MODIFICATION IN APPROVED MINING PLAN

Along with

PROGRESSIVE MINE CLOSURE PLAN

OF

METABODELI IRON ORE DEPOSIT

IN

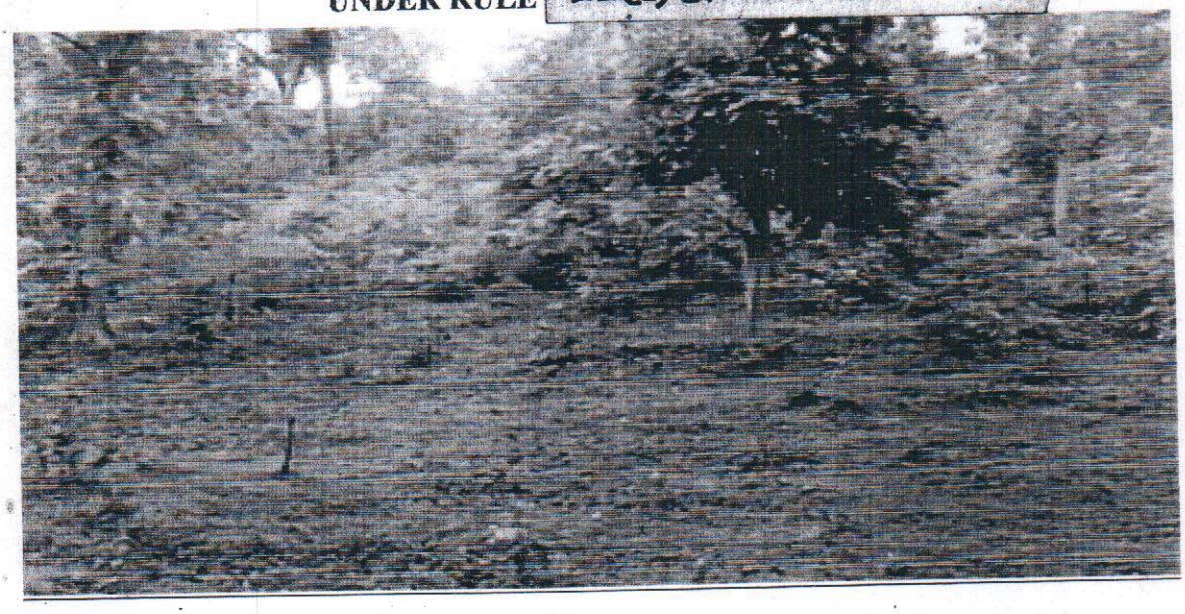
VILLAGE:- METABODELI

FOREST RANGE:- KOILIBEDA
FOREST DIVISION:- BHANUPRATAPPUR (WEST)

TEHSIL:– PAKHANJUR, DISTRICT:– KANKER (C.G.)

(APPLIED AREA 50.00 HECTARES, GOVT. FOREST LAND)
CATEGORY - "A" MECHANISED MINE
FOREST LAND – 50 HECTARES
NON FOREST LAND – NIL
TOTAL – 50 HECTARES
SUBMITTED TO THE COMPETENT AUTHORITY
(Indian Bureau of Mines)

UNDER RULE 22(6) OF MCR 1960



Applicant:

M/S JAYASWAL NECO INDUSTRIES LTD.
* F-8, MIDC, Hingna road, Nagpur (M.S.)
* Siltara Growth Center,
Siltara, Raipur (C.G.).

Consultant / RQP:

SHALABH SAHA
RQP/NGP/302/2003/A (valid up to 2013)
Geo Solutions (P) Ltd.
HIG-21, Amdi Nagar, Hudco Sector, Bhilai,
Distt. Durg(C.G.) PIN - 490009
Ph. No.-0788-2242913(O), 09425123191(M)
Email-geosolution@rediffmail.com

REGISTERED

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

No. 314(3)/2011-MCCM(CZ)/MP-30 Nagpur, Dated 10/01/2012

To,

M/s Jayaswal Neco Industries Ltd.,
Siltara Growth Centre, Siltara
Distt. Raipur (C.G)

Sub. : Approval of Modifications in Approved Mining Plan of Metabodeli Iron ore deposit, over an area of 50.00 hectares, in Kanker district of Chhattisgarh, submitted by M/s Jayaswal Neco Industries Ltd., under rule 22(6) of MCR, 1960.

Ref: 1.Your RQP's letter no. Nil dated 16.08.2011
2.This office letter of even no. dated 2.12.2011.
3.Your letter No Nil dated 23.12.2011.

Sir,

In exercise of the powers conferred by Proviso of Rule 22(6) of Mineral Concession Rules, 1960, I hereby **approve** the modification in the above said mining plan. This approval is subject to the following conditions in addition to the conditions imposed while approving the Mining Plan vide letter no. 314(3)/2009-MCCM(CZ)/MP-15, dated 31.08.2009: -

i) This approval of modification in the approved Mining Plan is 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 the modification in the approved Mining Plan does not in any way imply the approval of the Government in terms of any other provisions of the Mines and Minerals (Development & Regulation) Act, 1957 or the Mineral Concession Rules, 1960 and any other laws including the Forest (Conservation) Act, 1980, Environment (Protection) Act, 1986 and the rules made thereunder.

iii) It is further clarified that this approval of modification in the approved Mining Plan is subject to the provisions of Forest (Conservation) Act 1980, Forest Conservation Rules 1981 and other relevant statutes, orders and guidelines as may be applicable to the lease area from time to time.

iv) It is further clarified that the approval of modification in the approved Mining Plan is subject to the provisions of the Mines Act 1952 and Rules & Regulations made there under including submission of notice of opening, appointment of manager and other statutory officials.

v) The execution of modification in the approved Mining Plan shall be subject to vacations of prohibitory orders / notices, if any.

vi) The approval of mining operations and associated activities is restricted to the mining lease area only. The mining lease area is as shown on the statutory plans under Rule 28 of Mineral Conservation and Development Rules 1988, by the

6th Floor, 'D" Block, Indira Bhawan, Civil Lines, Nagpur – 440102
Email : com_cz@ibm.mah.nic.in Fax : (0712) 2565603 Telephone : (0712) 2565603

Lessee/RQP/Applicant, and Indian Bureau of Mines has not undertaken verification of the mining lease boundary on the ground.

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

viii) The modification in the approved Mining Plan is approved without prejudice to any other order or direction from the court of competent jurisdiction.

ix) The approval of modification in the approved Mining Plan is subject to the compliance of CCOM's Circular No. 2/2010 regarding Geo-referenced cadastral map within 6 months from the date of approval failing which the approval of the document shall be deemed to have been withdrawn with immediate effect

x) This approval is given for the received proposals as applicable from this date.

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

xii) 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.

xiii) 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 modification in the approved Mining Plan is, therefore, issued without prejudice to and is subject to the said directions of the Supreme Court as applicable.

xiv) Yearly report as require 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.

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

xvi) A copy of Environment Impact Assessment-Environment Management Plan (EIA-EMP) as approved by MOEF (Ministry of Environment & Forest) shall be submitted to IBM immediately after approval by MOEF.

xvii) 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 modification in mining plan

10/1/12

(Ranjan Sahai)
Controller of Mines (CZ)

Copy for information to :

1. The Director of Mines Safety, Directorate General of Mines Safety, Bilaspur Region, SECL Campus, Seepat Road, Bilaspur(C.G)-495006, alongwith one copy of approved modification in Mining Plan.
2. The Director, Directorate of Geology & Mining, Government of Chhattisgarh, Sonakhan Bhawan, Ring Road No.1 P.O. Ravigram, Raipur, Chhattisgarh-492006. It is requested to advise the applicant/lessee to submit the financial assurance to the Regional Controller of Mines, NR, Indian Bureau of Mines, Nagpur, to comply with the provisions of Rule 23(F)(3) of Mineral Conservation & Development Rules, 1988 before executing the mining lease deed. The lease deed shall be executed only after receiving a confirmation letter from the Regional Controller of Mines, Indian Bureau of Mines, Nagpur.
3. Shri Shalabh Saha, RQP, HIG-21, Hudco Colony, Amdi Nagar, Bhilai (C.G.).

(Ranjan Sahai)
Controller of Mines (CZ)

MODIFICATION IN APPROVED MINING PLAN
OF
METABODELI IRON ORE MINE

IN
VILLAGE- METABODELI

TEHSIL – PAKHANJUR, DISTRICT – KANKER (C.G.)

AREA - 50 HECTARES, FOREST LAND

Forest Rang – Koilibeda.
Forest Division - Bhanupratappur

भारतीय खान ब्यूरो
Govt. of India-Indian Bureau of Mines

CATEGORY - "A" MECHANISED

SUBMITTED TO THE COMPETENT AUTHORITY
(Indian Bureau of Mines)

UNDER RULE 22 (6) OF MC R 1960

अनुमोदित
APPROVED

पत्र क्रमांक 314(3)/2011 — एमसीसीएम (मध्य) एमपी/एमएस/पीएमसीपी — 30 दिनांक 10/1/2012 द्वारा अनुमोदित किया गया।
Approved vide letter No.314(3)/2011 —
MCCM(CZ)/MP/MS/PMCP — 30 dated 10/1/2012

10/1/12
खान नियंत्रक (मध्यांचल)
Controller of Mines (Central Zone)
भारतीय खान ब्यूरो
Indian Bureau of Mines

APPLICANT:
M/S Jayaswal Neco Industries Ltd
F-8, MIDC, Hingna Road, Nagpur
Cor. Add. Siltara Growth Center,
Siltara Industrial Area, Raipur
District – Raipur (Chhattisgarh)

RQP/CONSULTANT
SHALABH SAHA
(RQP/NGP/302/2003/A, valid upto 2013)
Geo Solutions (P) Ltd
HIG-21,Amdi Nagar, Hudco Sector, Bhilai,
Distt. Durg (Chhattisgarh) PIN-490009
Fax. No.-0788-2242913, 09425123191(M)
Email-geosolution@rediffmail.com

