Pisciculture	NIL	NIL	NIL	NIL
	(v) Converting into water reservoir.	NIL	NIL	NIL	NIL
	(vi) Picnic Spot	NIL	NIL	NIL	NIL
(B) STABILIZATION & REHABILITATION OF DUMPS (with lease)	(i) Terracing.	2.56	302639 cu.m.	4 lacs	NIL
	(ii) Pitching	NIL	NIL	NIL	NIL
	(iii)Construction of Parapet Walls/Retaining wall at toe of dumps.	4671m.	NIL	252 lacs	NIL
	(iv)Construction of Check Dams along slope of vallies etc.	NIL	6 nos.	102 lacs	NIL
	(v) Construction of Garland drain etc.	2200 m.	NIL	5.0 lacs	NIL
	(vi) Desilting of settling ponds, channels.	NIL	NIL	2.0 lacs	NIL
	(vii)Afforestation on dumps	NIL	NIL	NIL	NIL
	(viii) Others (Please specify)	NIL	NIL	NIL	NIL
(C) REHABILITATION OF BARREN AREA WITHIN LEASE	(i) Afforestation (Green belt building)	NIL	NIL	2.0 lacs	NIL
	(ii) Others (Please specify)	NIL	NIL	NIL	NIL
(D)ENVIRONMENT-AL MONITORING (Core zone & Buffer Zone separately)	(i) Ambient Air Quality	N.A.	8 Points	6 lacs	As per proposal
	(ii) Water Quality	N.A.	3 Points	3 lcs	As per proposal
	(iii) Noise Level Survey	N.A.	3Points	1 lac	As per proposal
	(iv) Ground Vibration	N.A.	N.A.	N.A.	N.A.
	(v) Others (Please specify) Decommisioning of infrastructure	N.A.	N.A.	N.A.	N.A.
TOTAL				377 lacs	

PROPOSAL FOR ITEM NO.12.6 & 12.7 OF PMCP FOR THE 2ND YEAR (JERELDABURU IRON ORE DEPOSIT)

ITEMS	DETAILS	AREA (HECT.)	QUANTITY	EXPENDITURE (Rs)	REMARKS
		PROPOSED	PROPOSED	PROPOSED	
(A) RECLAMATION & REHABILITATION OF MINED OUT LAND/AREA	(i)Backfilling	NIL	NIL	NIL	NIL
	(ii)Afforestation on the backfilled area	NIL	NIL	NIL	NIL
	(iii) Other (please specify) e.g. Afforestation on exhausted benches.	NIL	NIL	NIL	NIL
	(iv)Pisciculture	NIL	NIL	NIL	NIL
	(v) Converting into water reservoir.	NIL	NIL	NIL	NIL
	(vi) Picnic Spot	NIL	NIL	NIL	NIL
(B) STABILIZATION & REHABILITATION OF DUMPS (with lease)	(i) Terracing.	3.97	132660 cu.m.	4 lacs	NIL
	(ii) Pitching	NIL	NIL	NIL	NIL
	(iii)Construction of Parapet Walls/Retaining wall at toe of dumps.	150 m.	NIL	8.1 lacs	NIL
	(iv)Construction of Check Dams along slope of vallies etc.	NIL	NIL	NIL	NIL
	(v) Construction of Garland drain etc.	150 m.	NIL	0.4 lacs	NIL
	(vi) Desilting of settling ponds, channels.	NIL	NIL	2.0 lacs	NIL
	(vii)Afforestation on dumps	NIL	NIL	NIL	NIL
	(viii) Others (Please specify)	NIL	NIL	NIL	NIL
(C) REHABILITATION OF BARREN AREA WITHIN LEASE	(i) Afforestation (Green belt building)	NIL	NIL	2.0 lacs	NIL
	(ii) Others (Please specify)	NIL	NIL	NIL	NIL
(D)ENVIRONMENT-AL MONITORING (Core zone & Buffer Zone separately)	(i) Ambient Air Quality	N.A.	8 Points	6 lacs	As per proposal
	(ii) Water Quality	N.A.	3 Points	3 lcs	As per proposal
	(iii) Noise Level Survey	N.A.	3Points	1 lac	As per proposal
	(iv) Ground Vibration	N.A.	N.A.	N.A.	N.A.
	(v) Others (Please specify) Decommisioning of infrastructure	N.A.	N.A.	N.A	N.A.
TOTAL				26.5 lacs	

PROPOSAL FOR ITEM NO.12.6 & 12.7 OF PMCP FOR THE 3RD YEAR (JERELDABURU IRON ORE DEPOSIT)

