

# MINING PLAN

Submitted for approval under Rule 16 of MCR 2016  
including PMCP submitted under Rule 23 of Mineral Conservation and Development Rules 2017



for

## Kirloskar Bharath Mines

[M/s Bharat Mines & Minerals (ML No.2245) mine lease block]  
in Nandihalli village, Sandur Taluka, Bellary District

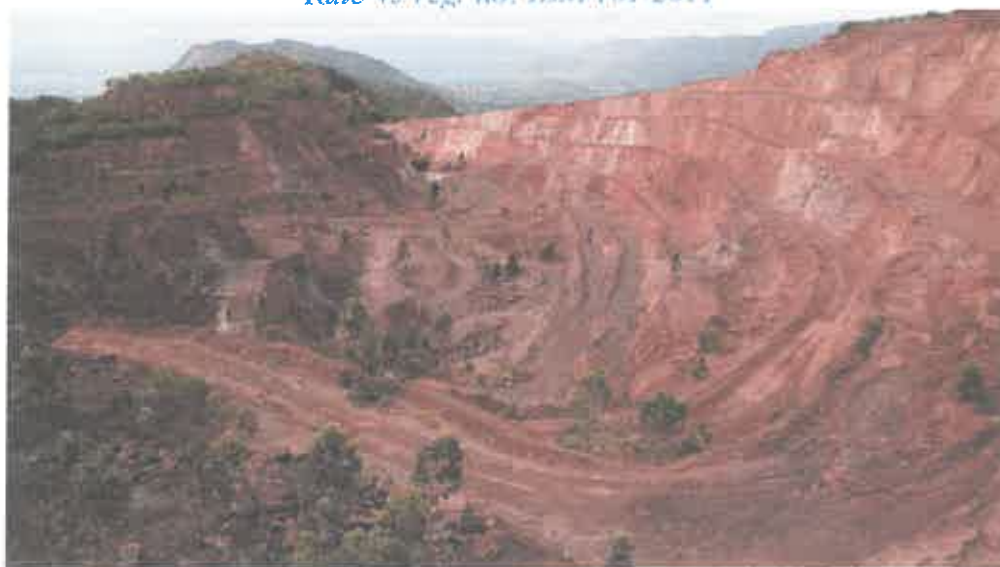
of



Enriching Lives

## KIRLOSKAR FERROUS INDUSTRIES LIMITED

Rule 45 reg. no: IBM/161/2011



**Area: 24.47 Ha**  
in Kumaraswamy Reserve Forest

**Lease period: 50 years as per MMDR Amendment Act 2015**

**Category: A-Fully Mechanized, Open Cast, Private, Captive**

Prepared by

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M.Sc. Mineral Exploration  
Qualified Person

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M.Sc. Mineral Exploration  
Qualified Person

May-2019

# C O N T E N T S



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## ANNEXURES



| Nos. | DESCRIPTION                                    |
|------|------------------------------------------------|
| 1.   | Copy of LOI by DMG, GoK for Mining Lease       |
| 1a   | Copy of letter regarding Production Quantity   |
| 2.   | Certificate of Company Registration            |
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| 5.   | Photo ID of Nominated Owner                    |
| 6.   | Copy of QP certificates                        |
| 7.   | Copy of DMG letter regarding DGPS co-ordinates |
| 8.   | Copy of MECL report (reserves) extract         |
| 9.   | Year wise Production & Development Program     |
| 10.  | Copy of Environmental Clearance                |
| 11.  | Copy of Forest Clearance                       |
| 12.  | Feasibility Study Report                       |

## PLATES



| Nos.       | DESCRIPTION                              | SCALE      |
|------------|------------------------------------------|------------|
| I a        | Location Plan                            | NTS        |
| I b        | Key Plan / Precise area map on Toposheet | 1 : 50,000 |
| I c        | CEC Lease sketch                         | 1 : 3000   |
| II a       | Surface Plan                             | 1 : 2000   |
| II b       | Geological Plan                          | 1 : 2000   |
| II c       | Geological Cross Sections                | 1 : 2000   |
| II d       | Graphical Lithologs                      | 1 : 500    |
| III a to e | Production development plans             | 1 : 2000   |
| III f      | Production development sections          | 1 : 2000   |
| IV         | Reclamation plan                         | 1 : 4000   |
| V          | Environment Plan                         | 1 : 2000   |
| VI a       | Conceptual Plan                          | 1 : 2000   |
| VI b       | Dump Management Plan                     | 1 : 2000   |
| VII        | Financial Area Assurance Plan            | 1 : 2000   |

**INTRODUCTORY NOTE:**

M/s Kirkoskar Ferrous Industries Limited (KFIL) is producing pig iron which is raw material for foundries and castings of International quality. Its Koppal Plant has an installed Pig Iron manufacturing capacity of 391,400 TPA and Casting capacity of 108,000 TPA near Bevinahalli village of Koppal taluk and Dist, Karnataka.

M/s Bharat Mines & Minerals (ML No.2245) mine lease block in Sandur Taluka, Bellary District Over an extent of 24.47 Ha area of Forest Land of Kumarswamy range (Devadarigudda) is a C category iron ore mining lease auctioned by GoK, and KFIL, is the 'Preferred Bidder' as per the Letter of Intent of Govt of Karnataka after e-auction.

Pursuant to the Hon'ble Supreme Court order dated 29th July 2011 and 26th August 2011, the mining operations and transportation of the iron ore from mining leases in the districts of Bellary, Tumkur and Chitradurga had been suspended. Central Empowered Committee was constituted by SC, in order to unravel the violations carried out by mining companies in Karnataka. As per the CEC's joint team survey, ML No. 2245, previously held by M/s Bharat Mines & Minerals Limited has a total encroachment area of 18.23 Ha [under mining pit (8.05 Ha), OB dumps (8.98 Ha) and others category (1.20)]. Based on their findings, the lease has been categorized under "C" category.

Further, the Hon'ble Supreme Court by its orders dated 5<sup>th</sup> August 2011 and 26<sup>th</sup> August 2011 had directed the Government of Karnataka to submit the Reclamation and Rehabilitation Plan(s) for the districts of Bellary, Tumkur and Chitradurga within three months. Subsequently, the Government of Karnataka vide letter dated 29<sup>th</sup> September 2011 has assigned the work of preparation of R & R Plan to the Indian Council for Forest Research and Education (ICFRE).

This Mining Plan is approved subject  
to the conditions / stipulations  
Indicated in the Mining Plan approval  
letter No. 279/1099/2019/BNG  
Date 24.5.2019

24/5/19  
क्षेत्रीय खान नियंत्रक  
Regional Controller of Mines  
भारतीय खान ब्यूरो  
Indian Bureau of Mines,  
बैंगलूर / Bangalore - 560 022



However, CEC has opined that before finalizing the R & R plans of any of the Category 'C' mining leases, it may be appropriate that the mineral reserves to be estimated based on the exploration data undertaken by the State Govt. Accordingly the Govt. of Karnataka has outsourced the exploration work to M/s. Mineral Exploration Corporation Limited (MECL), a Government of India Enterprise, Nagpur, to assess the mineral reserves in all "C" category mines in Bellary, Chitradurga and Tumkur Districts of Karnataka State. Hence, this mining lease was also explored by drilling, and Exploration Report was submitted by MECL.

Supreme Court had directed Karnataka government to commence the auction of 14 'C' category iron ore mines in which end-user firms would be able to take part. M/s KFIL, having a Pig Iron Plant & Foundry has taken part in the auction process to ensure raw material self-sufficiency for its plant and emerged as 'Preferred Bidder'. The Dept of Mines & Geology (DMG) has issued a letter of intent (LoI) vide letter no. DMG/MLS/AUC/'C'-2245/2018-19 dated 06.10.2018 and further directed KFIL to submit the required Statutory Clearances to get MDPA signed and start the mining operations (Annexure -1).

Hence, a Mining Plan along with PMCP has been prepared and submitted for approval under Rule 16 of MCR 2016 for 24.47 ha with a production program of 0.124 MTPA (Annexure-1a) as per the R&R report of ICFRE / CEC. This mining plan has been prepared based on the exploration report by MECL and all the Reclamation and Rehabilitation measures of R&R report have been incorporated appropriately.

The lessee had one more mining lease in the state of Karnataka only. The details of the same are given below:

Table-1:

| Lease ref. no. & date | Area    | Postal Address & Location                                | Type of mineral | Working / Non-working | Status of approval of MR                                                        | Date of Execution & Expiry                                                                 | Remarks             |
|-----------------------|---------|----------------------------------------------------------|-----------------|-----------------------|---------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|---------------------|
| 2240 dated 23.09.98   | 4.90 ha | Sy. No.23, Honagadde village, Kushtagi taluk, Koppal dt. | White Quartz    | Non- working          | Last Scheme of Mining was approved on 20/21.6.2013 Ref No. 279/612/98/ BNG/2386 | Originally executed on 23.09.98 and transferred to KFIL on 29.08.2007. Expiry - 22.09.2018 | Lease under renewal |

Apart from the above, KFIL also has secured another LoI from the Dept of Mines & Geology (DMG) for another ML block [M/s M. Channakeshava Reddy (ML No.2566) mine lease block in Lakkihalli & Kenkere villages, Hosadurga Taluka, Chitradurga District over an extent of 7.57 ha area] vide letter no. DMG/MLS/AUC/'C'-2566/2018-19 dated 07.01.2019.



**1.0 GENERAL**

a)

Table -2:

|                                        |                                                                                                          |
|----------------------------------------|----------------------------------------------------------------------------------------------------------|
| Name of lessee                         | M/s Kirloskar Ferrous Industries Ltd<br><b>Nominated Owner:</b><br>Sri Ravindranath Venkatesh Gumaste MD |
| Mine code and Rule 45 registration no. | Not yet allotted<br>IBM/161/2011                                                                         |
| Address                                | M/s Kirloskar Ferrous Industries Ltd,<br>Laxmanrao Kirloskar Road, Khadki, PUNE-03                       |
| District                               | Pune                                                                                                     |
| State                                  | Maharashtra                                                                                              |
| Pin code                               | 411003                                                                                                   |
| Phone                                  | 020-25810341                                                                                             |
| Fax                                    | 020-25813208 / 25810209                                                                                  |
| Mobile                                 | 09448491632                                                                                              |
| E-mail id                              | gumaste.rv@kfil.com                                                                                      |

**b) Status of applicant/lessee:**

Listed Public Limited Company

*(Copy of Registration of Company is given in Annexure-2, List of Directors as Annexure-3, Annexure-4 shows a copy of board resolution and Annexure-5 shows photo ID of nominated Owner)*

**c) Mineral(s) which is are included in the prospecting license (for fresh grant):**

Not applicable

**d) Mineral(s) which is included in the letter of Intent / lease deed:**

Iron Ore

**e) Mineral(s) which the lessee intends to mine:**

Iron Ore

**f) Name of Qualified Persons under Rule 15 of MCR -2016 preparing Mining Plan:**

Table -3:

|               |                                                                                            |                             |
|---------------|--------------------------------------------------------------------------------------------|-----------------------------|
| Name          | Sripad Pujar                                                                               | BVR Achar                   |
| Qualification | M.Sc. (Mineral Exploration)                                                                | M.Sc. (Mineral Exploration) |
| Address       | ROCK TECH ENTERPRISES<br>Annapurna Badavane, Hosapete – 583 201<br>Ballari Dist. Karnataka |                             |
| Phone         | 08394-226563                                                                               |                             |
| Fax           | 08394-224012                                                                               |                             |
| Mobile        | 9448366964                                                                                 | 9448469407                  |
| E-mail id     | rocktechpt@gmail.com                                                                       |                             |

*(Annexure-6 shows copies of certificates of Qualified Persons)*





## 2.0 LOCATION AND ACCESSIBILITY

### a) Lease Details (existing mine)

Table -4 :

|                                |                                                                                                                                                                                                                   |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Name of the mine               | Kirloskar Bharath Mines                                                                                                                                                                                           |
| Lat/long of any boundary point | LBS -A<br>Latitude - 15° 01' 43.84657"<br>Longitude - 76° 35' 25.62412"<br>There are 17 corner pillars and lat/long values of these pillars are given in the sketch enclosed as plate I c also listed in Table -6 |
| Date of grant of lease         | 06.10.2018 (LoI grant date)                                                                                                                                                                                       |
| Period/Expiry Date             | 50 yrs as per MMDR (Amendment) Act-2015                                                                                                                                                                           |
| Postal Address                 | Kirloskar Bharath Mines, Near Nandihalli, Sandur taluk                                                                                                                                                            |
| District                       | Bellary                                                                                                                                                                                                           |
| State                          | Karnataka                                                                                                                                                                                                         |
| Pin code                       | 583119                                                                                                                                                                                                            |
| Phone                          | 08539-286711, 286715 (441)                                                                                                                                                                                        |
| Fax                            | 08539-286706, 286714                                                                                                                                                                                              |
| Mobile                         | 9448386711, 9480267877                                                                                                                                                                                            |
| E-mail id                      | Srivatsan.rs@kfil.com, Gururaj.agasanoor@kfil.com                                                                                                                                                                 |



### b) Details of applied /lease area with location map (fresh area /mine):

Table - 5 :

| Forest                                               | Non-forest                                                                                   |
|------------------------------------------------------|----------------------------------------------------------------------------------------------|
| Kumaraswami Range<br>Reserve Forest<br>Area-24.47 ha | (i) Waste land<br>(ii) Grazing land<br>(iii) Agriculture land<br>(iv) Others (specify) } NIL |

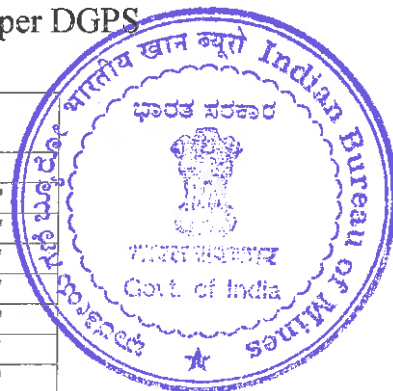
Table -6:

|                                                                               |                                                                                                                                               |
|-------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| Total lease area                                                              | 24.47 ha                                                                                                                                      |
| District & State                                                              | Ballari Dist, Karnataka State                                                                                                                 |
| Taluka                                                                        | Sandur                                                                                                                                        |
| Village                                                                       | Nandihalli                                                                                                                                    |
| Whether the area falls under Coastal Regulation Zone (CRZ)?                   | No                                                                                                                                            |
| Existence of public road/railway line, if any nearby and approximate distance | One public road is passing NE of the lease at around 4 km. Ranjitpur is the nearest railway station which is at a distance of 5km towards NE. |
| Toposheet No. with latitude & longitude of all corner boundary point/pillar   | Topo sheet no -D46 E 12 (57 A/12)<br>Lat / Long values are given in table below                                                               |



Table – 7: Latitude and longitudes of corner pillars as per DGPS

| SL. NO. | PILLAR ID | LATITUDE         | LONGITUDE        |
|---------|-----------|------------------|------------------|
|         |           | dd - mm - ss     | dd - mm - ss     |
| 1       | BLR-09    | N15°01'46.93700" | E76°34'38.49700" |
| 2       | LBS-A     | N15°01'43.84657" | E76°35'25.62412" |
| 3       | LBS-B     | N15°01'54.22593" | E76°35'21.37669" |
| 4       | LBS-C     | N15°01'55.32583" | E76°35'24.80892" |
| 5       | LBS-D     | N15°01'51.75250" | E76°35'26.60598" |
| 6       | LBS-E     | N15°01'53.95940" | E76°35'32.05997" |
| 7       | LBS-F     | N15°01'58.34472" | E76°35'32.97602" |
| 8       | LBS-G     | N15°02'03.69878" | E76°35'22.30861" |
| 9       | LBS-H     | N15°02'05.14264" | E76°35'25.34458" |
| 10      | LBS-I     | N15°02'03.03593" | E76°35'30.97060" |
| 11      | LBS-J     | N15°02'05.72812" | E76°35'37.45262" |
| 12      | LBS-K     | N15°02'07.18386" | E76°35'29.51739" |
| 13      | LBS-L     | N15°02'11.39010" | E76°35'38.33528" |
| 14      | LBS-M     | N15°01'53.16930" | E76°35'45.54410" |
| 15      | LBS-N     | N15°01'52.64912" | E76°35'44.32019" |
| 16      | LBS-O     | N15°01'54.28842" | E76°35'41.05733" |
| 17      | LBS-P     | N15°01'49.33657" | E76°35'31.05125" |
| 18      | LBS-Q     | N15°01'45.68789" | E76°35'29.67496" |



- c) **Attach a general location map showing area and access routes. It is preferred that the area be marked on a Survey of India topographical map or a cadastral map or forest map as the case may be. However, if none of these are available, the area may be shown on an administrative map.**



A general location map is attached as Plate- I a on administrative map and area precise map of 1:50,000 scale as Plate Ib. CEC sketch of the area is enclosed as Plate -Ic.