NO.	ENCLOSURE
I	CONSENT LETTER FROM THE APPLICANT
II	BOUNDARY PILLARS UNDERTAKING
III	CERTIFICATE FOR FULL CONSELTANCY
IV	PMCP UNDERTAKING (Time bound implementation) FROM THE APPLICANT
V	MINE Act. RULES, REGULATION APPROACH DGMS WITH MINERS HEALTH CERTIFICATE FROM THE APPLICANT
VI	DLCLARATION FOR CHANGE IN NAME, STATUS & ADDRESS ETC
VII	CERTIFICATE FOR NOMINATED OWNER & NOT WORKING IN OTHER COMPANY
VIII	UNDERTAKING FOR UNFC
IX	CERTIFICATE OF COORECTNESS & COMPLIENCE BY RQP

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C O N T E N T S

ANNEXURE NO.	ANNEXURES	Pages
I	RQP CERTIFICATE	1
II	CERTIFICATE OF INCORPORATION	1
III	LIST OF BOARD OF DIRECTORS	1
IV	COPY OF BOARD OF RESOLUTION FOR NOMINATED OWNER	1
V	PHOTO ID & ADRESS PROOF OF THE NOMINATED OWNER	2
VI	8TH MINUTES OF MEETING OF EXPERT APPRISAL COMMITTEE FOR ENVIRONMENT	2
VII	COPY OF APPROVAL OF CENTRAL GOVT. UNDER CLAUSE 5(1) OF MMDR 1957	1
VIII	COPY OF THE INTENT LETTRE FROM THE STATE GOVT.	3
IX	BASE LINE INFORMATION OF ENVIRONMENT	54
X	PRE-FEASIBILITY REPORT	6
XI	PROSPECTING REPORT WITH BORE-HOLE LOGS AND CHEMICAL ANALYSIS REPORT	53
XII	COPY OF THE LETTER FOR GEO-REFERENCED CADASTRAL MAP	2

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PLATE No.	PLATES	SCALE
I	FOREST MAP SHOWING AREA UNDER M.L.	1:15,000
II	KEY PLAN	1:50,000
III	SURFACE PLAN	1:2,000
IV	SURFACE GEOLOGICAL PLAN	1:2,000
IV A	GEOLOGICAL CROSS-SECTIONS	1:2,000
IV B	COMPOSITE GEOLOGICAL MAP SHOWING BOTH LEASES	1:4,000
IV C	GEOLOGICAL CROSS-SECTIONS ALONG BOREHOLES	1:2,000
V-1	1st YEAR DEVELOPMENT & PRODUCTION PLAN	1:2,000
V-2	2nd YEAR PRODUCTION & DEVELOPMENT PLAN	1:2,000
V-3	3rd YEAR PRODUCTION & DEVELOPMENT PLAN	1:2,000
V-4	4th YEAR PRODUCTION & DEVELOPMENT PLAN	1:2,000
V-5	5th YEAR PRODUCTION & DEVELOPMENT PLAN	1:2,000
V	YEAR-WISE PRODUCTION & DEVELOPMENT PLAN	1:2,000
V A	YEAR-WISE PRODUCTION & DEVELOPMENT SECTIONS	1:2,000
VI	ENVIRONMENT PLAN	1:5,000
VII	ENVIRONMENT MANAGEMENT PLAN	1:2,000
VIII	PROGRESSIVE MINE CLOSURE	1:2,000
IX	CONCEPTUAL PLAN	1:2,000
IX A	CONCEPTUAL SECTIONS	1:2,000
X	MAPS OF PROSPECTING REPORT	1:2,000

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APPROVED

nyaswal Neco Industries Ltd.

(STEEL PLANT DIVISION)

ISO 9001 REGISTERED
MGMT. SYS. RvA C024
DNV Certification B.V., The Netherlands

Siltara Growth Centre, RAIPUR-493111 (C.G.) INDIA
Phone : +91-7721-264241/63, Fax : +91-7721-264279
E-mail : spd@necoindia.com

Enclosure-I

CONSENT LETTER

The Modification in Approved Mining Plan along with Progressive Mine Closure Plan in respect of Metabodeli Iron ore deposit, village- Metabodeli, Kothodi Protected Forest, Range – Koilibeda, Division – Bhanupratappur (West), Tehsil - Pakhanjur, District - Kanker , C.G., over an area of 50.0 Ha. to fulfill the requirement of Rule 22 (6) of MC R 1960 for approval, has been prepared by *Shri SHALABH SAHA, RQP/NGP/302/2003/A.*

I request Regional Controller of Mines, Nagpur Regional office, to make further correspondence regarding this Modification in Approved Mining Plan with the said recognized person on his following address.

Shri Shalabh Saha
Geo Solutions (P) Ltd. HIG – 21, Amdi Nagar,
HUDCO Sector, Bhilai- 9, District - Durg (C.G.),

I hereby undertake that all the modifications so made in the Modification in Approved Mining Plan along with Progressive Mine Closure Plan by the recognized person may be deemed to have been made with my knowledge and consent and shall be acceptable to me on all respects, "understood the contents of the Modification in Approved Mining Plan and agree to implement."
Boundary pillars are marked preciously in the field which formed the basis for preparation of Modification in Approved Mining Plan for Metbodeli Iron ore deposit, village- Metabodeli, Tehsil- Pakhanjur, District - Kanker, C.G., over an area of 50.0 Ha.

I hereby also request you that on approval the copy of the approved Modification in Approved Mining Plan along with Progressive Mine Closure Plan should be delivered to Shri Shalabh Saha.

6/12/11

(Nominated owner)
Degree Lal Choudhary
President(Metal Mines)

Date: 06.12.11.
Palce : Raipur

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Enclosure-2

BOUNDARY PILLARS UNDERTAKING

With reference to the lease boundary points as indicated on the surface plan are marked in the field and the precise area forms the basis for preparation of Modification in Approved Mining Plan of Metabodeli Iron ore deposit, for an area of 50.0 Ha. in Metabodeli village, Tehsil-Pakhanjur, District- Kanker of Chhattisgarh State.

The boundary pillars erected on these points shall be maintained in good shape and condition throughout the subsistence of lease as per provisions under rules 33 of MCR, 1960 and item no. 2 part VII of form K of MCR, 1960.

Date: 06.12.11.
Palce : Raipur

6/12/11

(Nominated owner)
Degree Lal Choudhary
President(Metal Mines)

APPROVED

Jayaswal Neco Industries Ltd.

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E-mail : spd@necoindia.com

Enclosure-3

CERTIFICATE

This is to certify that the "Modification in Approved Mining Plan" of Metabodeli Iron ore deposit, for an area of 50.0 Ha. in village-Metabodeli, Tehsil- Pakhanjur, District- Kanker of Chhattisgarh State has been prepared in full consultation with me and I have understood its contents and agree to implement the same in accordance with the law.

6/12/11

Date: 06.12.11.

Palce : Raipur

(Nominated owner)
Degree Lal Choudhary
President(Metal Mines)

अनुमोदित
APPROVED

Jayaswal Neco Industries Ltd.

(STEEL PLANT DIVISION)

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Enclosure-4

CERTIFICATE

This is to certify that the "Progressive Mine Closure Plan" of Metabodeli Iron ore deposit, for an area of 50.0 Ha. in village - Metabodeli, Tehsil - Pakhanjur, District -Kanker of Chhattisgarh State, complies and has taken into consideration all statutory rules, regulations, orders made by the Central or State Government, Statutory organizations, Court etc. and wherever any specific permission is required I will approach the concerned authorities.

I also give an undertaking to the effect that all the measures proposed in this Closure Plan will be implemented in a time bound manner as proposed.

6/12/11

Date: 06.12.11.
Palce : Raipur

(Nominated owner)
Degree Lal Choudhary
President(Metal Mines)

अनुमोदित
APPROVED

Jayaswal Neco Industries Ltd.
(STEEL PLANT DIVISION)

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Enclosure-5

CERTIFICATE

"The provisions of Mines Act, Rules and Regulations made there under have been observed in the Modification in Approved Mining Plan of Metabodeli Iron ore deposit over an area of 50.0 Ha. in village- Metabodeli, Tehsil – Pakhanjur, District- Kanker of Chhattisgarh State, belonging to M/s Jayaswal Neco Industries Limited, F-8, MIDC, Hingna Road, Nagpur, M.S. and where specific permissions are required, the applicant will approach the D.G.M.S. further, standards prescribed by DGMS in respect of Miners Health will be strictly implemented".

Date: 06.12.11.
Palce : Raipur

(Nominated owner)
Degree Lal Choudhary
President(Metal Mines)
6/12/11

(RQP/NGP/302/2003/A)

APPROVED

Jayaswal Neco Industries Ltd.
(STEEL PLANT DIVISION)

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Enclosure- 6

DECLARATION

I, Degree Lal Choudhary, S/O Late Shri Dayaram Choudhary, resident of D-16/7, Near Pani Tanki, New Rajendra Nagar, Amlee DiHe, District-Raipur,State-Chhattisgarh 490008, hereby state that; In case any change in any of my firm's name address, status etc., the same shall be duly informed to the office of Indian Bureau of Mines.

6/12/11

Date: 06.12.11.
Palce : Raipur

(Nominated owner)
D. L. Choudhary
President(Metal Mines)

अनुमोदित
APPROVED

Jayaswal Neco Industries Ltd.

(STEEL PLANT DIVISION)

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Enclosure-7

DECLARATION

It is to certify that I, Degree Lal Choudhary am working as President (Metal Mines) of M/S. Jayaswal Neco Industries Limited and as nominated owner of this Metabodeli Iron ore deposit over an area of 50.0 Ha. in village - Metabodeli, Tehsil – Pakhanjur, District - Kanker of Chhattisgarh State. I am not working in any other firm / company or organization etc.

Date: 06.12.11.