ITEMS	DETAILS	AREA (HECT.)	QUANTITY	EXPENDITURE (Rs)	REMARKS
		PROPOSED	PROPOSED	PROPOSED	
(A) RECLAMATION & REHABILITATION OF MINED OUT LAND/AREA	(i)Backfilling	NIL	NIL	NIL	NIL
	(ii)Afforestation on the backfilled area	NIL	NIL	NIL	NIL
	(iii) Other (please specify) e.g. Afforestation on exhausted benches.	NIL	NIL	NIL	NIL
	(iv)Pisciculture	NIL	NIL	NIL	NIL
	(v) Converting into water reservoir.	NIL	NIL	NIL	NIL
	(vi) Picnic Spot	NIL	NIL	NIL	NIL
(B) STABILIZATION & REHABILITATION OF DUMPS (with lease)	(i) Terracing.	3.33	142262 cu.m.	4 lacs	NIL
	(ii) Pitching	NIL	NIL	NIL	NIL
	(iii)Construction of Parapet Walls/Retaining wall at toe of dumps.	150 m.	NIL	8.1 lacs	NIL
	(iv)Construction of Check Dams along slope of vallies etc.	NIL	NIL	NIL	NIL
	(v) Construction of Garland drain etc.	150 m.	NIL	0.4 lacs	NIL
	(vi) Desilting of settling ponds, channels.	NIL	NIL	2.0 lacs	NIL
	(vii)Afforestation on dumps	NIL	NIL	NIL	NIL
	(viii) Others (Please specify)	NIL	NIL	NIL	NIL
(C) REHABILITATION OF BARREN AREA WITHIN LEASE	(i) Afforestation (Green belt building)	NIL	NIL	2.0 lacs	NIL
	(ii) Others (Please specify)	NIL	NIL	NIL	NIL
(D)ENVIRONMENT-AL MONITORING (Core zone & Buffer Zone separately)	(i) Ambient Air Quality	N.A.	8 Points	8 lacs	As per proposal
	(ii) Water Quality	N.A.	3 Points	3 lcs	As per proposal
	(iii) Noise Level Survey	N.A.	3Points	1 lac	As per proposal
	(iv) Ground Vibration	N.A.	N.A.	N.A.	N.A.
	(v) Others (Please specify) Decommisioning of infrastructure	N.A.	N.A.	N.A	N.A.
TOTAL				26.5 lacs	

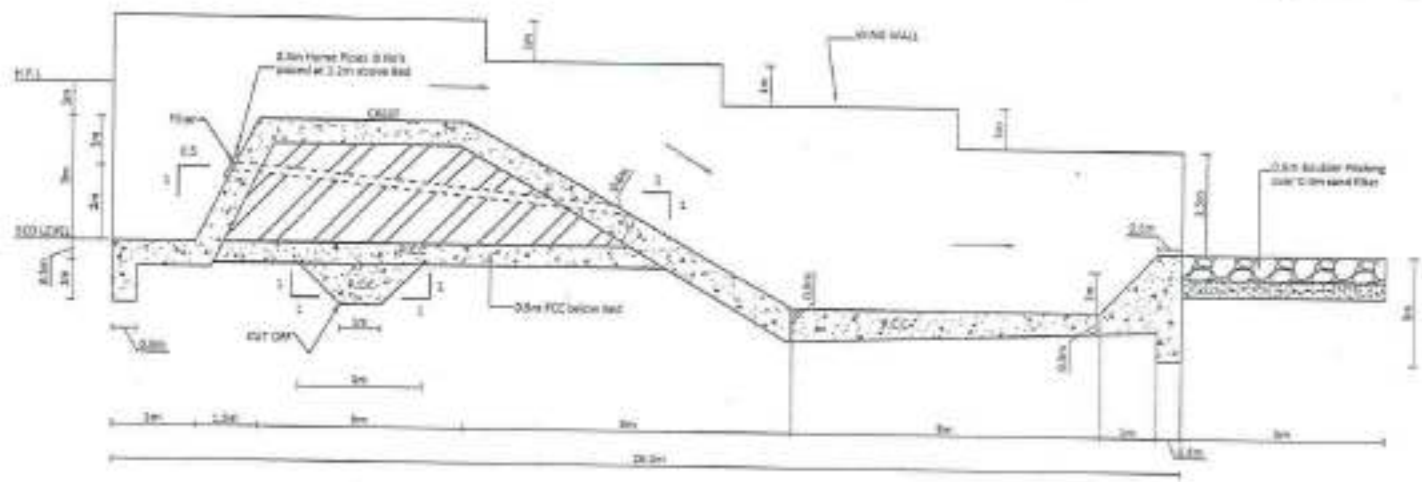
PROPOSAL FOR ITEM NO.12.6 & 12.7 OF PMCP FOR THE 4TH YEAR (JERELDABURU IRON ORE DEPOSIT)

ITEMS	DETAILS	AREA (HECT.)	QUANTITY	EXPENDITURE (Rs)	REMARKS
		PROPOSED	PROPOSED	PROPOSED	
(A) RECLAMATION & REHABILITATION OF MINED OUT LAND/AREA	(i)Backfilling	NIL	NIL	NIL	NIL
	(ii)Afforestation on the backfilled area	NIL	NIL	NIL	NIL
	(iii) Other (please specify) e.g. Afforestation on exhausted benches.	NIL	NIL	NIL	NIL
	(iv)Pisciculture	NIL	NIL	NIL	NIL
	(v) Converting into water reservoir.	NIL	NIL	NIL	NIL
	(vi) Picnic Spot	NIL	NIL	NIL	NIL
(B) STABILIZATION & REHABILITATION OF DUMPS (with lease)	(i) Terracing.	1.46	228450 cu.m.	4 lacs	NIL
	(ii) Pitching	NIL	NIL	NIL	NIL
	(iii)Construction of Parapet Walls/Retaining wall at toe of dumps.	150 m.	NIL	8.1 lacs	NIL
	(iv)Construction of Check Dams along slope of vallies etc.	NIL	NIL	NIL	NIL
	(v) Construction of Settling Ponds (Garland drain etc.)	150 m.	NIL	0.4 lacs	NIL
	(vi) Desilting of settling ponds, channels.	NIL	NIL	2.0 lacs	NIL
	(vii)Afforestation on dumps	NIL	NIL	NIL	NIL
	(viii) Others (Please specify)	NIL	NIL	NIL	NIL
(C) REHABILITATION OF BARREN AREA WITHIN LEASE	(i) Afforestation (Green belt building)	NIL	NIL	2.0 lacs	NIL
	(ii) Others (Please specify)	NIL	NIL	NIL	NIL
(D)ENVIRONMENT-AL MONITORING (Core zone & Buffer Zone separately)	(i) Ambient Air Quality	N.A.	6 Points	6 lacs	As per proposal
	(ii) Water Quality	N.A.	3 Points	3 lcs	As per proposal
	(iii) Noise Level Survey	N.A.	3Points	1 lac	As per proposal
	(iv) Ground Vibration	N.A.	N.A.	N.A.	N.A.
	(v) Others (Please specify) Decommisioning of infrastructure	N.A.	N.A.	N.A	N.A.
TOTAL				26.5 lacs	