### 3.0 DETAILS OF APPROVED MINING PLAN:

#### 3.1) Date and reference of earlier approved Mining Plan/Schemes

Not applicable as this is first Mining Plan after lease grant proposal to KFIL.

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

Not applicable as this is first Mining Plan after lease grant proposal to KFIL.

#### 3.3) Review of earlier approved proposal in respect of excavation exploration, reclamation etc.

Not applicable as this is first Mining Plan after lease grant proposal to KFIL.

#### 3.4) Status of compliance of violations pointed out by IBM

Not applicable as this is first Mining Plan after lease grant proposal to KFIL.

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

Not applicable as this is first Mining Plan after lease grant proposal to KFIL.

#### 3.6) In case the MP/SOM is submitted under rules 9 and 10 of the MCDR'88 or under rule 17(3) of the MCR' 2016 for approval of modification, specify reason and justification for modification under these rules.

Not applicable.



## PART – A



## 1.0 GEOLOGY AND EXPLORATION:

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

The lease area in Devadari range, trending almost NW-SE covers hills and plateaus and at some places is covered with laterite and a thick mantle of soil. The area comprises of NW-SE trending ridges with an altitude of around 1000m above MSL. The area has its highest elevation at about 1000m and lowest at about 760m above MSL. The area covers a major plateau area with some escarpments and hill slopes. The valleys host a drainage pattern trending towards northeast and join the small nallahs and streams.

The area enjoys tropical climate with an annual average rainfall of about 750mm. Maximum temperature in summer days is around 40° C, and minimum temperature during winter nights records between 12 – 18° C. Humidity varies between 25 to 85%.

- b) Brief descriptions of Regional Geology with reference to location of lease/applied area:

The lease area is in donimalai block of Sandur schist belt forming part of the Bellary- Hospet group of iron/manganese ore deposits. This schist belt is the smallest of the three basins and covers an area of just 960sqkm. It is structurally highly disturbed and squeezed out of shape by the intrusion of younger granites. Shelf facies as in the other basins is confined to the western margin. Well-developed mafic magmatism and strong development of Manganiferous greywacke, phyllite and numerous bands of banded hematite quartzites (BHQ) characterize the basin. The basin is known for its rich accumulation of both Iron and Manganese Ore. Basement cover relations are obscured because of intense deformation and intrusion by younger granite.

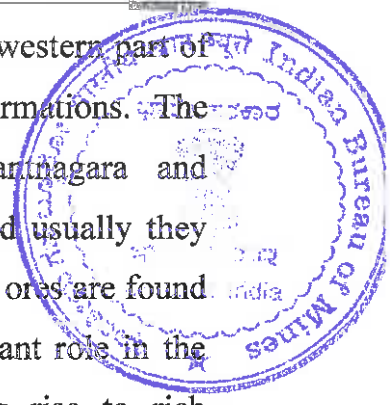


This lens-shaped schist belt is about 60km long, with a maximum width of 28km in the central part. Four formations have been distinguished in this basin (Yashwantnagar, Deogiri, Donimalai and Nandihalli). The Yashwantnagar Formation is largely composed of volcanic flows; the Deogiri formation by manganiferous greywacke argillite and the Donimalai Formation by extensive development of banded haematite and chert & Jasper. The topmost Nandihalli Formation is made up of metabasalts with intercalation of greywacke and argillites. Lateritization has played an important role in the concentration of manganese and Iron in the profile, resulting in rich accumulation of manganese/iron ore for which this schist belt is well known.

Table-8: The stratigraphic succession of Sandur Schist belt

|                                                          |                                                                                                                                                                                                                                                                              |
|----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Nandihalli formation                                     | Metabasalt, metagabbro, acid volcanics and intercalated bands of greywacke-argillite etc.)                                                                                                                                                                                   |
| Donimalai formation                                      | Banded ferruginous or pyritiferous chert (with its various metamorphic equivalents), metabasalt/amphibolite, metagabbro, andesitic tuff, acid volcanics, conglomerate, meta greywacke and metapelites, (garnet-mica schist, andalusite schist, cordierite-garnet gneiss etc) |
| Deogiri formation                                        | a. Manganiferous greywacke-argillite, with some bands of banded ferruginous chert and thin dolomitic limestone.<br>b. Metabasalt and rare acid tuff<br>c. Arenites, dolomitic limestone and phyllite.                                                                        |
| Yashwantnagara formation                                 | Metabasalt/amphibolite. with meta pyroxenite, metagabbro and thin intercalated bands of quartzite and quartz-mica schist.                                                                                                                                                    |
| Peninsular gneiss: (banded granodiorite/tonalite gneiss) |                                                                                                                                                                                                                                                                              |

(Source: *Stratigraphy and Structure of the Sandur Schist Belt, Karnataka*, Abinaba Roy and SK Biswas in *Journal of Geological Society of India*, Vol. 24, Jan. 1983)



The manganese ore deposits are mainly concentrated along the western part of the Sandur schist belt and restricted to Lower Deogiri formations. The important deposits are found in the Kammatur, Yashwanthnagara and Ramandurg areas. The chief ores are wad and psilomelane and usually they occur as a mixture of wad and psilomelane. The better grades of ores are found in the Kumaraswamy area. Lateritization has played an important role in the concentration of manganese and Iron in the profile, giving rise to rich accumulation of manganese and Iron ore for which this schist belt is well known.

*(Source: Geology of Karnataka-BP Radhakrishna & R Vaidyanathan)*

- c) **Detailed description of geology of the lease area such as shape and size of the mineral/ore deposit, disposition various litho-units indicating structural features if any etc. (Applicable for Mining Plan for grant & renewal and not for Scheme of Mining/Modifications in the approved mining plan/Scheme of Mining).**

The lease hold is in extreme end of SW part of Devadari gudda range of Sandur Schist Belt. There are four ore bands in the mining area is occurring at the top of the hillocks, show a generalized NW-SE trend of the foliation, which dip mainly towards northeast with angles varying from  $70^{\circ}$  to  $75^{\circ}$ . Ore bodies are bifurcated by ferruginous shale. In the main ore body at three places siliceous ore (BHQ) bands are exposed. The strike length of the ore body is varying from 150m to 400m. The total cumulative strike length of all the four ore bodies is about 900m. The width of the ore bodies varies from 15m to 60m.

The iron ore occurs both as lumps and fines. On an average the lumpy portions of the ore zone produce about 30% of the ROM. Rest is fine material of -10mm size. The ore bodies are steel grey to cherry red colored thick laminated to hard lumpy ore at top portions. And gradually as depth increases the powdery nature also increases and finally blue dust will remain at bottom levels. The grade of different category of iron ore of these ore bodies varies from 35% Fe (siliceous) to 64% Fe (high grade) with an overall average grade of 52.19%Fe. In total the ratio of lumpy (+10mm) ore to Powdery (-10mm) ore is around 30:70.





## d) (i) Name of the Prospecting/Exploration Agency:

M/s MECL

## (ii) Address:

Dr. Babasaheb Ambedkar Bhawan, Highland Drive Road,  
Seminary Hills, NAGPUR, Maharashtra(iii) E-mail id: [headbd@mecl.gov.in](mailto:headbd@mecl.gov.in) and phone no: 0712 251 0310

## e) Details of prospecting/exploration already carried out

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

No trenches /pits were carried out.

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

M/s MECL has drilled 4 nos. of Core drill holes (189.80m) and 15 nos. of RC drill holes (691m) during 2016 at a grid level varies from 50 to 110m. The core holes are of 72mm dia and RC holes are of 6.5" dia. These bore holes are marked in Geological Plan and borehole logs are enclosed as Annexure-14.

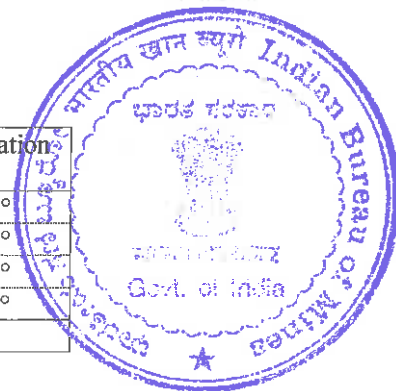
Table- 9: Details of drilled boreholes-RC

| Borehole no. | Co-Ordinates (WGS-84) |         | Level (mRL) | Depth (m)     | Inclination | Grid in m (Influence) | Category |
|--------------|-----------------------|---------|-------------|---------------|-------------|-----------------------|----------|
|              | Northing              | Easting |             |               |             |                       |          |
| MBMR-1       | 1662590               | 671386  | 999.78      | 25.00         | 90°         | 60                    | G1       |
| MBMR-2       | 1662646               | 671272  | 963.61      | 25.00         | 90°         | 70                    | G1       |
| MBMR-3       | 1662478               | 671376  | 997.56      | 25.00         | 90°         | 60                    | G1       |
| MBMR-4       | 1662312               | 671142  | 1003.03     | 51.00         | 90°         | 60                    | G1       |
| MBMR-5       | 1662447               | 671521  | 1017.61     | 25.00         | 90°         | 90                    | G1       |
| MBMR-6       | 1662561               | 671315  | 959.08      | 25.00         | 90°         | 60                    | G1       |
| MBMR-7       | 1662359               | 671221  | 969.02      | 70.00         | 90°         | 60                    | G1       |
| MBMR-8       | 1662505               | 671246  | 936.46      | 87.00         | 90°         | 60                    | G1       |
| MBMR-9       | 1662749               | 671070  | 968.19      | 09.00         | 90°         | 85                    | G1       |
| MBMR-10      | 1662749               | 671413  | 912.00      | 78.00         | 90°         | 70                    | G1       |
| MBMR-11      | 1662391               | 670964  | 962.17      | 100.00        | 60°         | 110                   | G2       |
| MBMR-12      | 1662408               | 671159  | 974.09      | 50.00         | 90°         | 50                    | G1       |
| MBMR-13      | 1662519               | 671480  | 1015.63     | 31.00         | 60°         | 60                    | G1       |
| MBMR-14      | 1662696               | 671182  | 935.32      | 55.00         | 90°         | 80                    | G1       |
| MBMR-15      | 1662704               | 671289  | 940.85      | 35.00         | 60°         | 50                    | G1       |
| <b>TOTAL</b> |                       |         |             | <b>691.00</b> |             |                       |          |



Table- 10: Details of drilled boreholes-Core

| Borehole no. | Co-Ordinates (WGS-84) |         | Level (mRL) | Depth (m)     | Inclination |
|--------------|-----------------------|---------|-------------|---------------|-------------|
|              | Northing              | Easting |             |               |             |
| MBM-16       | 1662786               | 671303  | 913.03      | 58.60         | 90°         |
| MBM-17       | 1662393               | 671086  | 997.78      | 70.00         | 60°         |
| MBM-18       | 1662425               | 671299  | 946.13      | 40.90         | 90°         |
| MBM-19       | 1662589               | 671204  | 932.89      | 20.30         | 90°         |
| <b>TOTAL</b> |                       |         |             | <b>189.80</b> |             |



**iii) Details of samples analysis indicating type of sample (surface/sub-surface from pits / trenches /borehole etc)**

779 nos. of samples from 15 nos. of RC and 4 nos. of core boreholes with 61 check samples were analyzed for Fe, SiO<sub>2</sub>, and Al<sub>2</sub>O<sub>3</sub> % by XRF at MECL Lab., Utilities Complex, Nagpur. Average grade of 52.19% Fe, 9.74% SiO<sub>2</sub> and 6.85% Al<sub>2</sub>O<sub>3</sub> has been estimated for the total reserves/resources estimated.

**iv) Expenditure incurred in various prospecting operations:**

Cost of exploration (including survey etc) as per LOI of Govt of Karnataka is Rs. 28,916,848 /- (Annexure-1).

- f) **The surface plan of the lease area may be prepared on a scale of 1: 1000 or 1: 2000 with contour interval of maximum of 10m depending upon the topography and size of the area duly marked by grid lines showing all features indicated under Rule 28(1)(a) of MCDR 1988.**

Prepared and enclosed as Plate no-II a on a scale of 1:2000

- g) **For preparation of geological plan, surface plan prepared on a scale of 1: 1000 or 1: 2000 scale specified under para 1.0 (f) of Part A of the format may be taken as the base plan. The details of exploration already carried out along with supporting data for existence of mineral, locations of proposed exploration, various lithounits along with structural features, mineralized / ore zone with grade variation if any may be marked on the geological plan along with other features indicated under Rule 28 (1)(b) of MCDR 1988:**

Prepared and enclosed as Plate no-II b on a scale of 1:2000

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

Prepared and enclosed as Plate no-II c on a scale of 1:2000



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

Most of the area is exposed and MECL has carried out exploration. However to know the variation in grade and recovery, lessee proposes to drill 15 nos. of core bore holes to a total depth of 710m the first year of this plan period. Proposed boreholes detailed below and are marked in the Geological Plan.