Palce : Raipur

6/12/11

(Nominated owner)
Degree Lal Choudhary
President(Metal Mines)

अनुमोदित
APPROVED

Enclosure 8

Jayaswal Neco Industries Ltd.

(STEEL PLANT DIVISION)

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Enclosure-8

UNDERTAKING FOR UNFC

a. After the mining lease is executed, the mineral reserves / resources of homogeneous type for which the mining plan is being submitted for approval, would be converted into proved reserves as per UNFC system at an appropriate cut-off grade with the new threshold values with one year of this scheme period, equivalent to minimum five years planned production, failing which no mining operations will be carried out / commence further.

b. The feasibility studies for the area will be undertaken to convert the resources into reserves once the ML is granted.

c. The remaining / unexplored part of the ML areas, assessment of mineral reserves / resources under UNFC system shall be as per Ministry of Mines letter No. F. No. 10/75/2008-MV dated 23.12.2010.

6/12/11

Date: 06.12.11.
Palce : Raipur

(Nominated owner)
Degree Lal Choudhary
President(Metal Mines)

अनुमोदित
APPROVED

Geo Solutions (P) Ltd.
HIG-21, Hudco Colony, Amdi Nagar, Bhilai (C.G.)
☎ 0788-3209099, 3299582, 094251-23191
Email : geosolution@rediffmail.com

Enclosure - 9

CERTIFICATE OF COMPLIANCE AND CORRECTNESS

1. This is to certify that the provisions of Mineral Conservation and Development Rules, 1988 and Mineral Concession Rules, 1960 have been observed in the Modification in Approved Mining Plan of Metabodeli iron ore deposit for an area of 50 Ha. in Kanker district of Chhattisgarh, applicant M/S Jayaswal Neco Industries Ltd., Nagpur and wherever specific permissions are required; the lessee will approach the concerned authorities of Indian Bureau of Mines for granting the permission.

2. Certified that the provision of Mines Act, Rules and Regulations made here under have been observed in the Modification in Approved Mining Plan and wherever specific permissions are required, the lessee will approach the D.G.M.S. and no violation against provision of Rules, Regulations of MMR, 1961 and there is no danger to human life.

3. It is also certified that the information furnished in the above mentioned Modification in Approved Mining Plan is true and correct to the best of my knowledge.

Place: Bhilai, (C.G.)
Date: 17-12-2011

Shalabh Saha
RQP/NGP/302/2003/A
Geo Solutions P Ltd

अनुमोदित
APPROVED

MODIFICATION IN APPROVED MINING PLAN
FOR 50 HA AREA

INTRODUCTION:

The Mining Plan for 50.0 Ha of area has already been approved by IBM vide letter No. 314 (3) /2009-MCCM (CZ) /MP-15, dated- 31/08/2009.

In the 8th meeting of Expert Appraisal Committee for Environmental Appraisal of Mining Projects, the committee made following observations regarding mining plan:

(1) The BHQ area should not be used for dumping and accordingly the mine plan should be revised.

(2) The Mine planning / life of the mine does not appear to be supported by adequate exploration/reserve estimates. This should be rectified by carrying out further exploration/prospecting in the leasehold and if no further resources are established, by suitably adjusting the mine life to confirm to the proven reserves.

(3) As there will be common facilities with the adjoining mine, details in this regard should be provided and suitably integrated in the approved mine plan of both the mines.

In view of the above suggestion, the fully mined out float ore area will be utilized for dumping the waste material. The proposed future exploration in BHQ within the leasehold area according to circular no. 3/2010, the threshold values of iron ore having 45% of Fe will be conducted by making three trenches across BHQ. The details of site services available in adjoining lease of 25 Ha. will be incorporated. Thus, on the basis of above observation, a Modification is necessary.

In this Modified Mining Plan, some paras of method proposed exploration, dumping, site services etc. has been revised accordingly.

अनुमोदित
APPROVE

10/11/12

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

(a). The list/details of lease granted/executed in favour of the applicant in a state and in the country.

The company has following Mining Leases at different places, the list of leases granted/ executed in favour of the company are as under:-

Sr.No.	Village/District/State	Area Hect.	Minerals	Date of grant of Mining Lease (period)
1.	Metabodeli/Kanker/(C.G.)	25	Iron ore	17-01-2002 (20 years)
2.	ChhoteDongar/Narayanpur/ (C.G.)	192.25	Iron ore	- (30 years)
3.	Khairabhatgaon/ Rajnandgaon/ (C.G.)	4.65	Limestone	07-03-1998 (20 years)
4.	Manpur/Kabirdham/(C.G.)	12.145	Limestone/ Dolomite	18-10-2000 (20 years)
5.	Katiya/Raipur / (C.G.)	8.90	Limestone	- (30 years)
6.	Manegaon/Gondia /(M.S.)	37.34	Titaniferous Iron ore	27-07-2005 (20 years)
7.	Dhobitola/Gondia /(M.S.)	2.61	Titaniferous Iron ore	04-08-2003 (20 years)

(b). If the area exceeds the maximum limit stipulated under the act, then the justification of applying excess area taking into account the availability of reserves, rate of production and requirement.

Not applicable, since the applied area is only 50.00 hectares and the total areas held are within the maximum limit stipulated under the Act.

(c). Whether the area granted under mining lease has been held under prospecting license earlier.

Prospecting License was granted for 200 hectares area under letter No. F-2/854/93/12/2 dated 14.09.94.

CERTIFIED APPROVED

The company filed an application for Prospecting Licence over an area of 200 Ha. for Iron Ore on 28.10.1993 which was approved by Central Govt., Ministry of Mines on 02.08.94. The CCF (Land Management) permitted for executing of prospecting operation over 200 Hects on 20.01.94 and informed to Secretary MRD. On receipt of the same the Secretary, MRD granted Prospecting License over 200 Ha for two years on 14.09.94 and execution of PL agreement was made on 11.10.94.

After grant of Prospecting License from State Govt, prospecting operation was carried out by M/s Geomin Consultant, Bhubaneshwar. The Topographical survey, Geological mapping and surface sampling were carried out on 200 Ha of land, but the drilling was carried out only in 25 Ha land by putting 4 Nos of boreholes. Due to naxal problem in the area the work was discontinued. Mining lease application for 25 Ha area was submitted to State Govt. on 07/12/094 and letter of intent was issued on 22/08/95. The mining plan was approved on 02/04/96. The State Govt. granted mining lease on 11/06/2002.

The initial period of two years of prospecting was expired hence, further applied for renewal of prospecting licence to State Govt. for balance 175 Ha on 14/02/96. The State Govt. granted the renewal on 23/04/97 for two years and agreement was signed on 27/10/97. Further drilling could not be executed due to enhanced naxal activities. But on the basis of geological mapping and 4 Nos. of boreholes the 50 Ha land on the downward slope of 25 Ha land were identified as mineralized zone and application for mining lease over 50 Ha was submitted to State Govt on 18/09/2001. State Govt. issued letter of intent in favour of the company subject to obtaining forest & Environment Clearance by MOEF and submission of Mining Plan approved by Indian Bureau of Mines, Nagpur on 28/07/2008 after 5(1) approval of Central Govt. The mining plan was approved on 31/08/2009 for 50 Ha land.

(d). If so, the details of the licensed area & quantum of prospecting work carried out with period of such work. Whether rules have been complied with regarding submission of scheme of prospecting/ prospecting report.

The prospecting work was done by Geomin Consultants Pvt. Ltd. Bhubneshwar, Orissa. During 1995-96.

i) Topographical survey of the P.L. area.

ii) A systematic geological mapping was done 1:2000 scale over the entire area of 50 Ha and preparation of geological sections has been carried out, since the ore-body is in continuation towards dip-direction.

iii) Four boreholes were sunk which comes under the 25 Ha of approved mining plan area, upto a depth of 20 m to know the thickness of ore-body.

iv) Sampling and analysis of different types of ores have been carried out.

(e). If the prospecting is carried out by other Govt./private agency for utilization of data with the copy of the report.

The area was prospected by Geomin Consultants Pvt. Ltd., 267, Kharvel Nagar, Bhubneshwar, Orissa. The PL holder is M/s Nagpur Alloys Casting Ltd, now named as M/s Jayaswal Industries Ltd., Nagpur (M.S.)

A copy of the Prospecting report are enclosed as annexure no. XI.

(f). If the mining lease is granted without prior prospecting, the justification for adequate evidence of proved mineral to sustain mining operations economically at least for the first five years period of mining plan.

Prospecting License was granted for 200 hectares area under letter No. F-2/854/93/12/2 dated 14.09.94.

The company filed an application for Prospecting Licence over an area of 200 Ha. for Iron Ore on 28.10.1993 which was approved by Central Govt., Ministry of Mines on 02.08.94. The CCF (Land Management) permitted for executing of prospecting operation over 200 Hects on 20.01.94 and informed to Secretary MRD. On receipt of the same the Secretary, MRD granted Prospecting License over 200 Hects. for two years on 14.09.94 and execution of PL agreement was made on 11.10.94. After grant of Prospecting License from State Govt, prospecting operation were carried out by M/s Geomin Consultant, Bhubaneshwar. The Topographical survey, Geological mapping and surface sampling were carried out on 200 Ha of land, but the drilling was carried out only in 25 Ha land by putting 4 Nos of boreholes. Due to naxal problem in the area the work was discontinued. Mining lease application for 25 Ha area was submitted to State Govt. on 07/12/094 and letter of intent was issued on 22/08/95. The mining plan was approved on 02/04/96. The State Govt. granted mining lease on 11/06/2002. The initial period of two years of prospecting was expired hence, further applied for renewal of prospecting licence to State Govt. for balance 175 Ha on 14/02/96. The State Govt. granted the renewal on 23/04/97 for two years and agreement was signed on 27/10/97. Further drilling could not be executed due to enhanced naxal activities. But on the basis of geological mapping and 4 Nos. of boreholes the 50 Ha land on the downward slope of 25 Ha land were identified as mineralized zone and application for mining lease over 50 Ha was submitted to State Govt on 18/09/2001. State Govt. issued letter of intent in favour of the company subject to obtaining forest & Environment Clearance by MOEF and submission of Mining Plan approved by IBM, Nagpur on 28/07/2008 after 5(1) approval of Central Govt. The mining plan was approved on 31/08/2009 for 50 Ha land. During our geological survey, there are ample evidences of continuation of the ore-body in the dip-direction in this applied area of 50 Ha. For this area the mining plan was submitted and approved by IBM.