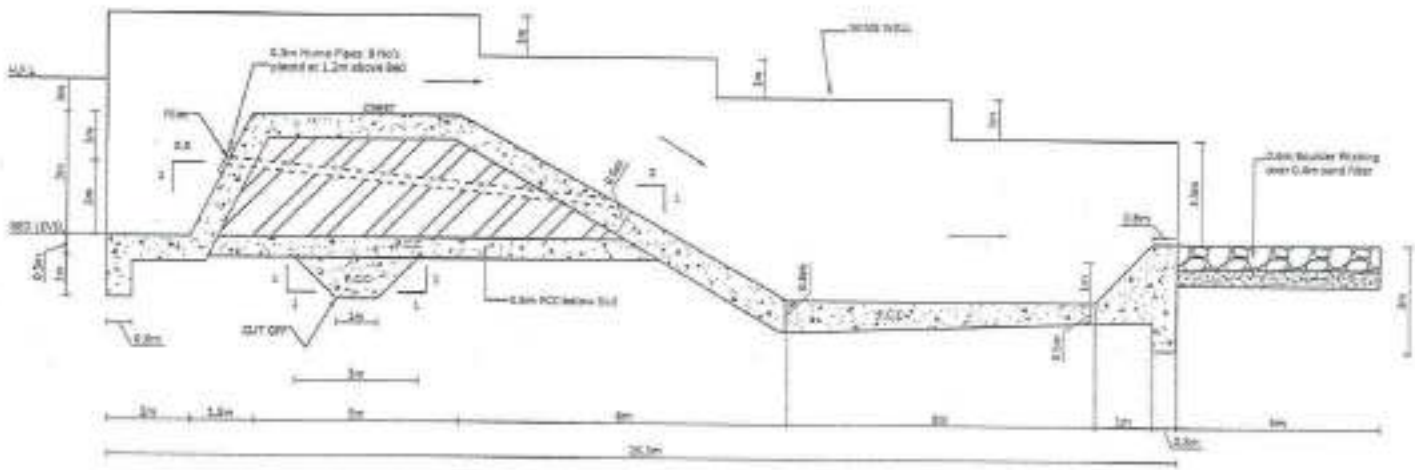
PROPOSAL FOR ITEM NO.12.6 & 12.7 OF PMCP FOR THE 5TH YEAR (JERELDABURU IRON ORE DEPOSIT)

ITEMS	DETAILS	AREA (HECT.)	QUANTITY	EXPENDITURE (Rs)	REMARKS
		PROPOSED	PROPOSED	PROPOSED	
(A) RECLAMATION & REHABILITATION OF MINED OUT LAND/AREA	(i)Backfilling	NIL	NIL	NIL	NIL
	(ii)Afforestation on the backfilled area	NIL	NIL	NIL	NIL
	(iii) Other (please specify) e.g. Afforestation on exhausted benches.	NIL	NIL	NIL	NIL
	(iv)Pisciculture	NIL	NIL	NIL	NIL
	(v) Converting into water reservoir.	NIL	NIL	NIL	NIL
	(vi) Picnic Spot	NIL	NIL	NIL	NIL
(B) STABILIZATION & REHABILITATION OF DUMPS (with lease)	(i) Terracing.	2.9	310630cu.m.	4 lacs	NIL
	(ii) Pitching	NIL	NIL	NIL	NIL
	(iii)Construction of Parapet Walls/Retaining wall at toe of dumps.	150 m.	NIL	8.1 lacs	NIL
	(iv)Construction of Check Dams along slope of vallies etc.	NIL	NIL	NIL	NIL
	(v) Construction of Settling Ponds (Garland drain etc.)	150 m.	NIL	0.4 lacs	NIL
	(vi) Desilting of settling ponds, channels.	NIL	NIL	2.0 lacs	NIL
	(vii)Afforestation on dumps	NIL	NIL	NIL	NIL
	(viii) Others (Please specify)	NIL	NIL	NIL	NIL
(C) REHABILITATION OF BARREN AREA WITHIN LEASE	(i) Afforestation (Green belt building)	NIL	NIL	2.0 lacs	NIL
	(ii) Others (Please specify)	NIL	NIL	NIL	NIL
(D)ENVIRONMENT-AL MONITORING (Core zone & Buffer Zone separately)	(I) Ambient Air Quality	N.A.	8 Points	6 lacs	As per proposal
	(ii) Water Quality	N.A.	3 Points	3 lcs	As per proposal
	(iii) Noise Level Survey	N.A.	3Points	1 lac	As per proposal
	(iv) Ground Vibration	N.A.	N.A.	N.A.	N.A.
	(v) Others (Please specify) Decommisioning of infrastructure	N.A.	N.A.	N.A	N.A.
TOTAL				26.5 lacs	