Table-11: Proposed Bore Holes

| Borehole no. | Co-Ordinates (WGS-84) |         | Level (mRL) | Depth (m) | Inclination |
|--------------|-----------------------|---------|-------------|-----------|-------------|
|              | Northing              | Easting |             |           |             |
| PBH-1        | 1662337               | 671174  | 980         | 50        | 90°         |
| PBH-2        | 1662506               | 671292  | 943         | 50        | 90°         |
| PBH-3        | 1662462               | 671230  | 938         | 60        | 60°         |
| PBH-4        | 1662388               | 671124  | 982         | 50        | 60°         |
| PBH-5        | 1662656               | 671378  | 988         | 50        | 90°         |
| PBH-6        | 1662674               | 671319  | 967         | 70        | 90°         |
| PBH-7        | 1662612               | 671230  | 930         | 40        | 90°         |
| PBH-8        | 1662771               | 671361  | 915         | 60        | 60°         |
| PBH-9        | 1662650               | 671206  | 938         | 40        | 90°         |
| PBH-10       | 1662451               | 670925  | 952         | 30        | 90°         |
| PBH-11       | 1662432               | 670898  | 936         | 40        | 90°         |
| PBH-12       | 1662817               | 671347  | 890         | 50        | 90°         |
| PBH-13       | 1662770               | 671281  | 928         | 30        | 90°         |
| PBH-14       | 1662916               | 671301  | 840         | 50        | 90°         |
| PBH-15       | 1662881               | 671251  | 889         | 40        | 90°         |
| TOTAL        |                       |         |             | 710       |             |

- j) Reserves and Resources as per UNFC with respect to the threshold value notified by IBM may be furnished in a tabular form as given below: (Area explored under different level of exploration may be marked on the geological plan and UNFC code for area considered for different categories of reserve / resources estimation may also be marked on geological cross sections). Submit a feasibility/pre-feasibility study report along with financial analysis for economic viability of the deposit as specified under the UNFC field guidelines may be incorporated.

Detailed exploration has been carried out by MECL and estimation of reserves/resources were made by MECL by geological cross section method at threshold cutoff of 45% Fe. MECL have taken Dip continuity up to 50m on either side of the iron ore intersection of the borehole for G1 category, next 50 to 100m has been placed under G2 Category and beyond 100m has been placed



under G3 category of UNFC. In order to derive the true horizontal and vertical thicknesses, corrections were applied. Thus, for strike correction and dip correction, the factor of 1.154 and 0.86 have been applied respectively. Bulk density of 3.5 T/m<sup>3</sup> has been considered. A call factor of 10% reduction has been applied to arrive the net geological reserves.

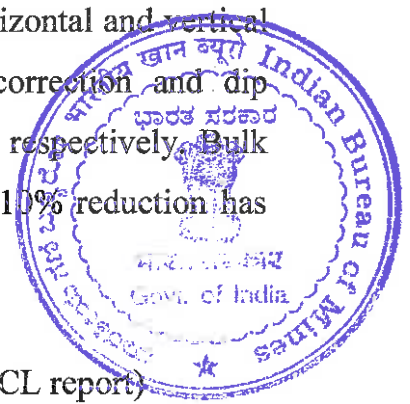


Table -12: Summary of Mineral Reserves / Resources (MECL report)

| Category                               | Qty in million T |
|----------------------------------------|------------------|
| G1                                     | 5.950            |
| G2                                     | 2.969            |
| G3                                     | 0.719            |
| Total in-situ reserves                 | 9.638            |
| Net geological reserves (90%)          | 8.674            |
| After application of correction factor | 7.577            |
| Average grade                          | 52.19 Fe %       |

Annexure-8 gives the detailed table showing estimation of reserves/resources.

However, resource/reserves were updated by cross sectional method considering the IBM threshold values (+45% Fe for Iron Ore, +35% Fe for Siliceous ore) based on the level of exploration conducted by MECL. Geological cross sections are prepared at 50 to 100m interval. Sectional areas are calculated, and these areas are multiplied by sectional influence to arrive at the volume of the individual lithology. This volume is multiplied by bulk density to calculate tonnages.

Proved Mineral Reserves (111) are estimated based on G1 level of exploration data (drilling- 50mx100m grid). Proved ore is considered up to the depth of ore intersection in individual boreholes. Actual ore exposure in working pits is also considered as proved ore limit at individual sections. No depth wise influence is considered for estimation of proved mineral reserves.

Probable Mineral Reserves (121) are estimated based on G2 level of exploration data (drilling more than 100m and less than 200m grid).

Some portion of the ore is not minable as it is blocked outside the pit limit along the lease boundary in 7.5m safety zone. These are classified as Feasibility Mineral Resources (211). Ore present up to 20-30m below the proved reserves based on the structure of the ore body and of exposed but unexplored mineralized zone is classified as Inferred mineral resources (333). Part of unexplored lease area devoid of mineral exposure is grouped under G4.

Table 13: Category wise area of Exploration

| Category | Area (Ha.) |
|----------|------------|
| G1       | 17.41      |
| G2       | 00.44      |
| G3       | 03.24      |
| G4       | 03.38      |
| Total    | 24.47      |

Although MECL has considered Bulk Density as 3.5 tons/cum which is high. However, a Bulk density of 3.0 tons/cum is considered for iron ore and for Siliceous ore, it is 2.8 tons/cum based on the experience in the sector. BD for waste is 2.0 tons/cum. Field testing of Bulk Density will be carried out after the execution of the mining lease since it is an auctioned mining lease area. After getting test results intimation will be submitted to IBM and necessary modification- if required- will be done. A recovery of 90% has been considered. Remaining 10% material which is intercalated waste will be separated during crushing/screening and sent for waste dumping.

- k) **Furnish detailed calculation of reserves/resources section wise (When the mine is fully mechanized, and deposit is of complex nature with variation of size, shape of mineralized zones, grade due to intrusion within ore zone etc, an attempt may be made to estimate reserves/resources by slice plan method). In case of deposits where underground mining is proposed, reserve/resources may be estimated by level plan method, as applicable, as per the proposed mining parameters**

Following tables give section wise details of calculation of reserves/resources as on June 2019.

Table-14: Proved Mineral Reserves (111)

| IRON ORE      |             |              |               |             |                    |                 | SILICEOUS IRON ORE |              |               |             |                    |                 |
|---------------|-------------|--------------|---------------|-------------|--------------------|-----------------|--------------------|--------------|---------------|-------------|--------------------|-----------------|
| Sec-<br>tions | Area<br>sqm | Influ<br>Mtr | Volume<br>Cum | BD<br>t/cum | Quantity<br>tonnes | Recovery<br>90% | Area<br>sqm        | Influ<br>Mtr | Volume<br>Cum | BD<br>t/cum | Quantity<br>tonnes | Recovery<br>90% |
| S2-S2'        | 5417        | 60           | 325020        | 3.0         | 975060             | 877554          | 738                | 60           | 44280         | 2.8         | 123984             | 111586          |
| S2a-S2a'      | 2916        | 50           | 145800        | 3.0         | 437400             | 393660          | 181                | 50           | 9050          | 2.8         | 25340              | 22806           |
| S3-S3'        | 2853        | 60           | 171180        | 3.0         | 513540             | 462186          | 1281               | 60           | 76860         | 2.8         | 215208             | 193687          |
| S4-S4'        | 3829        | 70           | 268030        | 3.0         | 804090             | 723681          | 0                  | 70           | 0             | 2.8         | 0                  | 0               |
| S4a-S4a'      | 2227        | 50           | 111350        | 3.0         | 334050             | 300645          | 0                  | 50           | 0             | 2.8         | 0                  | 0               |
| S5-S5'        | 1100        | 80           | 88000         | 3.0         | 264000             | 237600          | 0                  | 80           | 0             | 2.8         | 0                  | 0               |
|               |             |              | 1109380       |             | 3328140            | 2,995,326       |                    |              | 130190        |             | 364532             | 328,079         |





Table-15: PROBABLE MINERAL RESERVES (121)

| IRON ORE  |          |           |              |          |                 |               |
|-----------|----------|-----------|--------------|----------|-----------------|---------------|
| Sec-tions | Area sqm | Influ Mtr | Volume Cum   | BD t/cum | Quantity tonnes | Recovery 90%  |
| S4a-S4a'  | 600      | 50        | 30000        | 3.0      | 90000           | 81000         |
|           |          |           | <b>30000</b> |          | <b>90000</b>    | <b>81,000</b> |

Table-16: Feasibility Mineral Resources (211)

| IRON ORE  |          |           |            |          |                 |              | SILICEOUS IRON ORE |           |            |          |                 |              |
|-----------|----------|-----------|------------|----------|-----------------|--------------|--------------------|-----------|------------|----------|-----------------|--------------|
| Sec-tions | Area sqm | Influ Mtr | Volume Cum | BD t/cum | Quantity tonnes | Recovery 90% | Area sqm           | Influ Mtr | Volume Cum | BD t/cum | Quantity tonnes | Recovery 90% |
| S3-S3'    | 2530     | 60        | 151800     | 3.0      | 455400          | 409860       | 450                | 60        | 27000      | 2.8      | 75600           | 68040        |
| S4-S4'    | 2197     | 70        | 153790     | 3.0      | 461370          | 415233       | 0                  | 70        | 0          | 2.8      | 0               | 0            |
| S5-S5'    | 1247     | 80        | 99760      | 3.0      | 299280          | 269352       | 0                  | 80        | 0          | 2.8      | 0               | 0            |
|           |          |           | 405350     |          | 1216050         | 1,094,445    |                    |           | 27000      |          | 75600           | 68,040       |

Table-17: Inferred Mineral Resources (333)-Iron Ore

| Sec-tions | Area sqm | Influ Mtr | Volume Cum     | BD t/cum | Quantity tonnes | Recovery 90%     |
|-----------|----------|-----------|----------------|----------|-----------------|------------------|
| S2-S2'    | 2190     | 60        | 131400         | 3.0      | 394200          | 354780           |
| S2a-S2a'  | 4532     | 50        | 226600         | 3.0      | 679800          | 611820           |
| S4-S4'    | 3729     | 70        | 261030         | 3.0      | 783090          | 704781           |
| S4a-S4a'  | 3302     | 50        | 165100         | 3.0      | 495300          | 445770           |
| S5-S5'    | 150      | 80        | 12000          | 3.0      | 36000           | 32400            |
| S6-S6'    | 3386     | 80        | 270880         | 3.0      | 812640          | 731375           |
|           |          |           | <b>1067010</b> |          | <b>3201030</b>  | <b>2,880,927</b> |

## I) Mineral Reserves/Resources:

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

Table-18: Total resources as on June 2019

| Level of Exploration      | Iron Ore (million tonnes) |           |       | Grade Fe% |
|---------------------------|---------------------------|-----------|-------|-----------|
|                           | Normal                    | Siliceous | Total |           |
| G1 - Detailed exploration | 4.090                     | 0.396     | 4.486 | 52.19     |
| G2 - General Exploration  | 0.081                     | --        | 0.081 |           |
| G3 - Prospecting          | 2.881                     | --        | 2.881 |           |
| G4- Reconnaissance        | --                        | --        | --    |           |

Reserves and resources are arrived after applying results of feasibility and economic evaluation (P1 Annexure-12) based on the various factors such as:

- Open cast mining method, recovery factor as 90%
- Cutoff grade of +45% for normal ore/ +35% Fe for Siliceous ore and ultimate pit depth
- Mineral / ore blocked at lease boundary.



Table – 19: Resources and Reserves (As on June 2019)

| Category                     | UNFC    | Iron ore in tonnes |                         |           |              |
|------------------------------|---------|--------------------|-------------------------|-----------|--------------|
|                              |         | Normal<br>+45% Fe  | Siliceous<br>+35-45% Fe | Total     | Avg<br>Grade |
| A. Total Mineral Reserves    |         |                    |                         |           |              |
| Proved Mineral Reserves      | G1 -111 | 2,995,326          | 328,079                 | 3,323,405 | 52.19%       |
| Probable Mineral Reserves    | G2- 121 | 81,000             | -                       | 81,000    | Fe           |
| B. Total Remaining Resources |         |                    |                         |           |              |
| Feasibility Mineral Resource | G1-211  | 1,094,445          | 68,040                  | 1,162,485 |              |
| Prefeasibility Mineral       | G2-221  |                    |                         |           |              |
| Measured Mineral Resource    | G1- 331 |                    |                         |           |              |
| Indicated Mineral Resource   | G2- 332 |                    |                         |           |              |
| Inferred Mineral Resource    | G3- 333 | 2,880,927          | -                       | 2,880,927 |              |
| Total (A+B)                  |         | 7,051,698          | 396,119                 | 7,447,817 |              |

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



## 2. MINING – OPEN CAST MINING:

### A. OPEN CAST MINING:

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

**Existing:** The mining operations were earlier carried out by open cast, mechanized mining method and this will be continued. The mine had been worked by fully mechanized open cast method by deploying HEMM equipment i.e., Hydraulic shovel/Wheel loaders, Tippers, Drills, etc. Iron ore excavated was being hauled to the crushing and screening plant for processing. Hydraulic excavators were used for handling of waste and the waste was dumped in the designated area. Drilling / blasting was carried out with suitable spacing and burden.

Two pits have been worked in the mine - one on the centre (P-1) and other on the western side (P-2) of the ML area. The pit workings are found to be unsatisfactory and quite unsystematic. The bench heights and berm widths have not been maintained properly.

Table -20: Existing pit details

| Pit No. | Area (Dimensions)             | Top mRL | Bottom mRL | Bench Nos. | Avg. Height | Avg. Width | UTM Co-ordinates |         |
|---------|-------------------------------|---------|------------|------------|-------------|------------|------------------|---------|
|         |                               |         |            |            |             |            | Northing         | Easting |
| P1      | 9.57 Ha<br>(L 500m x B 180 m) | 935     | 1014       | 11         | 7m          | 7m         | 1662255          | 671010  |
|         |                               |         |            |            |             |            | 1662870          | 671409  |
| P2      | 0.53 Ha<br>(L 125m x B 45m)   | 917     | 972        | 7          | 7m          | 6m         | 1662332          | 670872  |
|         |                               |         |            |            |             |            | 1662475          | 670977  |

Encroachment of central pit outside the lease area has been observed. The encroachments of the mining pits are designated serially as EP-1, EP-2 & EP-3 of the pit P-1 encroached towards south, west-central and north respectively and EP-4 of the pit P-2, which accounts for a major portion of the pit. A total of 4 Inactive Dumps (IDs) comprising of OB material are in the ML area and are designated serially as ID-1 to 4. Apart from this, four ROM stocks are also present (MS-1 to 4). The details of the same are given below.