CHAPTER-1

GENERAL

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CHAPTER-1.

GENERAL:

(a)	**Name of Applicant** **Address**	:	M/S Jayaswal Neco Industries Ltd. F-8, MIDC, Hingna road, Nagpur (M.S.) Corrospondence Address- Siltara Growth Centre, Siltara, Raipur (Chhattisgarh). Phone – 07721-264238 to 41 Fax- 07721 264270
(b)	**Status of the Applicant**	:	Public limited Company

S. No.	Name of the Board of Directors	Designation	Address	Telephone no
01	Shri B.L. Shaw	Chairman	Usha sadan,246 Pt.R.S.S. marg, Civil Lines, NGP.	0712-2540293
02	Shri B.K. Agrawal	Director	51, New Colony, Byramji Town, NGP.	0712- 2595959
03	Shri M. M. Vayas	Director	K-53, Marer Tower,Cuffe Parde, Mumbai	022- 22182621
04	Shri Sanjiv Kumar Sachdev	Director(IDBI)	H- 53, Maker Kundan Garden, Juhu Tara Road, Santacruz (W) Mumbai-400049	09969327982
05	Shri Nirmit Ved	Director(EXIM)	Exprt Import Bank of India, Maker Chambers IV, 8th Floor, Nariman Point, Mumbai-400021	09820350179
06	Shri M. P. Singh	Director	Block A, Flat -1, 4th Floor, Arihant Heights, Bhairav Society, Pachpedinaka, Raipur-492001	09302839309
07	Shri Ramesh Jayaswal	Jt. M.D.	Usha sadan, 246 Pt.R.S.S. marg, Civil Lines NGP-440001.	0712-2540298
08	Shri Arbind Jayaswal	M.D.	Usha sadan, 246 Pt.R.S.S. marg, Civil Lines NGP-440001.	0712-2540298

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(c)	**Mineral(s) which are occurring in area and which the applicant intends to Mine**	:	Iron Ore
(d)	**Period of which mining lease is proposed to be applied**	:	30 years
(e)	**Name of RQP preparing the mining plan**	:	Shalabh Saha
	Address	:	H.I.G. – 21, Amdinagar, Hudco colony,
			BHILAI (Chhattisgarh)
	Phone	:	0788 – 2242913, 6531233 (O)
			0788 – 2241811 (R)
			09425123191
	e-mail	:	geosolution@rediffmail.com
	Registration No.	:	RQP/NGP/302/2003/A
	Date of grant	:	04/06/2003
	Valid up to	:	03/06/2013
(f)	**Name of Prospecting Agency**	:	Geomin Consultants (P) Ltd.
	Address	:	267, Kharavela Nagar, Bhubaneshwar-751 001. Regd. No.- RQP/CAL/167/92-B
(g)	**Reference no and date of consent letter from State Government**	:	Vide letter no.- F-3-94/2003/12 (1) dated- 28/07/2008 (Annexure VIII).

APPROVED

CHAPTER-2

LOCATION AND ACCESSIBILITY

CHAPTER-2.

LOCATION AND ACCESSIBILITY:

(a) Details of area(with location map)		
District /State	:	Kanker, Chhattisgarh
Taluka	:	Pakhanjur
Village		Metabodeli
Compartment number/Khasra No.	:	Old No.-426(P) & 427(P) New No.-1305 & 1306
Forest Range	:	Koilibeda
Forest Division/Circle	:	Bhanupratappur/Kanker
Lease Area(hectares)	:	50 Hectors
Whether the area is recorded to be in forest (please specify whether protected,reserve etc.)		Protected Forest area
Ownership/Occupancy	:	Govt. protected forest Land
Existence of public Road/ railway line, if any, nearby and approximate distance	:	The area is approachable from village Chargaon, SE of village a hill is at a distance of 2 km. Chargaon is approachable by 25 km forest road from Pondgaon, on Rajnandgaon-Durg-Rajhara-Bhanupratappur-Narayanpur-Jagdalpur state highway. The nearest rail-head is Dalli-Rajhara at a distance of about 84 km.
Toposheet No with Latitude / Longitude	:	64 D/16 Latitudes 20° 02′ 10″ to 20° 02′ 55″ N Longitudes 80° 58′ 45″ to 80° 59′ 25 E
Land Use Pattern (forest, agricultural, grading, barren,etc.)	:	Govt. protected forest Land

(b) Attach a general location and vicinity map showing area boundaries and existing and proposed access routes. It is preferred that the area to be marked on a survey of India topographical map or a cadastral map or forest map as the case may be. However if none of these are available the area should be shown on an accurate sketch map on scale of 1:5000.

Details of the Area:

State	District	Forest Division / Tahsil	Forest Range /Village	Compt.No. OLD/ NEW	Area (Ha)	Ownerships Occupancy.
Chhattisgarh	Kanker	Bhanupratappur/ Pakhanjur	Koilibeda/ Metabodeli	426(P)/1305	45.00	Govt. Forest land
				427(P)/1306	05.00	
				Total	**50.00**	

The detail of Present Land use as under:

S. No.	Items	Type of Land (Ha)					
		Forest Land	Agriculture Land	Barren land & rocky land	Grassing land	Any other type	Total
	(A) Lease area	50.0	-	-	-	-	50.0
	(B) mining & allied activities						
	i. Pits	-	-	-	-	-	-
	ii. Dumps	-	-	-	-	-	-
	iii. Roads	-	-	-	-	-	-
	iv. Site services	-	-	-	-	-	
	v. Plantation	-	-	-	-	-	-
	(C) Hutments	-	-	-	-	-	-
	Total						50.0

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APPROVED

Shalabh Saha

CHAPTER-3

GEOLOGY AND EXPLORATION

PART – A

CHAPTER-3.

GEOLOGY AND EXPLORATION:

(a). Briefly describe the topography and general geology and local/ mine geology of the mineral deposit including drainage pattern.

The topography, regional and local geology of the mineral deposit including drainage pattern are described in approved mining plan.

In Metabodeli hill, the area of 25 Ha granted under M.L. represents a prominent hilly topography with hill ranges trending North-East to South-West direction and dipping towards south-east. This area is covered under lessee's 25 Ha mining lease area. The applied area is on the slope of the already granted area and the continuation of ore body is on dip slope having two small hills of 550 m RL and 535 m RL which are in continuation of ML area of 25 Ha and sloping towards south-east and dip is in the same direction i.e. SE. The highest point is +550 m MSL. The lowest altitude is 390 m MSL. The general ground level gradient of the applied area is 550 m to 465m MSL. The highest point is marked is 578 m MSL which is falling in 25 Ha. of lessee's M.L.

A copy of the Toposheet is enclosed and location of the deposit is marked therein as Key Plan (Plate No.- II)

Local Geology: The Metabodeli deposit is a prominent hill elongated in NE-SW direction. The geological mapping conducted in the applied area, the stratigraphy sequences are as under:

- Laterites, Soil and alluvium
- Canga and Iron-ore floats
- Insitu – massive/ laminated ore
- Banded Hematite Quartzites / BMQ.

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Float Ore:

The south-eastern slope is dominated by float ore covering an area of 10 hectares out of the total 50 hectares ML area applied for. In most of the cases, the float ore is observed to be embedded in the soil layer although the ore is also noticed as recemented with laterite forming canga-ore. The float ore zones are noted mostly along the periphery of the insitu ore zone. The area covering by float ore is about 11 Ha.

Banded Hematite Quartzite:

All along the insitu ore, BHQ is occurring in SE direction in between the insitu ore and float ore. BHQ is prominently marked forming interlayer of alternate bands of silica and hematite of varying thickness from few mm to more than 10 mm. Being resistance, they preserve most of the structural elements of bedding plane. The area covering by BHQ zone is about 20 Ha.

Massive Iron Ore:

The iron ore found in this area is mostly hematite and can be classified as massive and laminated type of ore is found to occur on the top of the hill elongated N40^{0}S-S40^{0}W, to almost NE-SW, has a strike length of about 1500 m. The general dip is observed to be about 40^0 SE. The ore occurring in this area is mainly hematite also containing magnetite and martite. The area covering by insitu ore zone is about 29 Ha.

The hill top is occurring in the lessee's area of 25.0 hectare of ML in Metabodeli which in juxtaposition of the 50 hectare of area applied under ML. The ore body is occurring on the hill top along NE-SW direction and continuing on the south-eastern slope in the adjoining applied area of 50 hectares.

The average length of iron ore body in 25 Ha lease area is about 1,100 m and width is about 110 m. The average length of iron ore body in 50 Ha applied lease area is about 1,500 m and width is about 170 m.

Lateritic Soil:

Lateritisation is a common phenomena noted in the area. Thinly laminated iron ore are more prone to lateritisation. After lateritisation, they give rise to lateritisated laminated and lateritic ore which is mostly found on the surface as capping over thinly laminated ores.

Some Canga ore is also noted in very limited area. It is a broken pieces of hard ore recemented in a lateritic matrix and presenting a brecciated look on the surface.

The geological mapping was also carried out by interpretation of FCC image (given in next page).

Geological Plan and Geological cross sectional plan enclosed as (Plate No.-IV & IV A)

A composite Geological Plan is enclosed showing the both the lease area (25 Ha & 50 Ha) as Plate No. IV B on 1:4,000 scale.

A separate plan for cross-sections as per the influence of bore-holes is enclosed as Plate No. IV C on 1:2,000 scale.