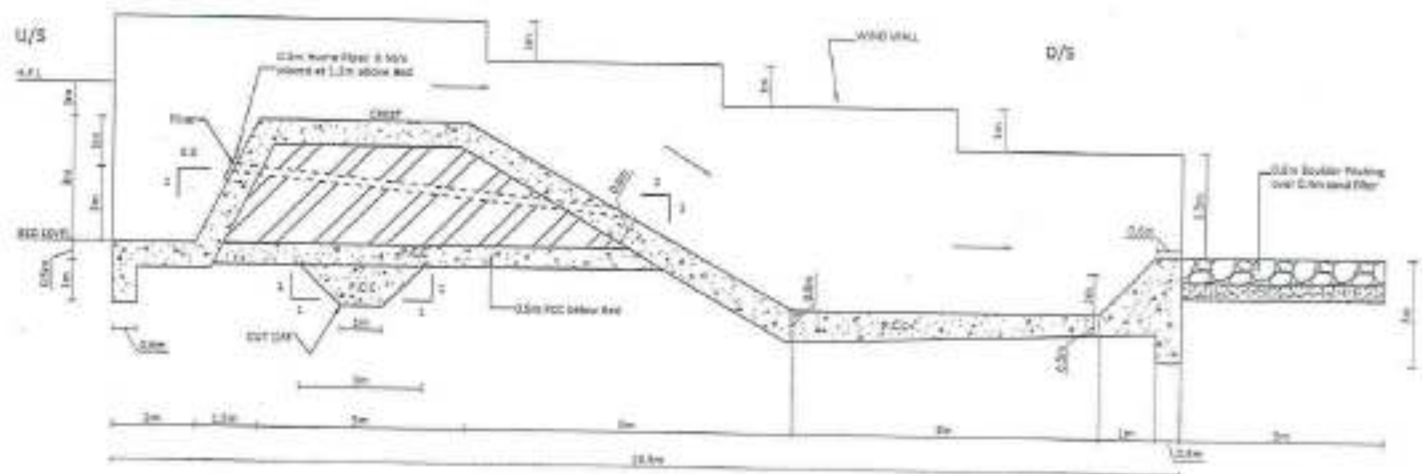
ANNEXURE-X



CLIENT:	JINDAL STEEL & POWER LIMITED
PROJECT:	IRON ORE MINING LEASE PROJECT
SUBJECT:	SECTIONAL ELEVATION OF SILT CHECK DAM PROPOSED

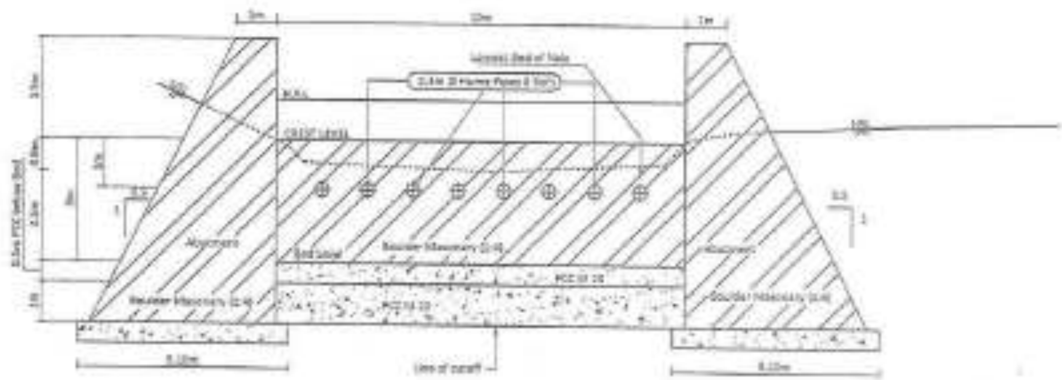


CLIENT	ADANI [illegible] POWER LIMITED
PROJECT	[illegible] IRON ORE MINING LEASE PROJECT
DRAWING	SECTIONAL ELEVATION OF SILT CHECK DAM PROPOSED AT SECTION 'B' ON NALA
	[illegible]

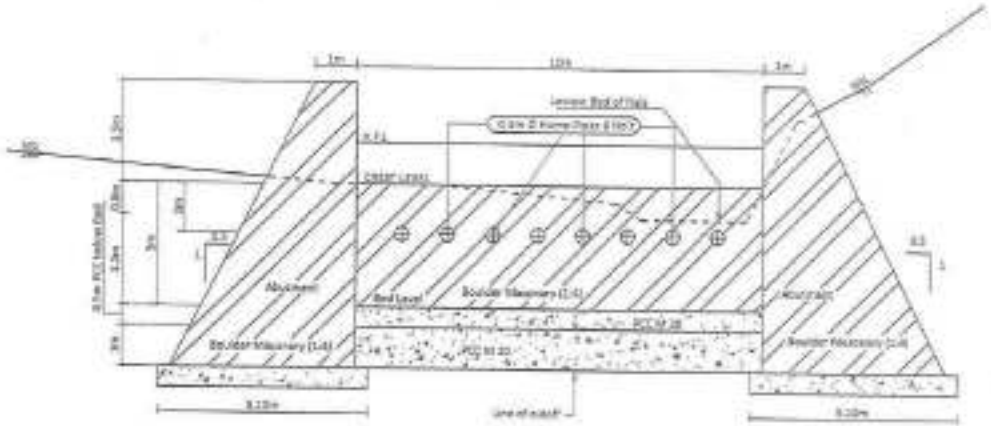


CLIENT:	JINDAL STEEL & POWER
PROJECT:	IRON ORE MINING LEASE PROJECT
SUBJECT:	AT SECTION 'C' ON NALA

Fig-5(a)