Table-21: Existing dump details

| Dump No. | Extent ha | Quantity (Tonnes) | Top mRL | Bottom mRL | UTM Co-ordinates |         |
|----------|-----------|-------------------|---------|------------|------------------|---------|
|          |           |                   |         |            | Northing         | Easting |
| ID 1     | 1.15      | 143640            | 990     | 884        | 1662200          | 670908  |
|          |           |                   |         |            | 1662253          | 671072  |
| ID 2     | 0.19      | 2520              | 970     | 933        | 1662253          | 670900  |
|          |           |                   |         |            | 1662419          | 670952  |
| ID 3     | 1.77      | 44150             | 1002    | 940        | 1662612          | 670974  |
|          |           |                   |         |            | 1662776          | 671200  |
| ID 4     | 0.22      | 1350              | 930     | 915        | 1662824          | 671146  |
|          |           |                   |         |            | 1662886          | 671262  |

Table-22: Existing ROM stock

| Dump No. | Extent ha | Quantity (Tonnes) | Top mRL | Bottom mRL | Avg Grade-Fe% | UTM Co-ordinates |         |
|----------|-----------|-------------------|---------|------------|---------------|------------------|---------|
|          |           |                   |         |            |               | Northing         | Easting |
| MS-1     | 0.96      | 41472             | 967     | 930        | 57.6          | 1662238          | 670930  |
|          |           |                   |         |            |               | 1662446          | 671057  |
| MS-2     | 0.26      | 18780             | 1003    | 974        | 59.2          | 1662280          | 671062  |
|          |           |                   |         |            |               | 1662395          | 671151  |
| MS-3     | 0.02      | 336               | 939     | 937        | 55.2          | 1662551          | 671202  |
|          |           |                   |         |            |               | 1662567          | 671220  |
| MS-4     | 0.03      | 1152              | 935     | 931        | 53.5          | 1662595          | 671202  |
|          |           |                   |         |            |               | 1662626          | 671226  |

**Proposed:**

Fully mechanized open cast method of mining by drilling and blasting and by deploying HEMM equipment like hydraulic excavators, wheel loaders, tippers, will be undertaken. To make optimum exploitation of the mineral deposit, the mine will be developed by making benches with a height and width of 7m and keeping the necessary berm width. The ROM excavated will be processed in the crushing and screening plants to obtain the lump and fine ore.

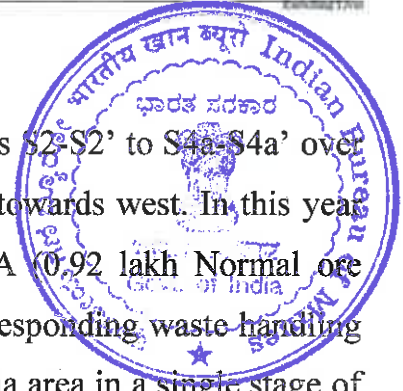
**b) Indicate year-wise tentative Excavation in Cubic Meters indicating development, ROM, pit wise as in table below.**

Production planning has been made in the P-1 pit only, within the proved limits. Proposed production quantity per annum will be 1.24 lakh tonnes of iron ore as per CEC approval. The details of excavation program is explained in next sections.



### ***Brief Description of year wise workings:***

**I Year :** In this year, mining will be between sections S2-S2' to S4a-S4a' over an area of 0.95 ha by making four benches pushing towards west. In this year the total production quantity will be 1.24 lakh TPA (0.92 lakh Normal ore +45% Fe + 0.32 lakh tons of Siliceous Ore) and corresponding waste handling will be 9,344 tonnes. Waste will be dumped in 0.11 ha area in a single stage of 10m.

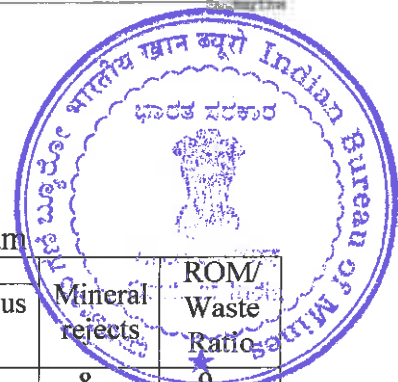


**II Year:** In this year also, mining will be between sections S2-S2' to S4a-S4a' over an area of 2.11 ha making six benches towards W. In this year the total production quantity will be 1.24 lakh TPA (0.94 L tons Normal Ore + 0.30 L tons Siliceous ore) and corresponding waste handling will be 9,636 tonnes. Waste will be dumped in 0.17 ha area over two stages of each 10m.

**III Year:** In this year also, mining will be between sections S2-S2' to S4a-S4a' over an area of 1.21 ha making seven benches. Benches will be moved in both E & W directions. In this year the total production quantity of +45% Fe grade Normal ore will be 1.24 lakh TPA and corresponding waste handling will be 9,182 tonnes. Waste will be dumped in 0.25 ha area over three stages of each 10m.

**IV Year:** In this year, mining will be between sections S2-S2' to S4-S4' over an area of 3.15 ha making five benches towards east. In this year the total production quantity of +45% Fe grade Normal ore will be 1.24 lakh TPA and corresponding waste handling will be 16,276 tonnes. Waste will be dumped in 0.50 ha area over four stages of each 10m.

**V Year:** In this year, mining will be in sections S2-S2', S2a-S2a' and S3-S3' over an area of 4.45 ha making nine benches towards east. In this year the total production quantity of +45% Fe grade Normal ore will be 1.24 lakh TPA and corresponding waste handling will be 92,036 tonnes. Waste will be dumped in 1.58 ha area over five stages of each 10m.



## I. Insitu Tentative Excavation

Table- 23: Year wise Production Program in Cum

| Year   | Pit no. | Total tentative Excavation | Top Soil | OB/SB /IB | ROM      |               | Mineral rejects | ROM/ Waste Ratio |
|--------|---------|----------------------------|----------|-----------|----------|---------------|-----------------|------------------|
|        |         |                            |          |           | Iron Ore | Siliceous Ore |                 |                  |
| 1      | 2       | 3                          | 4        | 5         | 6        | 7             | 8               | 9                |
| First  | 1       | 46,720                     | -        | 4,672     | 30,780   | 11,268        | -               | 1:0.11           |
| Second |         | 46,830                     | -        | 4,818     | 31,347   | 10,665        | -               | 1:0.11           |
| Third  |         | 45,910                     | -        | 4,591     | 41,319   | 0             | -               | 1:0.11           |
| Fourth |         | 49,430                     | -        | 8,138     | 41,292   | 0             | -               | 1:0.20           |
| Fifth  |         | 87,310                     | -        | 46,018    | 41,292   | 0             | -               | 1:1.11           |

Table- 24: Year wise Production Program in tonnes

| Year   | Pit no. | Total tentative Excavation | Top Soil | OB/SB /IB | ROM      |               | Mineral rejects | ROM/ Waste Ratio |
|--------|---------|----------------------------|----------|-----------|----------|---------------|-----------------|------------------|
|        |         |                            |          |           | Iron Ore | Siliceous Ore |                 |                  |
| 1      | 2       | 3                          | 4        | 5         | 6        | 7             | 8               | 9                |
| First  | 1       | 133,234                    | -        | 9,344     | 92,340   | 31,550        | -               | 1:0.08           |
| Second |         | 133,539                    | -        | 9,636     | 94,041   | 29,862        | -               | 1:0.08           |
| Third  |         | 133,139                    | -        | 9,182     | 123,957  | 0             | -               | 1:0.07           |
| Fourth |         | 140,152                    | -        | 16,276    | 123,876  | 0             | -               | 1:0.13           |
| Fifth  |         | 215,912                    | -        | 92,036    | 123,876  | 0             | -               | 1:0.74           |

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

No proposals of dump re-handling in this plan period.

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

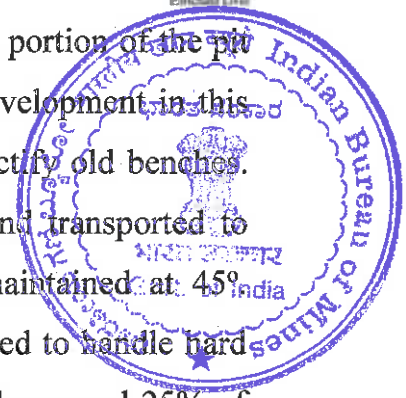
Year wise Production and Development plans and sections are enclosed in 1:2,000 scale (Plate III a to e).

- d) **Describe briefly giving salient features of the proposed method of working indicating Category of mine.**

Mining will be carried out in this plan period by fully mechanized (A-category) open cast mining method by making benches of 7m height and width of 7m.



Excavators will be used for progressing the benches. Central portion of the pit which is already exposed is proposed for production and development in this plan period. Systematic bench formation will be made to rectify old benches. The ore from the pits will be loaded into 16-ton tippers and transported to Crushing/Screening Plant. Overall bench slopes will be maintained at 45°. Drilling and blasting technique will be used whenever required to handle hard formation. Since ore deposit is soft to very soft in nature only around 25% of material needs blasting. Waste will be handled by excavators and transported to dump yard by using 16-tons capacity tippers.



### Extent of Mechanization:

The mine will be operated by mechanized method. Maximum quantity handled per annum will be 1.24 lakh tonnes of iron ore along with maximum waste of 0.71 lakh tons. Total max handling will be about 1.95 (~2.0) lakh TPA.

Hydraulic excavators will be used for progressing benches and for handling ore/waste material and tippers of 16tons capacity will be deployed for ore/waste transportation. Drilling and blasting technique will be used whenever required depending up on the hardness of formation.

Other activities like water supply for domestic use, water sprinkling, and afforestation will be carried out by water tankers. Jeeps will be deployed for movement of personnel/staff.

Table-25: List of mining machinery

| Type                     | Nos. | Size / Capacity | Make         | Motive Power |
|--------------------------|------|-----------------|--------------|--------------|
| Wagon drill / Compressor | 1    | 115mm           | Atlas Capsco | Diesel       |
| Excavator                | 2    | 0.9cum          | Tata Hitachi |              |
| Wheel Loader             | 1    | 1.0 cum         | HM           |              |
| Tipper                   | 5    | 16 tons         | Tata         |              |
| Jeep                     | 1    | 5 Seater        | Mahindra     |              |
| Water Tanker             | 2    | 8000 Ltrs       | Tata         |              |
| DG Set                   | 1    | 33KVA           | Kirloskar    |              |
| Crusher/Screening plants | 1    | 100 TPH         | Power screen |              |





### Adequacy of equipment:

One excavator of bucket capacity of 0.9cum will be deployed. It can handle about 160 tph. A typical hourly capacity of an excavator is calculated below.



Table -26

|                                                                                                  |                                |
|--------------------------------------------------------------------------------------------------|--------------------------------|
| Hourly capacity = $(3600 \times BC \times Sf \times Ff \times Tf \times n) / Ct$                 |                                |
| Where                                                                                            | BC = Bucket capacity = 0.9 cum |
|                                                                                                  | Sf = Swell factor = 0.8        |
|                                                                                                  | Ff = Fill factor = 0.9         |
|                                                                                                  | Tf = Tonnage Factor = 3        |
|                                                                                                  | n = Efficiency = 0.8           |
|                                                                                                  | Ct = Cycle time = 35 seconds   |
| Hence TPH = $(3600 \times 0.9 \times 0.8 \times 0.9 \times 3 \times 0.8) / 35 = 160 \text{ tph}$ |                                |

Considering 300 working days x 7 hrs/day;

Yearly handling by an excavator =  $160 \times 7 \times 300 = 3.36 \text{ lakh tons/annum.}$

Hence, an excavator is more than enough, as maximum proposed handling will be around 2.0 lakh TPA only. One will be standby.

Table -27: Tipper Requirement for transportation

| Production                       |            | Development                      |            |
|----------------------------------|------------|----------------------------------|------------|
| Production                       | 1.24 LTPA  | Development                      | 0.71 LTPA  |
| Working Days                     | 300        | Working Days                     | 300        |
| Production /Day                  | 413        | Development /Day                 | 237        |
| Effective working hours/day      | 7          | Effective working hours/day      | 7          |
| Production/hr                    | 59         | Production/Hr                    | 34         |
| Tipper Requirement               |            |                                  |            |
| Production-Lead                  | 0.5 Km     | Lead                             | 1 Km       |
| Speed                            | 20 Kmph    | Speed                            | 20 Kmph    |
| One Trip                         | 15 minutes | One Trip                         | 20 minutes |
| No. of Trips /hr                 | 4          | No of Trips/hr                   | 3          |
| Effective working hours/day      | 7          | Effective working hours/day      | 7          |
| Total Material to be handled     | 413 tpd    | Total Material to be handled     | 237 tpd    |
| No of trips /day (14 T)          | 30         | No of trips /day (14 T)          | 17         |
| No of Trips by one tipper /Shift | 28         | No of Trips by one tipper /Shift | 28         |
| No of Tippers Required           | 2          | No of Tippers Required           | 1          |

Proposed 5 nos. tippers are adequate as two will be standby. Wheel loader will be deployed for maintenance of dumps, feeding plants etc.

***Drilling/Blasting:***

About 50% material out of total ore handling of 2.0 lakh TPA will require blasting i.e. 1.0 lakh TPA as most of the lithology is soft.

Hence, maximum material to be blasted per day = 1.0 lakh tons/300 days  
= 333 tpd

Quantity broken/hole = Burden x Spacing x Depth x Avg. Bulk Density  
= 2.5 m x 3.0 m x 7m x 3.0 tons / m<sup>3</sup>  
= 157.5 tons/hole

Daily requirement of holes = 333/157.5 = 2.1 ( say 3)

Hence, for a daily requirement of drilling meterage of 14m (2 x 7=14m), one wagon drill will be enough as it can drill 50-60mtrs/shift which is adequate. However, Blasting will be carried out two to three times per month.

Bench height & width shall be maintained at 7m each for easy operation of machinery. So, holes of 7 to 8 m will be drilled with covering inclination and sub-grade drilling. Drill holes in development shall have a spacing and burden of 3m and 2.5m respectively. Charge per hole will be kept at around 30 kgs. Normally two rows of blasting pattern will be adopted to control the ground vibration, back break and noise pollution. Stemming of around 3m will be done to control the fly-rock generation. The maximum no. of holes kept in one blasting will be around 25-30. Use of MS delay detonators & cord relays will help in controlling the vibration and achieve better fragmentation.

Blast initiation in the hole will be done using Nonel BTH shock tube of 25Ms and 42Ms. The powder factor will be around 7 tonnes/kg. Hence the charge per hole will vary from 30kg to 40kg depending on the strata. Slurry explosives will be used for blasting.

The lessee will be getting a magazine after start of mine operation. Till such time, Explosive Contractors will be hired.

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

Mining is proposed in the North-Western portion of the lease area where ore is already exposed, by fully mechanized open cast mining method by forming benches of 7m height and width. Drilling/blasting will be deployed for hard formations.

During this plan period, the work progress will be between section S2-S2' to S4a-S4a'. Production proposals will be restricted to the area classified under proved reserves (111) category of UNFC. Overall pit slope will be maintained at 45° with horizontal. The slope of the benches will be around 80°. The approach roads for each bench will be made with enough width. In hard to medium hard zone drilling and blasting technique -whenever required- will be adopted. The topmost bench will be pushed back to facilitate the formation of benches properly. Ore zone is excavated and loaded by excavators into dumpers and transported to Crushing/Screening Plant for bifurcation of ROM into calibrated ore and fines. Dumpers are used for loading and dumping of ore / waste material. Loading will be carried out systematically and care will be taken to prevent spillage and dust generation. All loaded trucks will be covered by tarpaulins to avoid generation of dust during haulage. Other activities like water supply for domestic use, sprinkling and afforestation will be by water tankers.