Drainage Pattern:

One nala in the eastern hill slope and chargaon village flowing almost N-S joins the Chargaon Nadi. Metabodeli is a prominent elongated hill in NE-SW direction. It acts as a water devide line between the Water river in the north and the Chargaon river in the south with dendritic drainage pattern.

(b) The topographic plan of the lease area prepared on a scale of 1:1000 or 1:2000 with contour interval of 3 to 10 m. depending upon the topography of the area should be taken as the base plan for preparation of geological plan. The details of the exploration already carried out including evidences of mineral existence should be shown on the geological plan.

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The surface plan prepared on 1:2000 scale and enclosed as (Plate No.-III)

FALSE COLOUR COMPOSITE MAP

INDEX

ROAD	△578 SPOT LEVEL
RIVER	VILLAGE LOCATION

N
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S

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FALSE COLOUR COMPOSITE MAP
METABODELI IRON ORE DEPOSIT
TAHSIL-PAKHANJUR, DISTRICT-KANKER, (C.G.)
NOT TO SCALE

Surface Geological Plan and Geological cross sectional plan prepared on 1:2000 scale and enclosed as (Plate No.-IV & IVA)

(c) Geological section should be prepared at suitable intervals on a scale of 1:1000 or 1:2000.

Fifteen geological sections have been prepared at interval of 100 m on a scale of 1:2000 for estimation of reserves. (Plate-IV A).

(d). Broadly indicate the year wise future programme of exploration, taking into consideration the future production programme planned in next five years as given in the table below:

27 nos. of bore holes have been proposed during the first year of the mining plan period at about 100 m interval, hence all the Insitu ore zone will comes under proved category. The alternate bore-holes (14 nos. PBH-2, 3, 6, 7, 10, 11, 14, 15, 18, 19, 22, 23, 25 & 26) will be inclined towards NW direction (towards 25 Ha lease area) at angle of 40^0 to 50^0 upto a depth of 80-100 m to determine the contact between BHQ and insitu ore. Theses bore-holes will be drilled upto the encountering the BHQ. During the first phase of drilling inclined bore-holes will be drilled.

11 nos of trial pits have been proposed during the first year (priority on first quarter of the year) of the mining plan period at about 200 x 50 m interval to ascertain the depth of the float ore zone.

To know the quality of BHQ (Fe- content) as per the threshold value of minimum 45% Fe-content, 6 nos. of trenches have been proposed during the first year of the mining plan period.

Hence, the iron ore reserves of almost the lease area will be proved during the first year of the mining plan period. The quantity and quality of the BHQ area will be estimated as per the analyses report of trenches.

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Details of the proposed bore holes is as under:

Bore hole No.	Collar level (approx) (m)	Depth to be drilled (m)	Location of Proposed Bore hole	Latitudes	Longitudes
PBH-1	516	50	On C_1-C_2	20^0 02′ 25.2″	80^0 58′ 45.0″
PBH-2	493	80	On C_1-C_2	20^0 02′ 23.7″	80^0 58′ 46.8″
PBH-3	517	80	On C_3-C_4	20^0 02′ 27.7″	80^0 58′ 47.2″
PBH-4	490	40	On C_3-C_4	20^0 02′ 26.1″	80^0 58′ 49.1″
PBH-5	530	60	On C_5-C_6	20^0 02′ 30.2″	80^0 58′ 49.6″
PBH-6	510	80	On C_5-C_6	20^0 02′ 28.5″	80^0 58′ 51.4″
PBH-7	527	80	On C_7-C_8	20^0 02′ 32.6″	80^0 58′ 51.8″
PBH-8	507	40	On C_7-C_8	20^0 02′ 31.1″	80^0 58′ 53.7″
PBH-9	512	50	On C_9-C_{10}	20^0 02′ 35.0″	80^0 58′ 54.2″
PBH-10	492	80	On C_9-C_{10}	20^0 02′ 33.2″	80^0 58′ 56.2″
PBH-11	512	80	On C_{11}-C_{12}	20^0 02′ 37.5″	80^0 58′ 56.5″
PBH-12	472	30	On C_{11}-C_{12}	20^0 02′ 35.3″	80^0 58′ 59.0″
PBH-13	512	50	On C_{13}-C_{14}	20^0 02′ 39.9″	80^0 58′ 58.7″
PBH-14	480	80	On C_{13}-C_{14}	20^0 02′ 37.7″	80^0 59′ 01.4″
PBH-15	512	80	On C_{15}-C_{16}	20^0 02′ 42.4″	80^0 59′ 01.1″
PBH-16	490	40	On C_{15}-C_{16}	20^0 02′ 40.1″	80^0 59′ 03.6″
PBH-17	505	50	On C_{17}-C_{18}	20^0 02′ 44.9″	80^0 59′ 03.4″
PBH-18	477	80	On C_{17}-C_{18}	20^0 02′ 42.7″	80^0 59′ 05.9″
PBH-19	494	80	On C_{19}-C_{20}	20^0 02′ 47.3″	80^0 59′ 05.7″
PBH-20	465	30	On C_{19}-C_{20}	20^0 02′ 45.1″	80^0 59′ 08.3″
PBH-21	488	40	On C_{21}-C_{22}	20^0 02′ 49.8″	80^0 59′ 07.8″
PBH-22	470	80	On C_{21}-C_{22}	20^0 02′ 47.6″	80^0 59′ 10.4″
PBH-23	482	80	On C_{23}-C_{24}	20^0 02′ 52.1″	80^0 59′ 10.2″
PBH-24	475	30	On C_{23}-C_{24}	20^0 02′ 51.0″	80^0 59′ 11.7″

PBH-25	467	80	On C_{25}-C_{26}	20^0 02′ 54.7″	80^0 59′ 12.4″
PBH-26	450	80	On C_{27}-C_{28}	20^0 02′ 57.1″	80^0 59′ 14.7″
PBH-27	440	25	On C_{29}-C_{30}	20^0 02′ 59.7″	80^0 59′ 16.9″
Total		1,655 m			

Details of the proposed Trial pits:

Proposed Trial Pit nos	Dimension (L x W x D) m	Location
PTP-1	2 x 2 x 2	Near cross-section C_{19}-C_{20} on soil cover area
PTP-2	2 x 2 x 2	Near cross-section C_{23}-C_{24} on soil cover area
PTP-3	2 x 2 x 2	Near cross-section C_{21}-C_{22} on soil cover area
PTP-4	2 x 2 x 2	On cross-section C_{23}-C_{24} on Float ore area
PTP-5	2 x 2 x 2	On cross-section C_{25}-C_{26} on Float ore area
PTP-6	2 x 2 x 2	On cross-section C_1-C_2 on Float ore area
PTP-7	2 x 2 x 2	On cross-section C_1-C_2 on Float ore area
PTP-8	2 x 2 x 2	On cross-section C_5-C_6 on Float ore area
PTP-9	2 x 2 x 2	On cross-section C_5-C_6 on Float ore area
PTP-10	2 x 2 x 2	On cross-section C_9-C_{10} on Float ore area
PTP-11	2 x 2 x 2	On cross-section C_9-C_{10} on Float ore area
Total -11		

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Details of the proposed Trial Trenches on BHQ area:

Proposed Trial Pit nos	Dimension (L x W x D) m	Location
PTT-1	20 x 2 x 1	Near cross-section C_9-C_{10} on BHQ area
PTT-2	20 x 2 x 1	Near cross-section C_{13}-C_{14} on BHQ area
PTT-3	20 x 2 x 1	Near cross-section C_{17}-C_{18} on BHQ area
PTT-4	20 x 2 x 1	Near cross-section C_{21}-C_{22} on BHQ area
PTT-5	10 x 2 x 1	Near cross-section C_{19}-C_{20} on BHQ area
PTT-6	10 x 2 x 1	Near cross-section C_{15}-C_{16} on BHQ area
Total - 6		

Note:- In the mining plan, the flowing exploration has been suggested.

(1) The Core drilling of proposed BHs and trial pits will be undertaken during the first year of the mining plan.

(2) Total 27 boreholes have been proposed on insitu-ore. In case, the ore-body extends beyond the proposed depth, further drilling will be continued.

(3) 3 trial pits on the soil cover area and 8 pits on the float ore area.

In addition to above, to ascertain the quality of BHQ, the following exploration is suggested by making three trenches as under-

(4) The BHQ strata is almost vertical dipping and very hard and compact in nature, the drilling of borehole in BHQ is very difficult (as per our past experience) therefore, it is proposed to excavate 6 trial trenches in the BHQ area, almost perpendicular to the orientation of the strata.

The trench will be excavated by drilling Jack hammer holes upto 1.0m depth with spacing of 1.5m interval, and thereafter the drilled holes will be blasted. From the blasted mass, the BHQ-bearing boulders will be sized for sampling and preparation of laboratory samples for determination of Fe-content. After removing the blasted mass, completely, further jack hammer drilling of 1.5

meter over the cleaned out surface will be conducted and similarly, the laboratory sample will be prepared for Fe-content determination. This will give us clear picture about the quality of BHQ (% of Fe) up to three meter depth and since BHQ being uniformly banded formation, the Fe content the whole good for entire formation upto a reasonable depth.

The locations of PBHs, PTPs and PTTs are marked on the Geological Plan and sections given in plate nos.-IV & IV A.

Note: In future, it will be necessary to drill at least 2 to 3 bore holes in the float ore area to confirm the existence of BHQ, and if no BHQ is encountered upto a depth of at least 10 m (since the dip of BHQ is about 80^0 in this area of 50 Ha); then only the decision of back filling the mined out float ore area can be considered.

(e) Indicate geological and recoverable reserves and grade, duly supported standard method of estimation and calculations alongwith required sections(giving split up of various categories i.e. Proved, Probable, Possible). Indicate cut-off grade. Availability of resources should also be indicated for the entire leasehold.

Geological Reserve of Insitu Ore Body:

After the approval of the Mining Plan, no exploration activities have been carried out in the ML area, hence, the same reserve has been taken in this Modification in Approved Mining Plan.