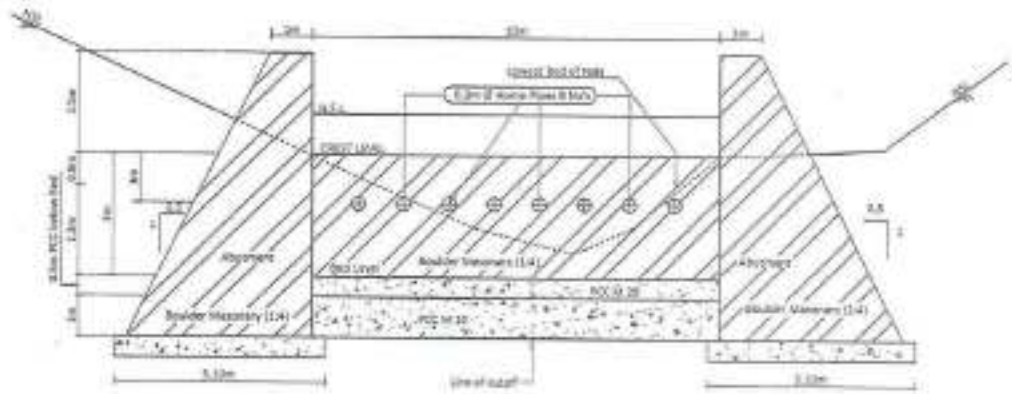


CLIENT-	JINDAL STEEL & POWER [illegible]
PROJECT-	IRON ORE MINING LEASE PROJECT
SUBJECT-	FRONT ELEVATION OF SILT CHECK DAM PROPOSED AT SECTION 'A' ON NALA



JINDAL STEEL & POWER LIMITED

IRON ORE MINING LEASE PROJECT



APPROVED

CLIENT- JINDAL STEEL & POWER LIMITED

PROJECT- IRON ORE MINING LEASE PROJECT

FRONT ELEVATION OF SILT CHECK DAM PROPOSED
AT SECTION 'S'

5 The details of first order streams emanating from the mine lease area and impact of the proposed project on the same and thereby on the hydrology of the area.

- The watershed area falls under South Karo river basin.
- The watershed area is bound between Lat - 22° 15' 1" N to 22° 16' 46" N and Long. 85° 22' 58"E to 85° 24' 16"E.
- Three seasonal nalas having independent flow line exists in the area which are separated by hillocks.
- The first order streams are seasonal only (23 first order streams).

Marking of nalas	Length traveling in the mines area (Km.)	Catchment Area (Sq.Km.)	Design Discharge (cumecs)
X - A	2.75	1.3	13
D - B	1.88	1.3	13
S - C	3.40	1.5	15

Map showing drainage of the Mining Lease Area

- The mining operation will be carried out by slicing method and after mining the excavated profile will match to the existing profile of the land.
- Though the NSL (Natural Surface Level) will be depressed (lower) than the existing levels but the overall drainage and general hydrology will not be affected.
- The first order streams have been studied. These are seasonal only and are of minor in nature having vary small catchments. They ultimately drain out in the main tapping streams marked as "A, B & C". They are situated on high altitudes and are likely to be disturbed during mining operation. As the operation is to be done by slicing method the natural slope of the area will remain more or less the same and thus the drainage & the general hydrology of the area will remain unaltered. There may be slight variation in the existing alignment of these streams during mining process but will be replaced by new first order streams. The overall impact on surface water flow and its drainage to the main carriers will not upset the stability of the area.
- The existing course of the main tapping streams will remain more or less the same. The exit points of these streams at the mine boundary will remain unaltered.