Table-28: Details of workings

| Year   | Pit no. | Area Ha | Sections           | Advancement | No. of benches | Level mRL |        | UTM Co-ordinates |         |
|--------|---------|---------|--------------------|-------------|----------------|-----------|--------|------------------|---------|
|        |         |         |                    |             |                | Top       | Bottom | Northing         | Easting |
| First  | P-1     | 0.95    | S2-S2' to S4a-S4a' | West        | 4              | 970       | 942    | 1662357          | 671178  |
|        |         |         |                    |             |                |           |        | 1662655          | 671187  |
| Second |         | 1.21    | S2-S2' to S4a-S4a' | West        | 6              | 984       | 942    | 1662357          | 671163  |
|        |         |         |                    |             |                |           |        | 1662655          | 671187  |
| Third  |         | 2.11    | S2-S2' to S4a-S4a' | E & W       | 3              | 956       | 935    | 1662357          | 671163  |
|        |         |         |                    |             |                |           |        | 1662655          | 671317  |
| Fourth |         | 3.15    | S2-S2' to S4a-S4a' | East        | 5              | 963       | 928    | 1662357          | 671163  |
|        |         |         |                    |             |                |           |        | 1662655          | 671342  |
| Fifth  |         | 4.45    | S2-S2' to S4a-S4a' | East        | 9              | 984       | 928    | 1662357          | 671163  |
|        |         |         |                    |             |                |           |        | 1662655          | 671358  |



Waste will be dumped in the north western portion of the lease area over the existing dump by forming terraces. Tippers of 16 tons capacity will be used to transport the waste generated from mine pit to the dump yard. The waste generation will be about 1.364 lakh tonnes in this plan period and proposed dumping area of 2.16 ha is enough to accommodate this waste. This area is in anti-dip side (footwall) of the ore body, away from UPL and boreholes drilled has proved this as non-mineralized area.

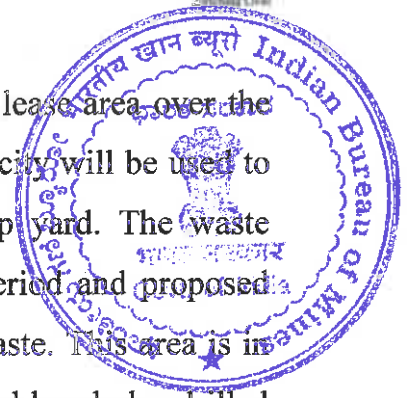


Table-29: Details of Waste Dumping

| Year   | Extent ha | Quantity tonnes | Top mRL | Bottom mRL | Stages Nos. | UTM Co-ordinates |         | Section line |
|--------|-----------|-----------------|---------|------------|-------------|------------------|---------|--------------|
|        |           |                 |         |            |             | Northing         | Easting |              |
| First  | 0.11      | 13766           | 942     | 936        | 1           | 1662670          | 671149  | S5-S5'       |
|        |           |                 |         |            |             | 1662117          | 671192  |              |
| Second | 0.17      | 14067           | 950     | 936        | 2           | 1662670          | 671137  | S5-S5'       |
|        |           |                 |         |            |             | 1662117          | 671192  |              |
| Third  | 0.25      | 13773           | 958     | 936        | 3           | 1662650          | 671100  | S5-S5'       |
|        |           |                 |         |            |             | 1662115          | 671192  |              |
| Fourth | 0.50      | 20864           | 972     | 936        | 4           | 1662626          | 671088  | S5-S5'       |
|        |           |                 |         |            |             | 1662121          | 671192  |              |
| Fifth  | 01.58     | 96624           | 986     | 936        | 5           | 1662618          | 670965  | S5-S5'       |
|        |           |                 |         |            |             | 1662172          | 671192  |              |

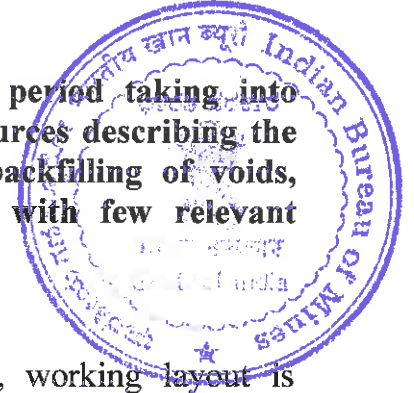
Table-30: UPL parameters

| Pit No. | Pit Area ha | Pit Dimension |           |                |       |
|---------|-------------|---------------|-----------|----------------|-------|
|         |             | Length (m)    | Width (m) | Avg. Depth (m) | Slope |
| P1      | 11.99       | 450           | 270       | 90             | 45°   |
| P2      | 01.35       | 135           | 100       | 60             | 45°   |

Location of proposed workings and dumping are shown in the year wise plans, plate III/a to e, and year wise sections are enclosed as Plate IIIc. Year wise calculation of bench wise and section wise Production and Development are given in Annexure-9.



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



Considering the current exploration data and geology, working layout is designed for the proposed production of 1.24 lakh TPA. Considering proved and probable mineral reserves of this lease area of about 3.323 million tonnes, the life of the mine will be 26.8 years. However, after the proposed exploration, the resources will be converted to minable reserves and the lease period may extend up to 50 years of lease grant period.

**Excavation:** Based on the establishment of proved category of reserves after exploration as on day, the mining area as well as ultimate pit limits is designed. In the lease about 13.34ha area mineralized. In this plan period about 9.89 ha will be used for excavation and 13.34ha in the conceptual period. About 14 nos. of benches will be made at the end of the conceptual period. Out of these, bottom most four benches will be backfilled with waste and afforestation will be carried out over this backfilling as well as remaining benches. The total pit of 13.34 ha area will be fenced in the post mining period. Kindly refer conceptual section S2-S2' in conceptual plan. Plate no. VI.

**Disposal of waste dumps:** The waste will be dumped in three locations (PPD, PD1, PD2) during life of mine including present mining plan period.

The PPD part of the dumping proposed in NW part of lease will be used for plan period dumping. The remaining area of this and another two areas PD1 and PD2 will be used for dumping in the conceptual stage. Total area marked for dumping in this plan period will be 4.80ha and during conceptual / life of the mine period is about 7.95 ha, which can hold around 0.70Mcum in total.





Dumping will be made in stages in retreating method from pit bottom by making terraces at every 10m height and by providing adequate engineering measures. Berms will be provided at the toe of each terrace to avoid water flow over the dump slopes. (Refer: conceptual plan plate no. VI).

In PPD, an area of 1.86 Ha will be used in plan period and remaining 0.47ha of this dumping area will be used for conceptual dumping. The total spread of the dump will be around 18500 sqm. (260m length x 71m width). The capacity of this dumping area is about 0.094 M cum. Dumping will be in 5 stages of each 10m height. This dump will be covered with coir matting and plantation after maturity.

Another dumping area, PD1 of 2.72 ha is located at SE part of the lease area. The capacity of this waste dump is about 0.346 M cum. There will be three terraces of dumping with 10m height in each stage. The total spread of the dump in this part will be around 19900 sqm. (240m length x 83m width). Protection measures like retention wall, garland drains will be provided before commencement of dumping. After maturity this dump will be stabilized with coir mat and suitable afforestation.

The third proposed dump PD2 is located at SW part of the lease area. In conceptual stage 5 to 9 stages of dumping with 10m height in each terrace will be made. The capacity of this dump will be about 0.254 Mcum. The spread of the dump will be around 25200sqm. (170m length x 148m width). Post mining, part of this dump will be used/rehandled for backfilling of worked out pit and remaining part will be stabilized suitably with coir mat and afforestation.

*(Please refer conceptual sections S2-S2' and S2a-S2a', Plate no. VI)*

**Sub grade ore:** No separate sub grade ore dump will be there during mining. The generated sub grade ore will be blended with high grade and transported.

**Backfilling of voids:** As on day there is no backfilling program. During post mining period some quantity of waste dumps will re-handled and backfilled in the workout pit and plantation will be done above that.





### Reclamation and Rehabilitation:

The most of reclamation part of work will be carried out in first five years of plan period. In the remaining period of life of mine all structures and measures will be maintained properly. For protection of the mining area and to prevent further degradation of land and stabilization of dumps, the following measures are proposed inside lease area as per ICFRE report and these will be implemented in this plan period of five years. The details of implementation schedule of mitigation/Engineering Measures, Engineering measures for the management of waste dumps, Erosion control measures for the waste dumps, Water surface Management plan, Afforestation, Green belt development et., are discussed in the next chapter i.e., in Progressive Mine closure plan.

**Land Use Pattern:** Existing land use as well as proposed for this plan period and in conceptual stage is given below: (Ref: Conceptual plan plate no.VI)

Table-31: Land Use in Ha

| Type               | Existing     | Plan period  | Conceptual period | Post mining activity                          |
|--------------------|--------------|--------------|-------------------|-----------------------------------------------|
| Mining             | 09.89        | 09.89        | 13.34             | Fencing, partially backfilling, afforestation |
| Dumping            | 04.80        | 04.80        | 07.95             | Afforestation                                 |
| Statutory building | 00.05        | 00.10        | 00.10             | Monitoring                                    |
| Mineral stock      | 00.50        | 00.50        | -                 | -                                             |
| Road               | 00.40        | 00.40        | 00.40             | Maintenance, Monitoring                       |
| Safety zone area   | 02.68        | 02.68        | 02.68             | Afforestation                                 |
| Untouched area     | 06.15        | 06.10        | -                 | -                                             |
| <b>Total</b>       | <b>24.47</b> | <b>24.47</b> | <b>24.47</b>      |                                               |

### B. UNDERGROUND MINING:

Not applicable



### 3.0 MINE DRAINAGE:

- a. **Minimum and Maximum depth of water table based on observations from nearby wells and water bodies:**

The water table in the vicinity is about 20-30m below the general ground level of around level of 700mRL.

- b. **Indicate maximum and minimum depth of workings:**

The mining activity will be concentrated on the elevated portions of the hill range. The RL of minimum depth of workings will be 960 mRL and maximum depth of workings will be around 870 mRL.

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

There is no chance of encountering ground water during mining as the lowest level in mining will be well above general ground level. Only rain water drains off from the plateau towards eastern side and goes in to the valleys.

- d. **Describe regional and local drainage pattern. Also indicate annual rain fall, catchments area, and likely quantity of rain water to flow through the lease area, arrangement for arresting solid wash off etc.**

Average annual rainfall in area is around 750mm. Whole lease area of 24.47 ha is catchment area for rainfall, hence the likely quantity of rain water that will be flowing through the lease area will be 1.835 lakh cum ( $0.75\text{m} \times 24.47 \times 10,000$ ). However, for protection of the mining area and for arresting solid wash-off the Surface water management measures have been proposed to implement in the R & R report, they are already discussed in above chapters.



#### 4.0 STACKING OF MINERAL REJECTS AND DISPOSAL OF WASTE:

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

The waste rock consists of ferruginous shale/phyllite, limonitic clay/lateritic clay and BHQ. No topsoil is expected as mining is proposed in existing workings in this plan period. The physical characteristics of wastes are;

**Ferruginous Shale/phyllite:** This is mainly friable material with light yellowish to red in colour having fine grains.

**Limonitic clay/lateritic clay:** This is mainly friable material with yellowish to red in colour having fine grains.

**BHQ:** It is hard and compact layered rock formation with colour ranging from grey to black.

No mineral rejects generation as all +35% Fe material produced in this plan period is ROM.

Table -32: Year wise quantity in tonnes of Waste and others

| Year   | Topsoil           |         | Waste       |         | Mineral rejects |         |               |
|--------|-------------------|---------|-------------|---------|-----------------|---------|---------------|
|        | Reuse / Spreading | Storage | Backfilling | Storage | Blending        | Storage | Beneficiation |
| First  | -                 | -       | -           | 9,344   | -               | -       | -             |
| Second | -                 | -       | -           | 9,636   | -               | -       | -             |
| Third  | -                 | -       | -           | 9,182   | -               | -       | -             |
| Fourth | -                 | -       | -           | 16,276  | -               | -       | -             |
| Fifth  | -                 | -       | -           | 92,036  | -               | -       | -             |

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

Waste will be dumped in the north western portion of the lease area over the existing dump by forming terraces. This area is in anti-dip side (footwall) of the ore body, away from UPL and boreholes drilled here have proved this as non-mineralized area. BH no. MBMR-14 drilled on section line S5-S5' has proved negative as it was drilled up to 55m meters. In this BH, initially upto 9m hard



BHQ is present having the average grade of 30.62% Fe and from 9m to 22m, an iron ore is present with intercalation of siliceous ore layers. Below this, from 22m to till the end (55m) only siliceous ore with intercalated bands of BHQ present with an average grade of 37.04% Fe. Hence, at present this zone cannot be worked out economically, hence shown away from the UPL. Further BHQ out crops of less than 35% Fe are present in the proposed dumping area. In section line 5-5' and 6-6' old waste dump is already present. Hence, dumping will be done over this existing dump in this plan period. After completion of proposed exploration, the plan will be modified-if necessary.

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

Waste will be dumped systematically by terracing with average height of 10m with reverse slopes. No sub grade generation will be in this plan period.

**Table-33: Details of Waste Dumping**

| Year   | Extent ha | Quantity tonnes | Top mRL | Bottom mRL | Stages Nos. | UTM Co-ordinates |         |
|--------|-----------|-----------------|---------|------------|-------------|------------------|---------|
|        |           |                 |         |            |             | Northing         | Easting |
| First  | 0.11      | 13766           | 942     | 936        | 1           | 1662670          | 671149  |
|        |           |                 |         |            |             | 1662117          | 671192  |
| Second | 0.17      | 14067           | 950     | 936        | 2           | 1662670          | 671137  |
|        |           |                 |         |            |             | 1662117          | 671192  |
| Third  | 0.25      | 13773           | 958     | 936        | 3           | 1662650          | 671100  |
|        |           |                 |         |            |             | 1662115          | 671192  |
| Fourth | 0.50      | 20864           | 972     | 936        | 4           | 1662626          | 671088  |
|        |           |                 |         |            |             | 1662121          | 671192  |
| Fifth  | 01.58     | 96624           | 986     | 936        | 5           | 1662618          | 670965  |
|        |           |                 |         |            |             | 1662172          | 671192  |

**Table -34: Engineering measures for proposed dumping**

| Items                                 | Particulars of works                                            | Dimension in m |       |        |        |
|---------------------------------------|-----------------------------------------------------------------|----------------|-------|--------|--------|
|                                       |                                                                 | Length         | Width |        | Height |
|                                       |                                                                 |                | Top   | Bottom |        |
| TW-8: Toe Wall at the toe of the dump | Foundation in hard soil mixed with boulders including hard rock | 655.00         | 3.15  |        | 0.60   |
|                                       | Plain cement concrete (1:4:8) in foundation                     | 655.00         | 3.15  |        | 0.15   |
|                                       | RR Stone masonry Dry                                            | 655.00         | 1.00  | 3.00   | 2.00   |
| GD-8                                  | Garland drain below the toe wall                                | 663.00         | 2.00  | 1.00   | 1.00   |



## 5.0 USE OF MINERAL:

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

Since this mine is a captive mine, entire production will be utilized as raw material by KFIL plant.

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

No involvement of any intermediate industries before its end use.

- c) Give detail requirements for other industries, captive consumption, export, associated industrial use etc.