After the proposed drilling of 27 bore-holes, the re-estimated reserve can be ascertained and accordingly the reserve will get modified.

However, as desire by IBM, the reserve has been re-categorized.

The geological reserve in applied mining lease area has been estimated by cross-section method. For this, fifteen cross sections were drawn at an interval of 100 m. As per the geological mapping, the reserve upto 7 m depth has been taken as probable reserve tapering near the contact of BHQ, since this ore body is an extension of the ore body in the updip adjoining area of Metabodeli (25 hect.) under mining lease of the lessee. The iron ore presence in highest contour of 540 m MSL and which is continue upto contour level of 420 m MSL, hence the ore is continue upto a contour level of 420 m.

The hill top is occurring in the lessee's area of 25.0 hectare of ML in Metabodeli which in juxtaposition of the 50 hectare of area applied under ML. The ore body is occurring on the hill top along NE-SW direction and continuing on the south-eastern slope in the adjoining applied area of 50 hectares.

The average length of iron ore body in 25 Ha lease area is about 1,100 m and width is about 110 m.

The average length of iron ore body in 50 Ha applied lease area is about 1,500 m and width is about 170 m.

The distance from the bore-holes drilled in PL area (adjoining 25 Ha ML area) to the boundary of applied 50 Ha applied lease area is as follows:

BH-1 – about 35 m

BH-2 – about 120 m

BH-3 – about 70 m

BH-4 – about 90 m

The thickness of probable insitu iron ore has been taken as 7 m as a safe side.

The exploration activities of PL area have been revoked on the basis of southern part of ore body. On the basis of outcrops of ore and above said details, the reserve has been categorized as G2 category which is as under is as under:

Section Line	Cross Sectional Area (sq m)	Area of influence (m)	Volume (cu m)	B.D.	Total Reserves (tonnes)
C1-C2	707.20	150	106080	3.5	3,71,280
C3-C4	717.16	100	71716	3.5	2,51,006
C5-C6	544.00	100	54400	3.5	1,90,400
C7-C8	370.20	100	37000	3.5	1,29,500
C9-C10	380.00	100	38000	3.5	1,33,000
C11-C12	277.40	100	27040	3.5	94,640
C13-C14	1117.70	100	111770	3.5	3,91,195
C15-C16	1106.60	100	110660	3.5	3,87,310
C17-C18	1372.56	100	137256	3.5	4,80,396
C19-C20	1581.28	100	158128	3.5	5,53,448
C21-C22	1164.00	100	116400	3.5	4,07,400
C23-C24	660.00	100	66000	3.5	2,31,000
C25-C26	651.40	100	65140	3.5	2,27,990
C27-C28	438.80	100	43880	3.5	1,53,580
C297-C30	586.40	75	58640	3.5	2,05,240
Total					**42,07,385**

Note:-

(1) In this area due to non-availability of subsurface data like borehole, reserve categories of ore have been considered as per prospecting report by Geomin Consultant (P) Ltd.

(2) The geological reserve of ore in this 50 Hec of area has been calculated by extending the iron ore bed in the dip direction from 25 Hec. Lease area. The thickness assumed is 9 m based on prospecting report (1 m lateritic ore + 6 m massive ore + 2 m soft ore = 9 m).

(3) Presently, the thickness of ore body is assumed only 7 m. For future estimation of ore reserves after detailed explored, looking to the general geological nature of this deposit, there is likelihood of increase in the depth of the deposit. The re-estimation of actual reserve after proposed exploration will be taken into account during the subsequent mining scheme period.

Geological Reserve of Float Ore:

The availability of float ore reserves is as under: The surface area covered by float ore is 1,12,850 sq m and average thickness has been taken as 2 m (as per the prospecting report) (categorized as G2).

Surface area (sq m)	Thickness of float ore zone (m)	Volume (cu m)	Recovery of float ore boulders 25% of the total volume (cu m)	B.D	Geological Reserves (tonnes)	Geological Reserves (Million tonnes)
1,10,850	2.0	22,1700	55,425	3.5	1,93,987	0.19

Thus, total Geological Iron-ore Reserves (which is categorized as 332) are as under:

Category	Reserves	
	Tonnes	Million Tonnes
(a) Proved insitu-ore reserve	42,07,385	4.21
(b) Float ore reserve	1,93,987	0.19
Total	**44,01,372**	**4.40**

The grade of iron ore as per the PL report are as under:

	Fe	SiO_2	Al_2O_3	P	S	LOI
Bore - Hole	59.73 – 68.68 %	0.82 – 22.20 %	0.54 – 1.86 %	0.002 – 0.03 %	0.002 – 0.30 %	0.75 – 2.72 %
Surface sample Main ore body	60.02 – 68.24 %	0.53 – 1.96 %	0.48 – 3.98 %	--	--	1.20 – 2.66 %
Surface sample Float ore	54.58 – 64.76 %	0.56 – 2.46 %	2.01 – 2.82 %	--	--	1.32 – 2.83 %

Note: From the conservation of mineral point of view and depleting the high grade of iron ore, time has come to lower the cut-off grade from 55% Fe to 45% Fe content.

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(f). Indicate mineable reserves by slice-plan/ level plan method, as applicable, as per proposed mining parameters.

Insitu reserve blocked under 7.5 m non-mining zone:

Category	Surface area of 7.5 m non-mining zone (sq m)	Thickness of insitu ore zone (m)	Volume (cu m)	Bulk Density	Geological Reserves (Tonnes)
Proved	13,500	7.0	94,500	3.5	3,30,750

The total geological insitu ore reserve - 42,07,385 tonnes
Reserve blocked under 7.5 m zone - 3,30,750 tonnes

Probable reserve (Mineable) - 38,76,635 tonnes

Note:- Since the mining will be carried out by slicing method due to thickness of ore being 7.0 m, the ore blockage for stability of bench has not been considered and the entire thickness of ore will be mined out in future. If the thickness of ore body increases after proposed bore holes are drilled, at that time the ore blocked for stability for bench will be taken into consideration.

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Float ore reserve Blocked under 7.5 m non-mining zone:

Surface area of 7.5 m non-mining zone (sq m)	Thickness of float ore zone (m)	Volume (cu m)	Incidence of ore boulders 25% of the total volume (cu m)	Bulk Density	Geological Reserves (Tonnes)
11,100	2.0	22,200	5,550	3.5	19,425

The total geological float ore reserve - 1,93,987 tonnes
Reserve blocked under 7.5 m non-mining zone - 19,425 tonnes

Mineable float ore reserve - 1,74,562 tonnes

Thus the reserve of iron ore is as under:

	Geological reserve (tonnes)	Blocked out reserve (tonnes)	Mineable reserve (tonnes)
Insitu ore	42,07,385	3,30,750	38,76,635
Float ore	1,93,987	19,425	1,74,562
Total	44,01,372	3,50,175	40,51,197

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The reserve and resources has been categorized as per UNFC are as under:

Probable Reserves (122):- The geological mapping including structural mapping, lithology etc were carried out on a scale of 1:2,000 on the 200 Ha of PL area. 4 nos. of bore-holes were drilled in the Pl area which is falls under 25 Ha adjoining mining lease area and 7 core samples were analyzed.

The geological reserve in applied mining lease area has been estimated by cross-section method. For this, fifteen cross sections were drawn at an interval of 100 m. As per the geological mapping, the reserve upto 7 m depth has been taken as probable reserve tapering near the contact of BHQ, since this ore body is an extension of the ore body in the updip adjoining area of Metabodeli (25 hect.) under mining lease of the lessee. The iron ore presence in highest contour of 540 m MSL and which is continue upto contour level of 420 m MSL, hence the ore is continue upto a contour level of 420 m. The probable insitu iron ore has been taken upto a thickness of 7 m as a safe side. In the float ore the thickness of ore has been taken as 2 m.

The pre-feasibility study has been carried out and on the basis of pre-feasibility study this reserve has been considered as G2 category.

The pre-feasibility report has been enclosed as Annexure No. VIII.

The iron ore reserves were categorized as 'probable' (as per the UNFC) reserves (122) depending on the above information. The estimated mineable reserves under this category is 38,76,635 tonnes in insitu ore and 1,74,562 tonnes in float ore. Hence, the total reserve under this category is 40,51,197 tonnes (4.05 million tonnes).

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Feasibility Mineral Resources (222):-

Reserve blocked in 7.5 m non-mining zone.

Blocked float ore - 19,425 tonnes (0.019 million tonnes)

Blocked insitu ore – 3,30,750 tonnes (0.330 million tonnes)

Total - 3,50,175 tonnes (0.35 million tonnes)

Total Reserves and Resource estimation table

Classification		***Code***	***Quantity***	***Grade***
Total Mineral Resources (A+B)			4.40 Million Tonnes	(54-68% Fe)
A. Mineral Reserve	(1) Proved Mineral Reserve	111	---	---
	(2) Probable Mineral Reserve	121	---	---
	(3) Probable Mineral Reserve	122	4.05 Million Tonnes	--do--
B. Remaining Resources	(1) Feasibility Mineral Resources	211	---	---
	(2) Prefeasibility Mineral Resources	221	---	---
	(3) Prefeasibility Mineral Resources	222	0.35 Million Tonnes	--do--
	(4) Measured Mineral Resources	331	---	---
	(5) Indicated Mineral Resources	332	---	---
	(6) Inferred Mineral Resources	333	----	---
	(7) Reconnaissance Mineral Resources	334	---	---

(h) Anticipated Life: Anticipated Life of the mine is computed by considering the proposed rate of production about 2,97,500 T/ year for next five years and subsequent years of production when the mine is fully developed. Considering the above factors anticipated Life of the mine will be about 13 years (mineable insitu ore reserve is 38,76,635 tonnes). However it may increase with addition of proved ore by detail exploration done during the first year of Mining Plan period.

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CHAPTER-4

MINING

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CHAPTER- 4.

MINING

(a). Briefly describe the existing proposed method for developing/ working the deposit with all designed parameters.