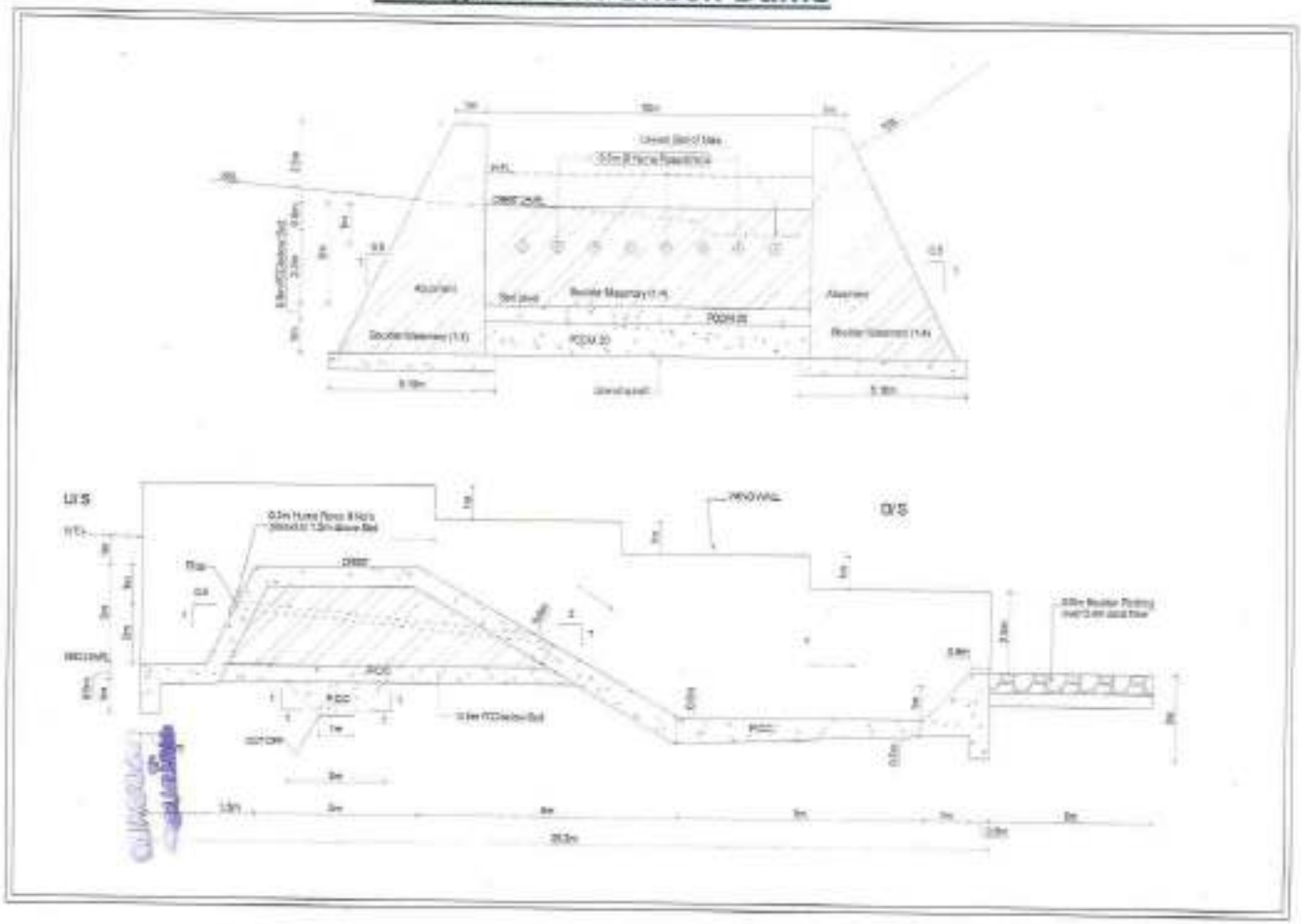
- All three nalas are flowing from South to North in available gradient.
- Mining will involve removal of overburden and dumping.
- Silt may fall in the stream bed which may be carried during monsoon period away from the mine area.
- The excavation and quarry operation will be done in the banks and bed of these nalas to extract mineral ores.
- This will create temporary depression and cuts along the rivulet.
- The ultimate flow of the silt along with water will be started from the boundary of the mining lease area.

Scheme Proposal

Proposed Preventive Measures

- To arrest the silt and debris within the quarry area, construction of 3 nos silt trap check dams will be done on the three main streams flowing in the mining lease area as shown in the plan at points A, B & C.
- The slicing method of mining will also arrest silt & debris in the lower portions and will arrest part of the overburden and debries.
- The silt trap check dams will be constructed near the boundary line of mining lease area to arrest silt within the mining lease area and allowing clean water to flow down without polluting the outflow. Necessary provision of outlets for flowing out the clean water has been made in the check dams.
- De-silting of the area U/s of the check dam will be done periodically to maintain the effectiveness of silt trapping arrangements in the mining lease areas.
- Provision of dump area has been made within the mining lease area as shown in the plan.
- To arrest silt from the dump area, construction of series of parapet walls at the boundary of the dump area and construction of garland drains out side all along the boundary will be done. The drain will be connected to the nalas U/s of proposed silt check dams.