No such use is envisaged as all ROM is expected to be consumed directly in the plant of KFIL.

- d) Indicate precise physical and chemical specification stipulated by buyers:

Table – 35:

| Category       | Grade   | Size in mm |
|----------------|---------|------------|
| Calibrated ore | +45 Fe% | +10 -30/40 |
| Fines          | +45 Fe% | -10mm      |

- e) Give details of processes adopted to upgrade the ROM to suit the user requirements:

No upgradation. Only dry processing of ROM by mobile crushing and screening plant into different sizes like -10mm & +10-30/40mm calibrated ore.



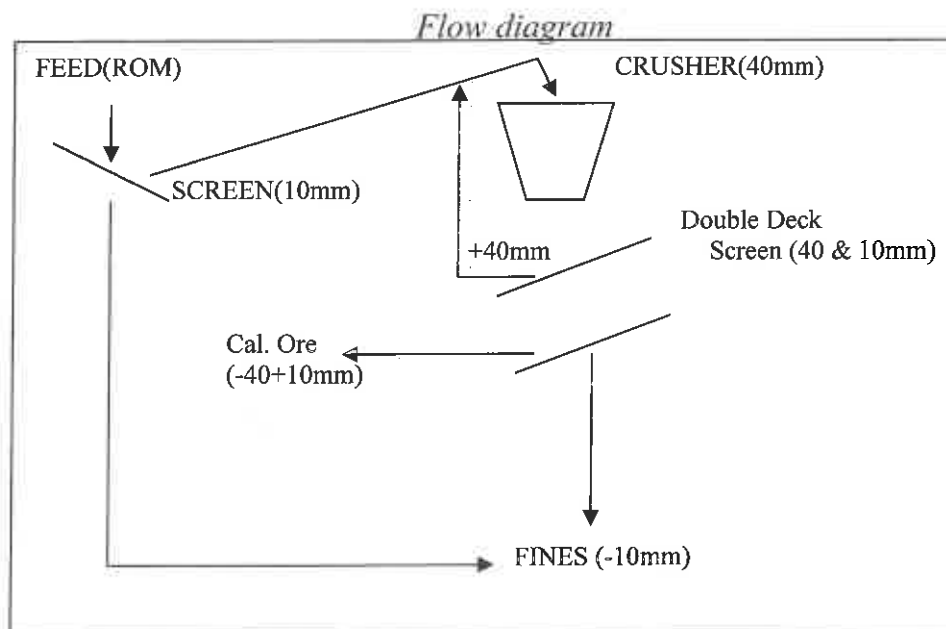
## 6.0 PROCESSING OF ROM AND MINERAL REJECT:

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

No wet mineral processing, only dry crushing and screening of iron ore for size separation of ore as per plant's requirement. A mobile Crushing (jaw crusher) and Screening Plant of 100ph will be deployed.

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

In the plants, the ROM of Iron ore shall be separated first into  $-10\text{mm}$  and  $+10\text{mm}$  material by screening.  $+10\text{mm}$  will be crushed in the crusher, set to crush at  $40\text{mm}$ . The crushed material will be screened on  $40\text{mm}$  and  $10\text{mm}$  screens and material of  $-40\text{mm}+10\text{mm}$  and  $-10\text{mm}$  will be sent to plant as Calibrated Ore and Fines respectively. The lumps if required are crushed to  $-40\text{mm}$  size and then screened.







The likely material balance of this processing of ROM will be as follows.

Table -36:

| Description        | Rate    |
|--------------------|---------|
| Feed (ROM)         | 100 tph |
| Cal. Ore(-40+10mm) | 30 tph  |
| Fines (-10mm)      | 70 tph  |



- c) **Explain the disposal method for tailings or reject from the processing plant.**

No rejects are generated.

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

No rejects are generated.

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

No processing plant is proposed.

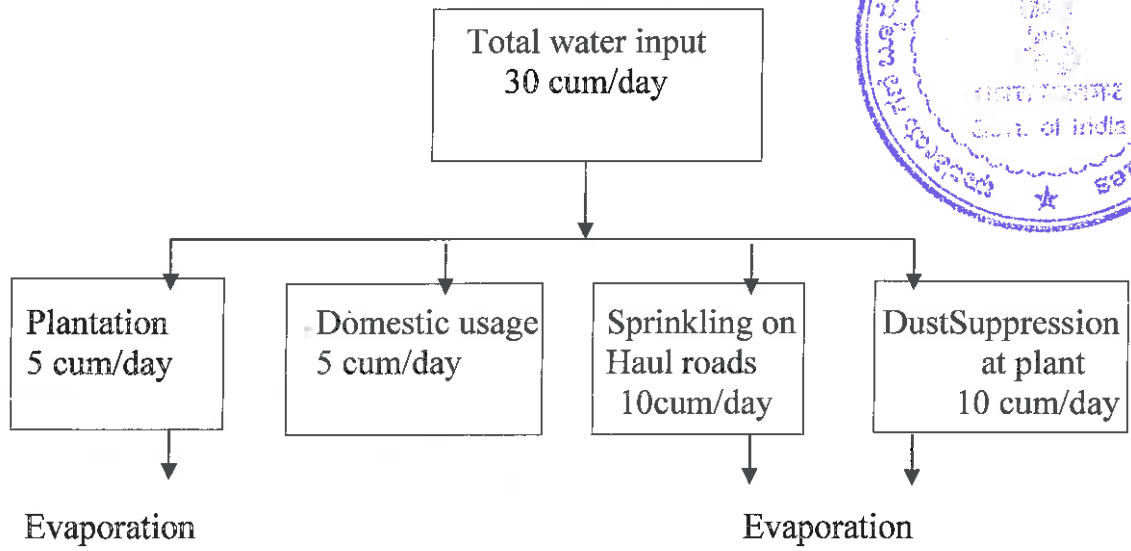
- f) **Specify quantity and type of chemicals to be stored on site / plant.**

Not applicable.

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

No water is required for processing except dust suppression. Other usages of water in the mine will be for dust suppression, afforestation and domestic use.

Water is sourced from bore wells located in the nearby village of Ranjitpur.

**Water Balance Chart**



## 7.0 OTHERS:

### a) Site Services & Infrastructure:

All the required infrastructural facilities like office, resting area, canteen, water facilities etc will be set up inside lease area. Sandur-Narayanapura village road is passing at the NE side of the lease at a km away. Water for drinking and domestic purposes will be sourced from the Borewell from the nearby area. Ranjitpura (2km) is the nearest railway station and Marmugoa is the nearest port (400km). Donimalai township (3km) is having all facilities like Police outpost, Hospital, Post Office, School, Workshops etc.

### b) Employment potential:

Table – 37: Details of Employment

| Category       | Nos.      |
|----------------|-----------|
| Highly Skilled | 3         |
| Skilled        | 14        |
| Semi-Skilled   | 4         |
| <b>Total</b>   | <b>21</b> |

| Sl. No            | Description     | Nos. | Sl. No | Description | Nos. |
|-------------------|-----------------|------|--------|-------------|------|
| 1                 | Mine Manager    | 1    | 6      | Mechanic    | 1    |
| 2                 | Mining Engineer | 1    | 7      | Supervisors | 4    |
| 3                 | Geologist       | 1    | 8      | Drivers     | 5    |
| 4                 | Foremen         | 1    | 9      | Operators   | 2    |
| 5                 | Mining Mate     | 1    | 10     | Helpers     | 4    |
| <b>Total - 21</b> |                 |      |        |             |      |



## 8.0 PROGRESSIVE MINE CLOSURE PLAN UNDER RULE 23 OF MCDR'1988

### 8.1 Environment Base line information:

Table-38: Existing land use

| Type               | Area-Ha      |
|--------------------|--------------|
| Mining             | 09.89        |
| Dumping            | 04.80        |
| Statutory building | 00.05        |
| Mineral stock      | 00.50        |
| Road               | 00.40        |
| Safety zone area   | 02.68        |
| Untouched area     | 06.15        |
| <b>Total</b>       | <b>24.47</b> |



#### *Water Regime:*

No perennial rivers/nallahs or springs present in the area. Only some *nallahs* are present culminating into small tanks and ponds. Most of the water is sourced from Ground water resources only. Water table is about 20-30m below the general ground level and the chance of encountering the same during mining on the hill ridge is nil.

#### *Quality of air:*

*And*

#### *Ambient noise level:*

The mine is not operating since 2011 and this lease has been awarded to KFIL Ltd through auction. Once the mine operation begins, lessee will conduct environmental monitoring and all data will be submitted IBM regularly.

#### *Flora:*

The mining area has some vegetation with small trees along with shrubs and bushes. The major species of flora in the mining area are;



*Acacia catechu, Acacia chundra, Ailanthus, Annona, Azadirachta indica, Buchanania lanzan, Dolichandrone atrovirens, Cassia fistula, Chloroxylon swietenia, Diospyros melanoxylon, Garuga pinnata, Hardwickia ercul, Holarrhena pubescens, Ixora pavetta, Lagerstroemia parviflora, Lannea coromandelica, Mitragyna parvifolia, Morinda pubescens, Polyalthia cerasoides, Santalam album, Soyimida febrifuga etc.*

*Dominant grass specie occurring in the mine lease area and surroundings are Aristida adscensionis, Aristida setacea, Dactyloctenium aegyptium Cymbopogon martini and Heteropogon contortus. (Source: R&R- ICFRE)*

**Fauna:** Some important species of mammals, reptiles and birds are;

- i) *Mammals: Antelope cervicarpa, Panthera pardus, Manis crassicaudata; Macaca radiate, Semnopithecus entellus, Felis chaus, Viverricula indica; Muntiacus muntjak, Sus scrofa.*
- ii) *Reptiles: Ptyas mucosa, Daboia russelii, Naja naja, Xenochrophis piscator, Geochelone elegans, Varanus bengalensis and other Psammophilus dorsalis, Chamaeleo zeylanicus.*
- iii) *Birds: Pavo cristatus, Ciracias benghalensis, Megalaima haemacephala, Megalaima zeylanica, Alcedo, Perdicula aegoondab, Coturnix coromandelica, Centropus sinensis, Halcyon smyrnensis, Eudynamys scolopacea, Merops orientalis, etc. (Source: R&R report of ICFRE)*

### **Climatic conditions:**

The area enjoys tropical climate with an annual average rainfall of about 750mm. Maximum temperature in summer days is around 40° C, and minimum temperature during winter nights records between 12 – 18° C. Humidity varies between 25 to 85%.



### Human Settlement:

No human settlement exists inside mining area. There are about 16 villages situated within the buffer zone, with total population of 38,196 as per the census data.



Table -39 : Population Details

| SI No. | VILLAGE            | House Holds | Total Population | Distance km |
|--------|--------------------|-------------|------------------|-------------|
| 1      | Lakshmipura        | 288         | 1316             | 7.1         |
| 2      | Somalapur          | 51          | 300              | 8.5         |
| 3      | Yeswanthanagar     | 954         | 5157             | 9.7         |
| 4      | Dowlatpur          | 358         | 2178             | 7.7         |
| 5      | Krishnanagar       | 693         | 4160             | 8.0         |
| 6      | Muraripur          | 136         | 1138             | 10.0        |
| 7      | Taranagar          | 976         | 5377             | 9.9         |
| 8      | Bhujanganagar      | 867         | 4672             | 6.5         |
| 9      | Ranjitpur          | 141         | 874              | 2.4         |
| 10     | Vittalnagar        | 143         | 833              | 4.6         |
| 11     | Deogiri            | 615         | 3224             | 4.3         |
| 12     | Nandihalli         | 89          | 460              | 2.0         |
| 13     | Ubbalagundi        | 240         | 1280             | 8.3         |
| 14     | Donimalai Township | 1507        | 6554             | 3.0         |
|        | <b>TOTAL</b>       | <b>7058</b> | <b>37523</b>     | <b>--</b>   |

### Public buildings, Places of worship & Monuments:

There is no public building or monuments within the lease area.

### Any Sanctuary located in the vicinity of leasehold:

There is no sanctuary located near the lease area.

## 8.2 Impact Assessment:

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

Due to the mining activity, there will be change in ground profile, due to pits, dumps and other allied activities. The land use likely to be degraded in this mining lease is given below:





Table-40: Land Use

| Type               | Existing     | Plan period  | Conceptual period | Post mining activity                          |
|--------------------|--------------|--------------|-------------------|-----------------------------------------------|
| Mining             | 09.89        | 09.89        | 13.34             | Fencing, partially backfilling, afforestation |
| Dumping            | 04.80        | 04.80        | 07.95             | Afforestation                                 |
| Statutory building | 00.05        | 00.10        | 00.10             | Monitoring                                    |
| Mineral stock      | 00.50        | 00.50        | -                 |                                               |
| Road               | 00.40        | 00.40        | 00.40             | Maintenance, Monitoring                       |
| Safety zone area   | 02.68        | 02.68        | 02.68             | Afforestation                                 |
| Untouched area     | 06.15        | 06.10        | -                 |                                               |
| <b>Total</b>       | <b>24.47</b> | <b>24.47</b> | <b>24.47</b>      |                                               |

The mining pits are present in the lease area serving as production benches. The major impacts observed include soil erosion, loss of topsoil, creation of pits and deforestation and possibility of adding silt load in the natural nallah nearby the lease area.

**ii) Air quality:**

The semi arid climatic condition of the area coupled with mining activities on the top of the hills through open-cast, contributes to air pollution. The dust is observed to be the predominant air pollutant when the mining is in operation.

**iii) Water quality:**

The major impact on water pollution is due to erosion of waste dump and sub-grade dump, oil and grease, contamination of water bodies due to discharge of mine water/effluent and sedimentation of the seasonal nallahs flowing nearby.

**iv) Noise levels:**

Noise pollution by mining activities is mainly because of excavation, handling and transportation of ore and overburden and operation of processing equipment.

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

Very little drilling and blasting activities are proposed and hence no major impact from drilling / blasting.

**vi) Water regime:**

There is no seepage water and there is no water table in the vicinity as the lowest level in mining will be well above the ground level. Monsoon water gets drained through seasonal nallahs joins nearby tank.

**vii) Acid mine drainage:**

Not applicable as no acidic material is present in the mining area.

**viii) Surface subsidence:**

Not applicable as it is opencast mining in a stable area.

**vii) Socio-economics:**

The mining will bring positive effect by way of generation of employment and business opportunities to local people. Apart from this lessee will undertake CSR activities focusing on measures to improve education, health, literacy of the people of surrounding villages.

**viii) Historical monuments etc.**

There are no public buildings, places of worship or monuments are located near the lease area.

**Mitigative measures:**

**Air:** It is proposed to deploy Water Tankers to suppress the dust by regular water spraying on all the roads used for haulage and around Crushing Screening Plant. Plantation will be carried out as green belt all along the lease boundary which act as wind breaks.

**Water:** For protection of the mining area and for arresting solid wash-off the surface water management measures will be implemented as proposed in the R&R report.



**Noise:** The management plan for controlling noise pollution are providing noise insulation/padding in plants and machinery wherever practicable, limiting of speed of haulage vehicles/tippers, proper maintenance of noise generating parts of the machine, provision of earmuffs to workers as a measure to protect their ears etc.