In this modification, there will be no change in the method of mining. The entire mining operations will be carried out as per in the approved mining plan. During the first year, the development activity will involve road-making for transportation of drilling machines, excavators, dozer and transportation by dumpers and excavation of top soil cover, wherever encountered, on insitu ore area. The mining will be by top slicing method and will start from the non-mining zone leaving 2 m for slope and safety by maintaining slope of about 45^0. The lay out of the road has been shown on the Year-Wise Development & Production Plan (Plate No. V). The haulage road for the 3rd year mining will continue in sub-sequent years due to the slice mining method. The haulage road will be about 10 m width and maintained in 1:16 gradient.

The exploration proposed will also be taken up.

This will also help in organizing the mining work to be taken up from second year onwards for in-situ ore zone. Only float ore mining will be taken up during this year. The advancement of working will be start from the eastern side of the lease area and continue towards western side. The float ore area of 44,000 sqm of mineralized float ore will be recovered (thickness of the float ore is about 2.0 m). The recovery of ore by float ore mining will be 1,07,800 tonnes (35 % of ROM).

The recovery of ore has been expected about 25% of ROM and rest 75 % will be waste, reject and sub-grade (below 55% Fe), out of this, 65% will be generated waste/reject and about 10% will be below 55% Fe-content, this ore will also be mined as saleable ore, hence the total saleable ore will be 35% of ROM. The expected waste/rejects material of 57,200 cum (65% of ROM).

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The breakup of ROM, saleable ore and generation of waste/rejects in float ore recovery will be as under:

Saleable ore	- 35% of ROM
Waste/rejects	- 65% of ROM
Total ROM	100%

During the second year onwards, the mining will be started on the insitu ore body on the two hills by slicing method. The mining will be started by primary drilling of the mining block by wagon drill upto 5.5 m depth to avoid toe formation for a bench height of 5.0m.

After primary drilling the holes will be blasted and big boulders encountered in the blasted mass will be subjected to secondary drilling by jack-hammer and subsequently blasted. Thereafter, the blasted mass will be reduced to loadable size (250-300mm). The loadable size ore will be loaded by 2 m^3 capacity shovel into 20 tonner tippers for transport to the Steel Plant.

The waste/rejects material will be loaded manually or by 1.2 m^3 capacity shovel into 10 tonner tippers to the dumping site on outside of the mining lease area. The breakup of ROM, saleable ore and generation of rejects in insitu-ore mining will be as under:

Saleable ore	- 90% of ROM
Rejects	- 10% of ROM
	100%

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Note(*):- Since the threshold value of iron ore is 45% Fe, there will be no sub-grade generation.

The production of saleable ore has been expected about 80% of ROM and rest 20 % will be waste, reject and sub-grade (below 55% Fe), out of this, 10% will be generated waste/reject and about 10% will be below 55% Fe-content, this

ore will also be mined as saleable ore, hence the total saleable ore will be 90% of ROM.

The locations are shown in the Five Year Development and Production Plan is given in Plate No.V.

Year-wise production of Marketable/Saleable ore and Rejects / waste for Float ore (First year):

Year	Working range	OB (cum)	Float ore mixed with waste ROM (cum)	Recovery of Marketable ore (+45% Fe) 35% of ROM (cum)	T.F.	ROM (Tonnes)	Waste/ reject 65% of ROM (cum)	Ore: waste handling
I	Float ore	Nil	88,000	30,800	3.5	1,07,800	57,200	Negligible

Year-wise production of Marketable/Saleable ore and Rejects for Insitu ore (second year to fifth year):

Year	Working RL range	OB (cum)	ROM (cum)	B.D.	ROM (Tonnes)	Marketable ore 90% of ROM (+45% Fe)	Rejects / waste 10% of ROM (cum)	Ore: Reject handling
II	+535-520m	Nil	38,500	3.5	1,34,750	1,21,275	3,850	Negligible
III	550-535m	Nil	43,600	3.5	1,52,600	1,37,340	4,360	Negligible
IV	535-520m	Nil	84,000	3.5	2,94,000	2,64,600	8,400	Negligible
V	420-515m	Nil	85,000	3.5	2,97,500	2,67,750	8,500	Negligible
Total		Nil	2,51,100		8,78,850	7,90,965	25,110	

Note:-

(1) After full extraction of float ores of the area, it will be used for future prospecting.

(2) The waste will be 65% in case of float ore zone and reject 10% of ROM in case of insitu ore.

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15/11/12

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

Shalabh Saha

(b) Indicate quantum of development and tonnage and grade of production expected pit wise as in table below.

Year wise Development and Production for the first five year:

First Year Development and Production:

During the first year, the mining will be restricted to float ore zone upto 2m depth, in the eastern slope of the area. During this year, the infrastructure facilities will be developed along with approach road from hill top will be constructed for mining during second year onwards.

During this period about 44,000 sq. m area in float ore with 2.0 m depth will be excavated. With 35% recovery of float ore and 3.5 tonnage factor (44,000 x 2 x 0.35 x 3.5 = 1,07,800 tonnes of float ore will be recovered. The big boulders of float ore will be broken to handlable size.

The balance 65% material will be rejects/waste (65%). The entire generation of reject / waste will be utilized for the back-filling the fully mined out float ore zone.

At the initial phase of development activities, the transport road is proposed to be constructed over the length of about 1,200 meters at a width of about 10 meter with gradient of 1:16 and some infrastructure facilities like office, rest shelter will be constructed.

Second Year Development and Production:

From second year onwards, mining will be carried in the in-situ iron ore zone. In the second year, mining of ore will commence from the western side of area hill top of the hill No. I, i.e. from +535 m, which will go down subsequently upto a contour of 520 m with a thickness of ore-body upto 5 m at each contour interval of 5 m as given in the following table. The mining will be started by primary drilling of the mining block by wagon drill upto 5.5 m depth for a bench height of 5.0 m.

The total area of excavation for ROM mining of ore will be 7,700 sq m and the volume will be 7,700 x 5 = 38,500 cu m.

And the tonnage will be 38,500 × 3.5 = 1,34,750 T. Out of this, the saleable ore will be 90% of ROM i.e. 1,21,275 Tonnes.

The remaining 10% will be rejects i.e. 3,850 cum.

Third Year Development and Production:

In third year onwards, mining of ore will commence from hill No-II from 550 m which is further west of hill I and will go down upto a contour of 535 m in two benches, each of 5 m bench height. The total area of excavation for ROM mining of ore will be about 8,720 sqm. The volume of ROM will be 8,720 x 5 = 43,600 cum.

The tonnage will be 43,600 × 3.5 = 1,52,600 T. Out of this 90% of ROM will be saleable ore i.e. 1,37,340 Tonnes.

The remaining 10% will be rejects i.e. 4,360 cum.

Fourth Year Development and Production:

Subsequent, fourth year, mining of ore will commence from the same hill No. II below the third year's working, i.e. from 535 m which is go down upto a contour of 520 m in three benches each of 5 m height. The total area of excavation for ROM mining of ore will be about 16,800 sqm and volume will be 16,800 x 5 = 84,000 cum.

The tonnage will be 84,000 × 3.5 = 2,94,000 T). The, 90% of ROM will be saleable ore i.e. 2,64,600 Tonnes.

The remaining 10% will be rejects i.e. 8,400 cum.

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Fifth Year Development and Production:

Subsequently, in the fifth year, mining of ore will commence from the the hill No. II below the fourth year's working, i.e. from 520 m which is go down upto a contour of 515 m with a bench height of 5 m. The total area of excavation for ROM mining of ore will be about 17,000 sqm and volume will be 17,000 x 5 = 85,000 cu m.

The tonnage will be 85,000 × 3.5 = 2,97,500 T. Out of this 90% of ROM will be saleable ore i.e. 2,67,750 Tonnes.

The remaining 10% will be rejects i.e. 8,500 cum.

The First Year Development and Production in Float ore are tabulated as under:

Year	Float ore area	Thick-ness (m)	Area mined (m^2)	Volume ROM (m^3)	Recovery (35% of ROM) (m^3)	T.F.	Total (T)	Waste (65%) (m^3)
I	**Float ore Mining**	2 m	44,000	88,000	30,800	3.5	1,07,800	57,200

The Second year to Fifth Year Development and Production in Insitu ore are tabulated as under:

Year	Bench level (m MSL)	Bench Ht.	Area to be mined (sqm)	Volume ROM (m^3)	B.D	Total (T)	Saleable ore 90% of ROM (T)	Rejects 10% of ROM (m^3)
II	+535	2 m	500	960				
	535-530	5 m	1300	5500				
		5 m	2400	7500				
	530-525	5 m	3800	12000				
	525-520		8000	38500	3.5	1,34,750	1,21,275	3,850
III	550-545	5 m	1720	8600				
	545-540	5 m	3000	15000				
		5 m	4000	20000				
	540-535		8720	43600	3.5	1,52,600	1,37,340	4,360
IV	535-530	5 m	3800	19000				
	530-525	5 m	5000	25000				
		5 m	8000	40000				
	525-520		16800	84000	3.5	2,94,000	2,64,600	8,400
V	520-515	5 m	17,000	85000	3.5	2,97,500	2,65,750	8,500
				2,51,100		**8,78,850**	**7,90,965**	**25,110**

(c). Attach individual year wise plan & section:

Year wise plan is given in Plate No.V (separately Plate V-1 to Plate V-5) and year wise sections are given in plate No.V A.

(d). Attach supporting composite plan and section showing pit layouts, dumps, stack of sub-grade mineral, if any, etc.

The composite plan showing lay-out of working is given in the year wise production/development plan. (Plate No.V & V A).

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(e) Indicate proposed rate of production when the mine is fully developed and the expected life of the mine and the year from which effected.

The proposed rate of production will increase around 2.97 lakh tonnes mineable ore per year, by taking this production, the life of the mine will be about 13 years.