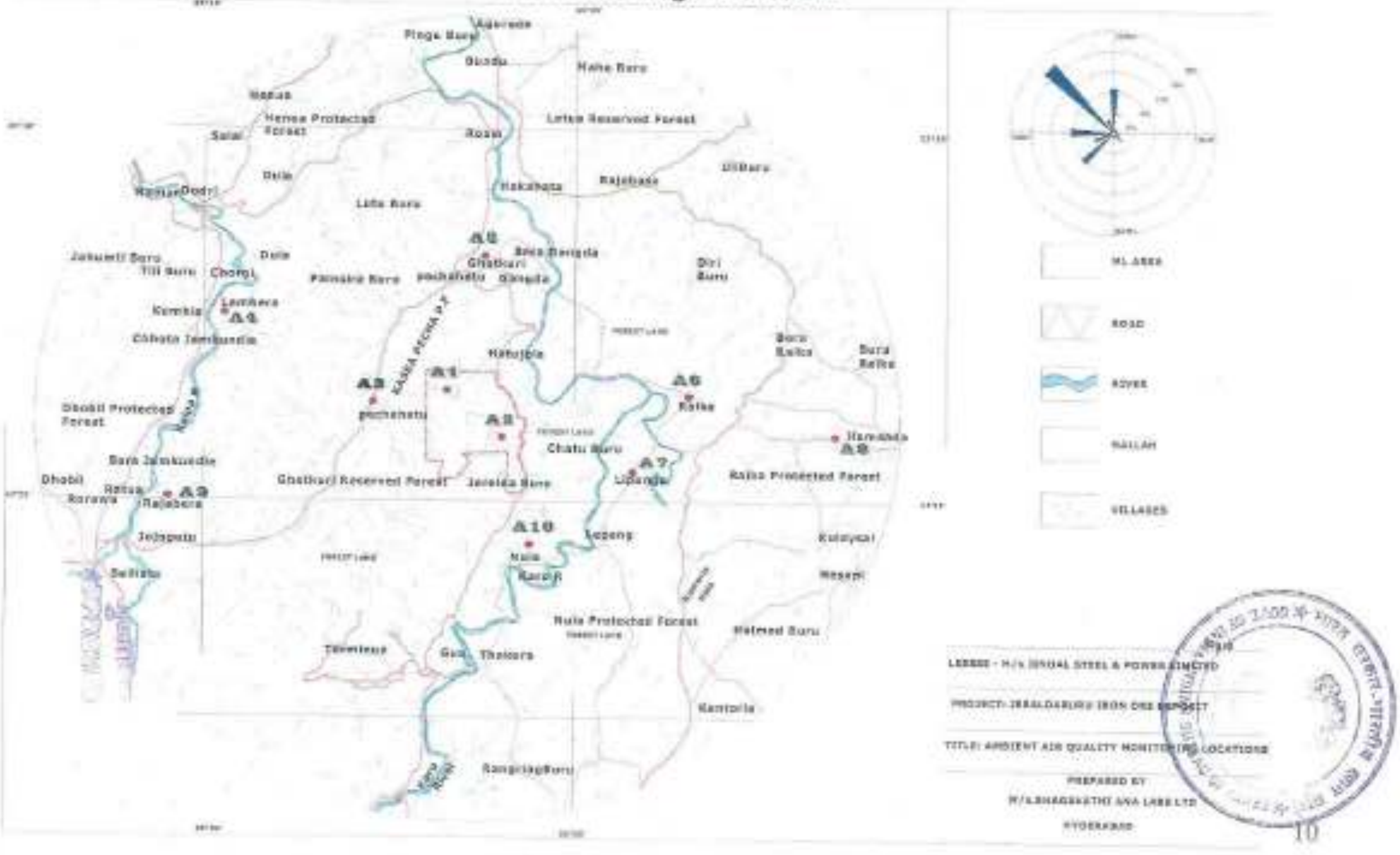
Design of Silt Check Dams



Front Elevation and Sectional Elevation of Silt Check Dam proposed at Section 'C' on Nalla

10. Information on baseline AAQ data particularly the SPM, RSPM, NOx and the contribution of the proposed project should be given.

AAQ Monitoring Locations



Baseline AAQ Monitoring Results (98th Percentile Values)

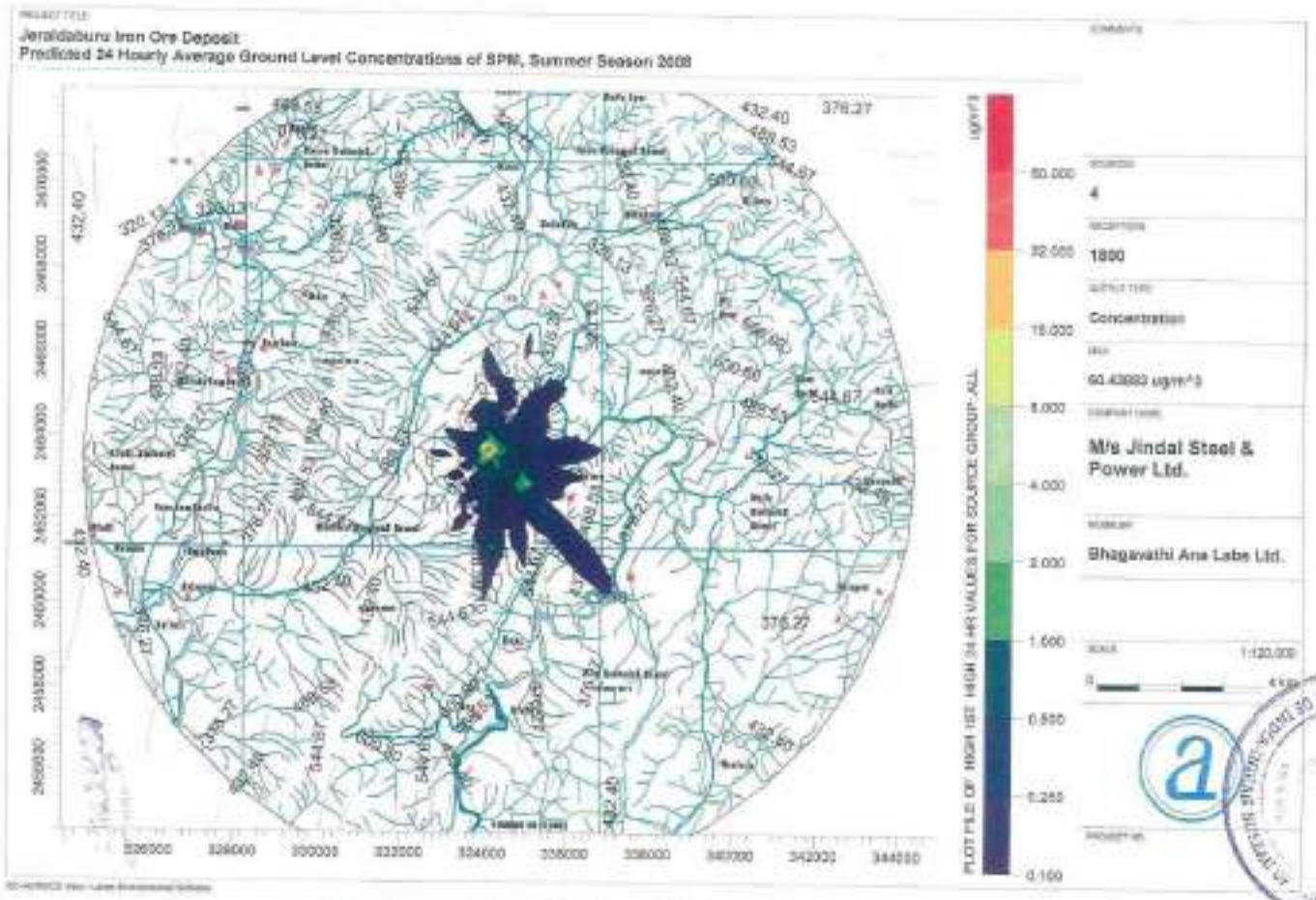
Location Code	Location	Unit: µg/m³			
		SPM	RSPM	SO_2	NO_X
A1	Core Zone-1	89.1	29.6	9.5	13.1
A2	Core Zone-2	90.6	32.6	9.8	13.1
A3	Pechahatu	92.6	33.3	10.2	17.4
A4	Lambera	90.9	32.0	10.4	15.4
A5	Ghatkuri	108.3	46.9	10.3	15.9
A6	Raika	93.4	39.7	11.2	15.8
A7	Lipunga	107.8	42.5	11.2	15.3
A8	Hamsada	143.2	56.9	12.7	18.0
A9	Rajabera	95.0	33.5	10.1	14.4
A10	Nuia	143.7	72.5	12.7	18.6