### **8.3 Progressive Reclamation Plan:**

#### **8.3.1 Mined-out land:**

No proposal of backfilling as no mining area will be exhausted in this plan period. However, for protection of the mining area and to prevent further degradation of land and stabilization of dumps, the following measures are proposed.

#### **8.3.2 Topsoil Management:**

No topsoil is expected as proposed mining area is within the worked-out pits. However, if any topsoil is encountered it will be used for plantation.

#### **8.3.3 Tailing Dam Management:**

No proposals as no tailing dam is present or proposed.

#### **8.3.4 Acid mine drainage, if any and its mitigative measures:**

Not applicable as no acidic material is present in the mining area.

#### **8.3.5 Surface subsidence mitigation measures:**

Not applicable as the proposal is for opencast mining in a stable area.



Table-41: Summary of year wise proposal for item No. 8.3

| Items                                         | Details                                       | Actual Position<br>(as on Apr-19)                                                          | First    | Second   | Third    | Fourth   | Fifth    | Remarks               |
|-----------------------------------------------|-----------------------------------------------|--------------------------------------------------------------------------------------------|----------|----------|----------|----------|----------|-----------------------|
| Dump management                               | Area afforested (ha)                          | -                                                                                          | -        | -        | -        | -        | -        | -                     |
|                                               | No. of saplings planted                       | -                                                                                          | -        | -        | -        | -        | -        | -                     |
|                                               | Cumulative no. of plants                      | -                                                                                          | -        | -        | -        | -        | -        | -                     |
|                                               | Cost including watch and care during the year | -                                                                                          | -        | -        | -        | -        | -        | -                     |
| Management of worked out benches              | Area available for rehabilitation(ha)         | --                                                                                         | -        | -        | -        | -        | -        | -                     |
|                                               | Afforestation done (ha)                       | --                                                                                         | -        | -        | -        | -        | -        | -                     |
|                                               | No of saplings planted                        | --                                                                                         | -        | -        | -        | -        | -        | -                     |
|                                               | Cumulative no of plants                       | --                                                                                         | -        | -        | -        | -        | -        | -                     |
|                                               | Any other method of rehabilitation (specify)  | --                                                                                         | -        | -        | -        | -        | -        | -                     |
| Reclamation and Rehabilitation by backfilling | Cost including watch and care during the year | --                                                                                         | -        | -        | -        | -        | -        | -                     |
|                                               | Void available for Backfilling – in ha        | --                                                                                         | -        | -        | -        | -        | -        | -                     |
|                                               | Void filled by waste /tailings(Area in Ha)    | -                                                                                          | -        | -        | -        | -        | --       | -                     |
|                                               | Afforestation on the backfilled area          | --                                                                                         | -        | -        | -        | -        | -        | -                     |
|                                               | Rehabilitation by making water reservoir      | --                                                                                         | -        | -        | -        | -        | -        | -                     |
| Rehabilitation of waste land within lease     | Any other means(specify)                      | --                                                                                         | -        | -        | -        | -        | -        | -                     |
|                                               | Area available (ha)                           | --                                                                                         | -        | -        | -        | -        | -        | -                     |
|                                               | Area rehabilitated                            | --                                                                                         | -        | -        | -        | -        | -        | -                     |
| Others (specify)                              | Method of rehabilitation                      | --                                                                                         | -        | -        | -        | -        | -        | -                     |
|                                               | Greenbelt plantation*                         | --                                                                                         | 0.536 ha | 0.536 ha | 0.536 ha | 0.536 ha | 0.536 ha | 1340 plants each year |
|                                               | Reclamation & rehabilitation measures         | R&R measures as given in next pages will be carried out                                    |          |          |          |          |          | -                     |
|                                               | Env. monitoring                               | Will be carried out as per guidelines, details of proposed monitoring program given below. |          |          |          |          |          |                       |

- Plantation details are given in next pages in separate table no. 45.

Table-42: Proposed Env. Monitoring Program-Core Zone (As per the standard CFE guidelines)

| Type                      | Location       | Frequency                        |
|---------------------------|----------------|----------------------------------|
| Ambient Air Quality (AAQ) | Mine head      | Twice in a week at each location |
|                           | Crushing Plant |                                  |
|                           | Haul Road      |                                  |
|                           | Dump Area      |                                  |
| Noise Monitoring          | Mine head      | Once in a Month at each location |
|                           | Crushing Plant |                                  |
| Soil sampling             | Mine site      | Once in three months             |



Table-43: Proposed Env. Monitoring Program-Buffer Zone (As per the standard CFE guidelines)

| Type                      | Location                 | Frequency                        |
|---------------------------|--------------------------|----------------------------------|
| Ambient Air Quality (AAQ) | Ranjithpur               | Twice in a week at each location |
|                           | Sandur                   |                                  |
|                           | Swamihalli               |                                  |
|                           | Ubbalagandi              |                                  |
| Noise Monitoring          | Nandihalli               | Once in a Month at each location |
|                           | Swamihalli               |                                  |
|                           | Devgeri                  |                                  |
|                           | Navalahatti              |                                  |
|                           | Ubbalagandi              |                                  |
|                           | Ranjithpur               |                                  |
|                           | Bhujaganagar             |                                  |
|                           | Sandur                   |                                  |
| Soil Sampling             | Ubbalagandi              | Once in three months             |
|                           | Bhujaganagar             |                                  |
|                           | Swamihalli               |                                  |
| Water                     | Narihalla Back water     | Once in three months             |
|                           | Harishankar spring water |                                  |
|                           | BMM camp Tubewell        |                                  |
|                           | Bujaganagar Tubewell     |                                  |
|                           | Swamihalli Tubewell      |                                  |



#### Dump management:

The proposed dumping area located towards NE side of the mine pit and is in continuation of existing waste dump (ID-3). Waste dumping made to a maximum height of 45 m in retreating method from pit bottom to top by providing terraces at every 10 m height and 8 m width by providing adequate engineering measures. Berms will be provided at the toe of each terrace to avoid water flow over the dump slopes.

Table -44: Engineering measures for Proposed Dumping

| No.                  | Items                                 | Particulars of works                                            | Dimension in m |       |        |        |
|----------------------|---------------------------------------|-----------------------------------------------------------------|----------------|-------|--------|--------|
|                      |                                       |                                                                 | Length         | Width |        | Height |
|                      |                                       |                                                                 |                | Top   | Bottom |        |
| Proposed dumping PBF | TW-8: Toe Wall at the toe of the dump | Foundation in hard soil mixed with boulders including hard rock | 655.00         | 3.15  |        | 0.60   |
|                      |                                       | Plain cement concrete (1:4:8) in foundation                     | 655.00         | 3.15  |        | 0.15   |
|                      |                                       | RR Stone masonry - Dry                                          | 655.00         | 1.00  | 3.00   | 2.00   |
|                      | GD-8                                  | Garland drain below the toe wall                                | 663.00         | 2.00  | 1.00   | 1.00   |

Table-45: Engineering Measures for Existing dumps

| No.   | Items                                   | Particulars of works                                            | Dimension in m |       |        |        |
|-------|-----------------------------------------|-----------------------------------------------------------------|----------------|-------|--------|--------|
|       |                                         |                                                                 | Length         | Width |        | Height |
|       |                                         |                                                                 |                | Top   | Bottom |        |
| EID-1 | TW-1: Toe Wall at the toe of the dump   | Foundation in hard soil mixed with boulders including hard rock | 186.00         | 2.15  |        | 0.60   |
|       |                                         | Plain cement concrete (1:4:8) in foundation                     | 186.00         | 2.15  |        | 0.15   |
|       |                                         | RR Stone masonry Dry                                            | 180.00         | 1.00  | 2.00   | 3.00   |
|       | GD-1                                    | Garland drain below the toe wall                                | 186.00         | 2.00  | 1.00   | 1.00   |
| ID-1  | TW-7: Toe Wall at the toe of the dump   | Foundation in hard soil mixed with boulders including hard rock | 180.00         | 2.15  |        | 0.60   |
|       |                                         | Plain cement concrete (1:4:8) in foundation                     | 180.00         | 2.15  |        | 0.15   |
|       |                                         | RR Stone masonry Dry                                            | 180.00         | 1.00  | 3.00   | 2.00   |
|       | GD-7                                    | Garland drain below the toe wall                                | 190.00         | 2.00  | 1.00   | 1.00   |
| EID-2 | TW-2: Toe wall at the toe of waste dump | Foundation in hard soil mixed with boulders including hard rock | 202.00         | 3.15  |        | 0.60   |
|       |                                         | Plain cement concrete (1:4:8) in foundation                     | 202.00         | 3.15  |        | 0.15   |
|       |                                         | RR Stone masonry Dry                                            | 202.00         | 1.00  | 3.00   | 2.00   |
|       | GD-2                                    | Garland drain below the toe wall                                | 202.00         | 2.00  | 1.00   | 1.00   |
| EID-3 | TW-3: Toe wall at the toe of waste dump | Foundation in hard soil mixed with boulders including hard rock | 57.00          | 3.15  |        | 0.60   |
|       |                                         | Plain cement concrete (1:4:8) in foundation                     | 57.00          | 3.15  |        | 0.15   |
|       |                                         | RR Stone masonry Dry                                            | 57.00          | 1.00  | 3.00   | 2.00   |
|       | GD-3                                    | Garland drain below the toe wall                                | 57.00          | 2.00  | 1.00   | 1.00   |
| EID-4 | TW-4: Toe wall at the toe of waste dump | Foundation in hard soil mixed with boulders including hard rock | 108.00         | 3.15  |        | 0.60   |
|       |                                         | Plain cement concrete (1:4:8) in foundation                     | 108.00         | 3.15  |        | 0.15   |
|       |                                         | RR Stone masonry Dry                                            | 108.00         | 1.00  | 3.00   | 2.00   |
|       | GD-4                                    | Garland drain below the toe wall                                | 202.00         | 2.00  | 1.00   | 1.00   |
| EID-5 | TW-5: Toe wall at the toe of waste dump | Foundation in hard soil mixed with boulders including hard rock | 841.00         | 3.15  |        | 0.60   |
|       |                                         | Plain cement concrete (1:4:8) in foundation                     | 841.00         | 3.15  |        | 0.15   |
|       |                                         | RR Stone masonry Dry                                            | 841.00         | 1.00  | 3.00   | 2.00   |
|       | GD-5                                    | Garland drain below the toe wall                                | 841.00         | 2.00  | 1.00   | 1.00   |

**Surface Water Management:** The proposed engineering measures for the surface water management of the lease area are given below:

- **Loose Boulder Check Dam (LBCD):** (Random Rubble dry stone masonry): 15 LBCDs of 6 to 10 m length are proposed for the *nalas* in the lease area.
- **Gabion (Wire crate) Check Dam (GCD):** Altogether, 2 GCDs of a length varying from 10 to 15 m are proposed for the *nalas* within and outside lease area.
- **Stone Masonry Check Dam (SMCD):** A total number of 5 SMCDs are proposed for the *nalas* in the lease area.





- **Silt Settling Tank (SST):** A total number of 2 SSTs of a dimension of 20 x 10 x 3 m are proposed for the *nalas* in the lease area.
- **Rainwater Harvesting Pit (RWHP):** One RWHP (10 x 5 x 3 m) is proposed for the protection of surface runoff in the lease area.

### Afforestation:

Afforestation of the safety zone green belt area is to be taken up now. Afforestation covering 1000 trees and 2500 shrubs per ha, inclusive of maintenance for five year has been worked out as per the norms of State Forest Department, Karnataka.



Table-46: Year wise details of Plantation

| Year   | Area (ha) | Saplings (nos.) | Survival Rate | Species                                                                                                           | UTM Co-ordinates |         |
|--------|-----------|-----------------|---------------|-------------------------------------------------------------------------------------------------------------------|------------------|---------|
|        |           |                 |               |                                                                                                                   | Northing         | Easting |
| First  | 0.536     | 1340            | 80%           | As per R&R recommendations<br>Pongamia pinnata (Honge),<br>Cacia cimia (sime tangadi),<br>Hardiwika binaath etc., | 1662800          | 671093  |
|        |           |                 |               |                                                                                                                   | 1662982          | 671428  |
| Second | 0.536     | 1340            |               |                                                                                                                   | 1662639          | 670878  |
|        |           |                 |               |                                                                                                                   | 1662809          | 671355  |
| Third  | 0.536     | 1340            |               |                                                                                                                   | 1662300          | 670852  |
|        |           |                 |               |                                                                                                                   | 1662645          | 671206  |
| Fourth | 0.536     | 1340            |               |                                                                                                                   | 1662132          | 670866  |
|        |           |                 |               |                                                                                                                   | 1662420          | 671287  |
| Fifth  | 0.536     | 1340            |               |                                                                                                                   | 1662377          | 671283  |
|        |           |                 |               |                                                                                                                   | 1662795          | 671575  |

Table -47: Implementation Schedule of Mitigation / Engineering Measures

| Type                                                   | Particulars of work               | Years |             |   |   |   |
|--------------------------------------------------------|-----------------------------------|-------|-------------|---|---|---|
|                                                        |                                   | 1     | 2           | 3 | 4 | 5 |
| <b>EID/ID</b>                                          | Toe wall at the toe of waste dump | √     |             |   |   |   |
|                                                        | Garland drain                     | √     |             |   |   |   |
| <b>Proposed Dump/PBF</b>                               | Toe wall at the toe of waste dump | √     | √           | √ | √ | √ |
|                                                        | Garland drain                     | √     | √           | √ | √ | √ |
| <b>Gully plugs</b>                                     | Loose Boulder check dam (dump)    | √     | √           |   |   |   |
|                                                        | Logwoodcheck dam(dump)            | √     | √           | √ | √ | √ |
|                                                        | Brushwoodcheck dam(dump)          | √     | √           | √ | √ | √ |
| <b>Check dams</b>                                      | Gabion/Wire crate check dam       | √     |             |   |   |   |
|                                                        | Rainwater harvesting pit          | √     |             |   |   |   |
|                                                        | Silt settling tank                | √     |             |   |   |   |
|                                                        | Stone masonry check dam           | √     |             |   |   |   |
|                                                        | Loose Boulder check dam           | √     |             |   |   |   |
| <b>Greenbelt development</b>                           |                                   | √     | Gap filling |   |   |   |
| <b>Afforestation</b>                                   |                                   | √     | √           | √ | √ | √ |
| <b>Environmental monitoring &amp; watch &amp; ward</b> |                                   | √     | √           | √ | √ | √ |



Table-48: Summary of the cost of proposed measures

| Sl. No.            | Item of work                                            | Cost (Lakh Rs.)   |
|--------------------|---------------------------------------------------------|-------------------|
| 1.                 | Afforestation for encroachment area                     | 37.41             |
| 2.                 | Engineering structures for waste dump management        | 82.60             |
| 3.                 | Engineering structures for Surface water management     | 20.93             |
| 4.                 | Afforestation of the total area at the conceptual stage | 35.58             |
| 5.                 | Afforestation of area under greenbelt                   | 6.89              |
| <b>Grand Total</b> |                                                         | <b>Rs. 183.41</b> |

#### 8.4 Disaster Management and Risk Assessment:

The disaster and the risk may occur due to natural calamity such as earthquake, land slide, collapse etc. However, in such cases, the emergency services required for help like Police Station, Fire Station, Hospital, Ambulance services and its contact numbers will be made available with the Mines Manager.