(f). Attach a note furnishing a conceptual mining plan for the entire lease period(for B-category mines) and upto the life of the mine (for A-category mine) based on the geological, mining and environmental considerations.

During subsequent five year period, the ROM production of about 2.97 lakh tonnes per year is anticipated. With the present mineable reserve, the anticipated life of the mine is 13 years as stated earlier and will require in insitu-ore and float-ore area total 4,00,000 sq m of mineralized area.

The distribution of 40 Ha of mineralized area is as under:

Float ore area – 11 Ha (approx.)

Insitu ore area – 29 Ha (approx.)

Presently the depth of the ore has been taken as 7 m. The exploration suggested in mining plan will definitely increase the life of the mine due to the increase in depth of the ore body as well as in the BHQ zone.

(i) Time frame of completion of mineral exploration programme in the lease, with broad description identifying the potential area to be covered in the given time frame.

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The proposed exploration programme will be completed during the first year of the mining plan on priority basis.

27 nos. of bore holes have been proposed during the first year of the mining plan period at about 100 m interval, hence all the Insitu ore zone will comes under proved category.

11 nos of trial pits have been proposed during the first year of the mining plan period (priority on first quarter) at about 200 x 50 m interval to ascertain the depth of the float ore zone.

To know the quality of BHQ (Fe-content) as per the threshold value of minimum 45% Fe-content, 6 nos. of trenches have been proposed during the first year of the mining plan period.

Hence, the iron ore reserves of almost the lease area will be proved during the first year of the mining plan period. The quantity and quality of the BHQ area will be estimated as per the analyses report of trenches.

It will be necessary to drill at least 2 to 3 bore holes in the float ore area to confirm the existence of BHQ, and if no BHQ is encountered upto a depth of at least 10 m (since the dip of BHQ is about 80^0 in this area of 50 Ha); then only the decision of back filling the mined out float ore area can be considered.

(ii) Whether ultimate pit limit has been determined and demarcated on the surface and geological plan.

Presently, no pit within the area.

During this Mining Plan period, the pit size will be 24,700 sq m area, which is insitu ore zone. The float ore area will be almost utilized for dumping the waste/reject material.

The ultimate pit limit will covered all the in-situ ore bearing area, which is about 2,90,000 sq m.

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(iii) Whether the site for disposal of waste rock and unsaleable ores has been examined for adequacy of land and suitability of long term use in the event of continuation of mining activity.

During the first five year of this mining plan period, the waste / reject material will be dumped on the float ore zone which will be mined out during the first year, after the fully exhaustion of the float ore and confirmation of not encountering the BHQ below the float ore.

After this first five years, the waste/reject will be dumped on the float ore zone on the eastern side of the area, after the fully exhaustion of the float ore and confirmation of not encountering the BHQ below the float ore.

Hence, no additional area will be required for this dumping.

(iv) The ultimate size of the waste/reject dump.

The waste material generated during first year mining of float ore will be about 65% of the total excavation i.e. 57,200 cum. This will be dumped on this float ore area up to a height of 3 m.

From second year onwards, the waste material/rejects generated during in-situ ore mining will be about 10% of total excavation, will also be transported to the fully mined out float ore area and dumped at about 1.5 m height, wherein a retaining wall will be constructed all around the dump after necessary preparatory work along with plantation all around the area.

During conceptual period, the dumping will be carried out on the fully mined out float ore area on the southern side of the lease. The quantity to be waste/reject material will be about 1,23,000 cum, with a dump height of 3 m the area required will be 41,000 sq m and taking 20% swell factor the actual area required will be 49,200 sq m.

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(v) Whether back filling of pits after recovery of mineral upto techno-economically feasible depth envisaged. If so describe the broad features of the proposal.

The back-filling of mined out float ore zone will be carried out as dumping the waste 65% after fully exhaustion of float ore and 10 % waste/reject generated during mining of insitu ore.

The mining area is a hillock type, which is mined out by slicing method and after conceptual plan period/exhaustion of in-situ iron ore, the area will be a flat plateau and it will be utilized for plantation of different types of trees which can survive in this region.

(vi) Final slope of the faces.

From the cross-sections, it is seen that BHQ formation is encountering between 480 m RL to 430 m RL depending on the slope of the hill which is having the same strike orientation of main ore body i.e. NE-SW. Due to hill slope varying at different places in the lease area, the mining activity will continue accordingly i.e 550 m RL to 450 m RL and the BHQ formation will be varying from 480 m RL to 430 m RL respectively. The slope of the mining faces will be less than 30^0 which will be sufficiently stable.

(vii) Post mining land use envisaged.

The total 40.0 ha of mineralized zone will be mined out upto the life of the mine, after the fully excavation.

The mined out float ore zone will be utilized for dumping of waste 65% of float ore and 10 % waste/reject generated during mining of insitu ore, after fully exhaustion of float ore.

At the end of the life of the mine starting from 550 m RL with a thickness of ore body of 7 m proved depth upto 430 m RL, the excavated in-situ ore area

will be in the form of the sloping plateau and it will be utilized for plantation of different types of trees which can survive in this region.

Plantation will be carried out on dumps after spreading and leveling.

The proposed plantation during conceptual plan period will be about 900 plants in each hectare area (the spacing of plantation will be 3 m x 3m).

After the proposed exploration, the above conceptual plan will get modified during the submission of the Mining scheme.

With the present anticipated life of the mine, the conceptual plan is likely to as under:

S. No.	Description	Area in Sq m		
		Present	End of five year	Upto the life of mine
1	Area under mining	Nil	24,700 (insitu ore) +44,000(float ore) = 68,700	2,90,000
2	Area under roads	Nil	14,500	27,050
3	Area under infrastructures	Nil	640	NIL
4	Area for soil dump	Nil	NIL	NIL
4	Area for Sub-grade dump	Nil	NIL	NIL
5	Area for rejects/waste dump	Nil	NIL	NIL
6	Area for Plantation (50 trees per year) in non-mining zone of 7.5 Ha.	Nil	2,250	2,250+6,300=8550
	Total	Nil	86,090	3,25,600

(viii) Afforestation.

1. The plateau slope after fully mining the ore will be taken up for plantation at a spacing of 3 m x 3m in the entire area.
2. Plantation will be carried out on stabilized dump using local grass and tree species.

(g). Opencast mines:

(i).Describe briefly giving salient features of the mode of working (mechanized/semi-mechanised/manual).

The production of iron ore will be by fully mechanized method. The method of mining has been described in detail earlier in this chapter.

(ii).Describe briefly the layout of mine workings, the layout of faces and sites for disposal of overburdens/waste. A reference to the plans enclosed under 4(b) and 4(d) will suffice.

The production of iron ore will be done by fully mechanized method, by opencast mining, added by mining machineries for primary drilling and blasting by wagon drilling and further fragmentation of big boulders by secondary drilling & blasting by jack hammers. The ore will be sorted, sized upto handlable size by manual labours and transported to the plant by tippers loaded by shovel. The waste rock/rejects will be transported and dumped on the fully mined out float ore zone. Wherever top lateritic soil is encountered, it will be meticulously separated and transported to the earmarked space for dumping yard for future plantation. All these have been indicated in Production and Development Plan (plate No. V).

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4.6.1. Extent of Mechanization:

Describe briefly including calculations of adequacy and type of Machinery and equipments proposed to be used in different mining operations.

For Production of about 2.97 lakh tonnes per year of ROM (for getting about 2.5 lakh tonnes of saleable ore), i.e. 992 T/day based on 300 working day/year, the requirement of equipments and machineries will be as under:

(1) Drilling machines-

ROM required per day 992 tonnes.

Out put of one bore-holes will be 5.5 m (depth) x 1.5 m (burden) x 2.0 m (spacing) = 52.5 Tonnes.

one hole the output will be 52.5 tonnes.

No. of holes required to be drilled will be 992/52.5 = 18.89.86 or say 19 holes per day

Total meterage 19 x 5.5 = 104.5 m say 105 in a day.

One wagon drill can drill about 65 m in a day, hence 2 wagon drill will be required.

Hence, two number of Wagon drill, Jack Hammer (for breaking big boulders) and one Rotary compressor will be required.

(2) Loading Equipments- Excavators / shovels

One excavator can load 3 buckets in the 15 mts into each dumper of 20 Tonner,

In 6 hours working time, 24 dumpers can be loaded.

Thus, no. of excavator required will be 2 nos for loading 49 dumpers.

Thus, two number of Hydraulic excavator/shovels will be required for loading.

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(3) Transport equipments from quarries to crusher

Total production of saleable ore will be maximum 2,65,750 tonnes in a year, hence 2,65,750 / 300 = 885 tonnes per day.

One dumper can make only one trip in a day

One 20 tonner dumper can yield 18 tonnes

No. of dumper will be 885/18 = 49 nos.

Thus, 49 number of Dumpers of 20 tonner capacity will be required for transportation.

(4) Miscellaneous equipments for allied operation and Machineries related to Mining of deposit not covered earlier

As per approved mining plan, tipper for OB, one Dozer for leveling, Diesel tankers, water tankers, well equipped service van and two Jeep will be required for allied operation.

The details of the machineries to be deployed are as under:

Types of Machineries	Nos.	Capacity	Motive Power	Remark
Wagons drill	2	100 mm dia	Diesel	For primary drilling
Jack Hammer	2	32 mm dia	Diesel	For secondary drilling
Rotary Compressor	1	--	Diesel	For Jack Hammer drilling
Shovel/Excavator	2	2.0 cum	Diesel	For Loading
Hydraulic excavator	1	1.2 cu m	Diesel	OB/sub-grade/waste handling
Dumpers	49	20 T	Diesel	for transportation of ROM
Tippers	4	10 T	Diesel	OB/sub- grade / waste transportation
Dozer	1	--	Diesel	For levelling
Diesel tankers	1	--	Diesel	For fuel recharge
Water tankers	1	8000 liters	Diesel	For sprinkling water
Service van	1	---	Diesel	---
Jeep	2	--	Diesel	--