Overall Scenario

	SPM (µg/m³)		NO_X (µg/m³)	
	Core Zone	Buffer Zone	Core Zone	Buffer Zone
Baseline Concentration	90.70	146	13.30	18.7
Predicted Increase	60.44	< 2.0	6.03	2.0
Overall Scenario	151.14	148	19.33	20.70

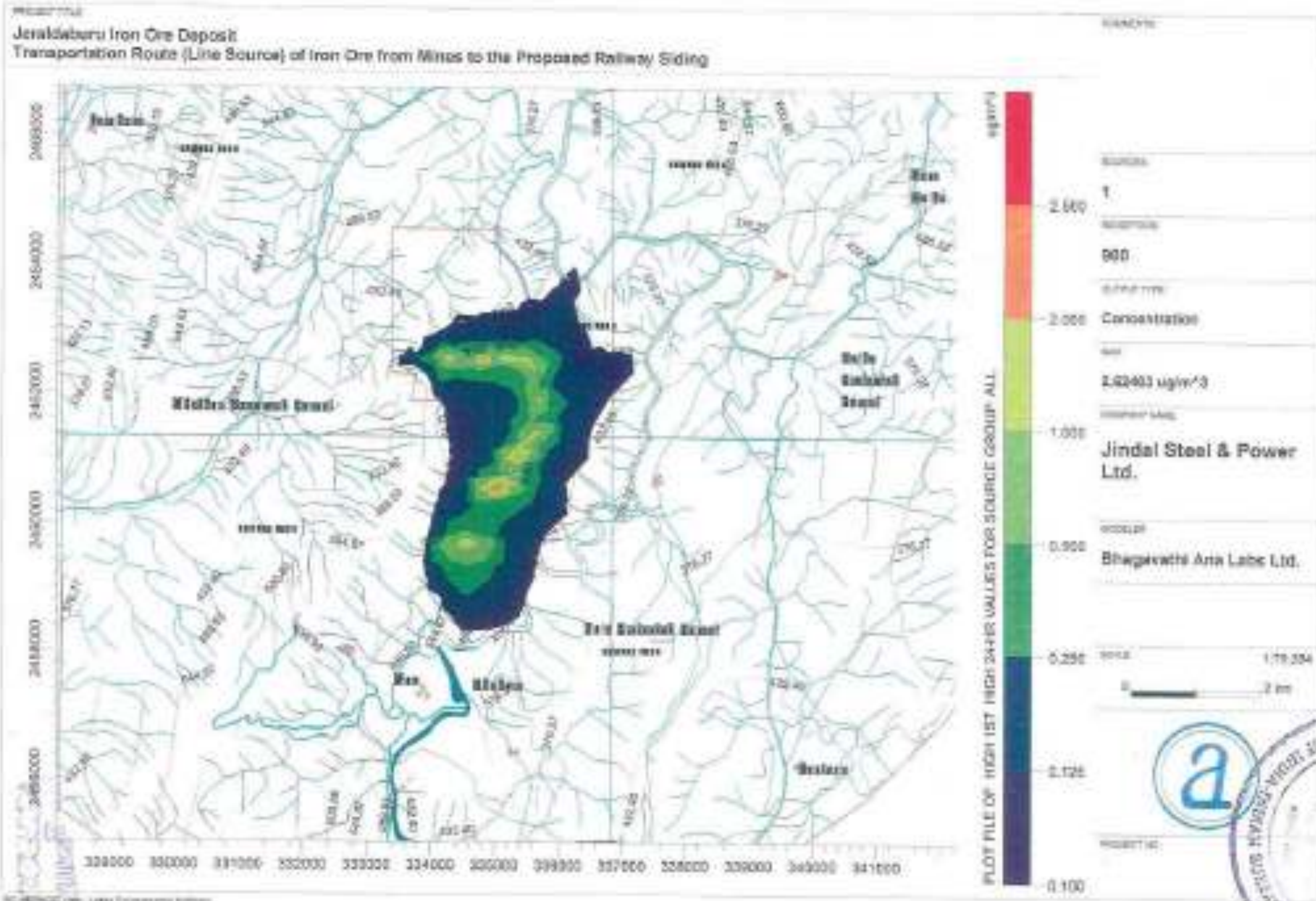
Used AERMOD model

Isopleths of SPM



Maximum Contribution: 60.44 µg/m³)

Dispersion of NO_x (Transportation of 2.3 Million Tons during 2nd Year)



Maximum Contribution: 2.62 µg/m³)