##### *Address for contact during emergency:*

Mr. Gururaj A.–Cell: 9480267877, Mines Manager,  
Kirlokar Bharath Mines, near Nandihalli, Sandur taluk, Bellary dt.

#### **Disposal of Mining Machinery:**

The mine operation will be mechanized and most of the required machineries / trucks will be on hire.

**Safety and Security:** The required safety measures such as fencing the pit, maintaining the proper gradient of haul roads on the mine benches, maintaining the pit slope of 45 degrees and providing the safety equipment will be strictly adhered.

#### 8.5 Care and Maintenance during temporary discontinuance:

During such time, the area will be closed at gates and temporary staff will be arranged for care and maintenance.



### 8.6 Financial Assurance:

Not applicable, as this lease is granted after auction wherein a MDPA will be signed between lessee and GoK. However, area proposed to put into use in this plan period as stated in Rule 27 of MCDR 2017 will be 18.37 ha.



Table-49: Area put to use in this plan period

| Sl. No. | Type of Land Use         | Area of land use (in ha)         |                                           |                              | The area (in ha) considered as fully reclaimed & rehabilitated | Net area (ha) considered for calculation of financial assurance |
|---------|--------------------------|----------------------------------|-------------------------------------------|------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------|
|         |                          | Area put on use at start of plan | Additional requirement during plan period | As at the end of Plan period |                                                                |                                                                 |
|         | 1                        | 2                                | 3                                         | 4                            | 5                                                              | 6                                                               |
| 1       | Area under mining        | 09.89                            | -                                         | 09.89                        | --                                                             | 09.89                                                           |
| 2       | Storage for topsoil      | -                                | -                                         | -                            | --                                                             | -                                                               |
| 3       | Overburden dump          | 04.80                            | -                                         | 04.80                        | --                                                             | 04.80                                                           |
| 4       | Mineral stock            | 00.50                            | -                                         | 00.50                        | --                                                             | 00.50                                                           |
| 5       | Statutory Buildings      | 00.05                            | +00.05                                    | 00.10                        | --                                                             | 00.10                                                           |
| 6       | Roads                    | 00.40                            | -                                         | 00.40                        | --                                                             | 00.40                                                           |
| 7       | Railways                 | -                                | -                                         | -                            | --                                                             | -                                                               |
| 8       | Green belt / safety zone | 02.68                            | -                                         | 02.68                        | -                                                              | 02.68                                                           |
| 9       | Crushing plant           | -                                | -                                         | -                            | -                                                              | -                                                               |
| 10      | ETP                      | -                                | -                                         | -                            | -                                                              | -                                                               |
| 11      | Township area            | -                                | -                                         | -                            | -                                                              | -                                                               |
| 12      | Biodiversity Area        | --                               | -                                         | -                            | -                                                              | -                                                               |
| 13      | Others-Un used           | 06.15                            | -00.05                                    | 06.10                        | Nil                                                            | -                                                               |
|         | <b>Grand Total</b>       | <b>24.47</b>                     |                                           | <b>24.47</b>                 | <b>-</b>                                                       | <b>18.37</b>                                                    |

This Mining Plan is approved subject to the conditions / stipulations Indicated in the Mining Plan approval letter No. 239/1099/2019/ENG Date: 24/5/2019

  
**SRIPAD PUJAR**  
QUALIFIED PERSON

  
क्षेत्रीय खान नियंत्रक  
Regional Controller of Mines  
भारतीय खान ब्यूरो  
Indian Bureau of Mines,  
बैंगलूर / Bangalore - 560 022

  
**B.V.R. ACHAR**  
QUALIFIED PERSON

**KIRLOSKAR FERROUS INDUSTRIES LIMITED**  
A Kirloskar Group Company



Enriching Lives

**CONSENT LETTER/ UNDERTAKING/ CERTIFICATE**

01. The Mining Plan of Kirloskar Bharat Mines [M/s Bharat Mines & Minerals (ML No.2245) mine lease block] over an extent of 24.47 ha located in Nandihalli Village of Sandur Taluk, Ballari Dist., Karnataka under Rule 16 of MCR 2016 has been prepared by Mr.Sripad Pujar and Mr.BVR Achar. This is to request the Regional Controller of Mines, Indian Bureau of Mines, Bengaluru, to make any further correspondence regarding any correction of the Mining Plan with the said qualified persons at the address below:

**SRIPAD PUJAR**                      **B.V.R. ACHAR**  
Rock Tech Enterprises, Annapurna Badavane,  
HOSPET – 583 201, Ballari Dist. Karnataka State.

We hereby undertake that all modifications / updating as made in the said Mining Plan by the said qualified persons be deemed to have been made with my knowledge and consent and shall be acceptable on me and binding in all respects.

02. It is certified that the **CCOM Circular No-2/2010** will be implemented and complied with.

03. It is certified that the **Progressive Mine Closure Plan** of Kirloskar Bharat Mines [M/s Bharat Mines & Minerals Limited (ML No.2245) mine lease block] over an extent of 24.47 ha complies with all statutory rules, regulations, orders made by the Central or State Government, Statutory organization, Court etc which have been taken into consideration and wherever any specific permission is required the lessee will approach the concerned authorities.

The information furnished in the Progressive Mine Closure Plan is true and correct to the best of my knowledge and records.

Further, all the measures proposed in this closure plan will be implemented in a time bound manner as proposed

04. The provisions of **Mines Act, Rules and Regulations** made there under have been observed in the Mining Plan over an area of 24.47ha, in Nandihalli village of Sandur Taluk, Bellary Dist., Karnataka, belonging to Kirloskar Ferrous Industries Ltd 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".

for Kirloskar Ferrous Industries Ltd

**Ravindranath Venkatesh Gumaste**

Managing Director

**Nominated Owner**

Place: Bevinahalli

Date: 15.04.2019



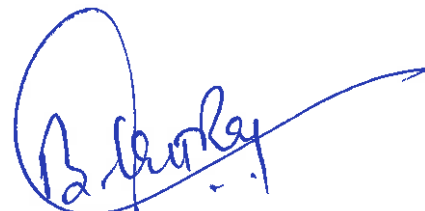


## CERTIFICATE FROM QP

The provisions of the Mineral Conservation and Development Rules, 2017, have been observed in the preparation of Mining Plan of Kirloskar Bharath Mines [M/s Bharath Mines & Minerals (ML No.2245) mine lease block] over an extent of 24.47 ha located in Nandihalli village of Sandur Taluk, Ballari Dist., Karnataka and whenever specific permissions are required, the lessee will approach the concerned authorities of Indian Bureau of Mines.

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

  
**SRIPAD PUJAR**  
*Qualified Person*

  
**B.V.R. ACHAR**  
*Qualified Person*

Place: Hosapete

Date: 20.05.2019





## Kirloskar Bharath Mines – Photographs



Two views of mine workings-Pit no. 1





View of mine workings-Pit no.2



Views of  
old dump







Views of old dump and proposed backfilling area



Photos of few Boundary Pillars









**GOVERNMENT OF KARNATAKA**

No:DMG/MLS/AUC/'C'-2245/2018-19

Office of the Director  
Department of Mines and Geology  
Khanija Bhavan, Race Course Road  
Bangalore-1, Date: 06.10.2018  
Email id: [dir-mines@karnataka.gov.in](mailto:dir-mines@karnataka.gov.in)



To,  
**Kirloskar Ferrous Industries Limited,**  
**Laxmanrao Kirloskar Road,**  
**Khadki, Pune - 411 003,**  
**Maharashtra.**

**Sub:** Letter of Intent with reference to e-auction dated 04.09.2018 for grant of iron ore mining lease for "M/s Bharath Mines & Minerals, ML No: 2245" Block in Nandihalli village, Sandur Taluka, Ballari District over an extent of 24.47 Hectare Area of Forest land.

**1. Background:**

1.1. The Director, Department of Mines and Geology, Karnataka, pursuant to the Supreme Court judgments and orders in Samaj Parivartana Samudaya and Ors. Vs. State of Karnataka and Ors in W.P.(C) 562 of 2009 (the "Judgment"), the Mines and Minerals (Development and Regulation) Act, 1957 and its amendments (the "Act") and the Mineral (Auction) Rules, 2015 including its amendments (the "Rules"), issued the notification and notice inviting tender dated 30 January 2018 for grant of mining lease for "M/s Bharath Mines & Minerals, ML No: 2245" located in Nandihalli village, Sandur Taluka, Ballari District of Karnataka (the "Tender Document"). The e-auction process was conducted in accordance with the Mineral (Auction) Rules, 2015 (including its amendments) and the Tender Document for the said mineral block and "Kirloskar Ferrous Industries Limited" was declared as the "Preferred Bidder" in accordance with Rule 9(9)(iii) of the Mineral (Auction) Rules, 2015 including its amendments.

5/10

**SRIPAD PUJAR**  
**QUALIFIED PERSON**

**B.V.R. ACHAR**  
**QUALIFIED PERSON**





- 1.2. The upfront payment for " M/s Bharath Mines & Minerals, ML No: 2245" Block is Rs. 3.81.61,718/- (Rupees Three Crore Eighty One Lakhs Sixty One Thousand Seven Hundred and Eighteen Only). As required under Rule 10(1) of the Mineral (Auction) Rules, 2015. Kirloskar Ferrous Industries Limited has deposited the first instalment of the upfront payment, being ten percent of the upfront payment, of Rs. 38,16,172/- through Demand Draft (DD) bearing No. 025616 dated: 14.09.2018 which was received on 14.09.2018.
- 1.3. With reference to letter No. DMG/MLS/CCA/12/2016-17 dated 23.08.2018 issued by DMG during the bid evaluation stage and thereupon the declaration submitted. Kirloskar Ferrous Industries Limited has submitted the revised bid security on 11.09.2018 for maintaining bid validity as 510 days from the Bid Due Date (i.e. 20<sup>th</sup> August 2018).

## 2. Grant of Letter of Intent

- 2.1. Accordingly, pursuant to Rule 10(2) of the Mineral (Auction) Rules, 2015 including its amendments, the Government of Karnataka is issuing this letter of intent for grant of mining lease for " M/s Bharath Mines & Minerals, ML No: 2245" Block in Nandihalli village, Sandur Taluka, Ballari District over an extent of 24.47 Hectare Area of Forest land to Kirloskar Ferrous Industries Limited.

## 3. Conditions

- 3.1. This letter of intent and the subsequent grant of aforementioned mining lease shall be subject to the provisions of the Judgment, Act and the rules made thereunder, as amended from time to time.
- 3.2. Kirloskar Ferrous Industries Limited shall be declared as the "Successful Bidder" and subsequently be granted the mining lease only upon satisfactory completion of all requirements under the Judgment, Act, rules made thereunder and the Tender Document.

*G*  
6/10



3.3. For reference, the current requirements under the Rules and the Tender Document for declaration of Kirloskar Ferrous Industries Limited as the "Successful Bidder" and subsequent grant of the mining lease are reiterated below. It is clarified that the requirements mentioned below are only for reference and in the event of any change in Applicable Law, the requirements under the modified law, shall be applicable.

(a) Declaration of the "Successful Bidder":

Kirloskar Ferrous Industries Limited shall be considered to be the "Successful Bidder" upon:

- i. continuing to be in compliance with all the terms and conditions of eligibility;
- ii. payment of the second instalment of the Upfront Payment which is Rs 38,16,172/- (Rupees Thirty Eight Lakhs Sixteen Thousand One Hundred and Seventy Two Only), as per the Tender Document;
- iii. furnishing the Performance Security pursuant to the Auction Rules, valid for the period specified in the Tender Document and Mine Development and Production Agreement (MDPA), for an amount equal to Rs. 3,81,61,718/- (Rupees Three Crore Eighty One Lakhs Sixty One Thousand Seven Hundred and Eighteen Only). Pursuant to sub-rule (1) of Rule 12 of the Auction Rules, the Performance Security shall be adjusted every five years so that it continues to correspond to 0.50% of the reassessed value of estimated resources including the value of any newly discovered mineral that may be included in the mining lease deed on its discovery determined in accordance with the Auction Rules. In such case, bank guarantee constituting the Performance Security shall be substituted with another bank guarantee of the same value issued in accordance with Clause 10.2 of the Tender Document, which is for the revised amount or if the Performance Security has been provided through a security deposit, additional amount towards security deposit shall be provided;
- iv. satisfying the conditions specified in clause (b) of sub-section (2) of section 5 of the Act with respect to a mining plan;

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v. having cleared all dues to the Government of Karnataka arising from mining activity that the Preferred Bidder has undertaken in Karnataka in the past, if such dues have been determined to be payable by him in terms of the extant provisions of the MMDR Act, 1957 and the rules framed there under, along with an undertaking that he shall also clear all dues that the Government of Karnataka determines in future, payable by him in terms of the extant provisions of the MMDR Act, 1957 and the rules framed there under, to the Government of Karnataka arising from mining activity undertaken by him in Karnataka in the past, if such dues have not been determined; and

vi. having paid the actual expenses incurred by the Government of Karnataka on mine exploration, preparation of Provisional R&R Plans, survey, construction of pillars and DGPS survey within 60 days of issue of letter of intent. This amount is equal to **Rs 2,89,16,848/- (Rupees Two Crore Eighty Nine Lakhs Sixteen Thousand Eight Hundred and Forty Eight Only).**

The above activities shall be completed by the Preferred Bidder in accordance with the timelines mentioned in the Tender Document.

(b) Signing of the Mine Development and Production Agreement (MDPA)

Kirloskar Ferrous Industries Limited shall sign the Mine Development and Production Agreement with the Government of Karnataka upon obtaining all consents, approvals, permits, no-objections and the like as may be required under Applicable Laws for commencement of mining operations.

(c) Grant of mining lease

Subsequent to execution of the MDPA, **Kirloskar Ferrous Industries Limited** shall pay the **third instalment** of the Upfront Payment which is **Rs. 3,05,29,374/- (Rupees Three Crore Five Lakhs Twenty Nine Thousand Three Hundred and Seventy Four Only).** Upon such payment, the Government of Karnataka shall issue a grant order and thereafter within a period of 30 days a mining lease shall be executed in favour of **Kirloskar Ferrous Industries Limited** as per Rule 10(6) of The Mineral (Auction) Rules, 2015. The date of the commencement of the period for which a mining lease is granted shall be the date on which a duly executed mining lease is registered.

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#### 4. Validity

- 4.1. This letter of intent is valid for a period of 30 months from the date of its issuance, within which time all the above conditions must be fulfilled and the Mining Lease Deed must be executed between Kirloskar Ferrous Industries Limited and the Government of Karnataka. In case Kirloskar Ferrous Industries Limited is unable to fulfil all or any of the above conditions, then it may submit an application to Government of Karnataka, requesting for further extension. It is in the sole discretion of the Government of Karnataka to extend the validity of this letter of intent after Kirloskar Ferrous Industries Limited submits the reasons/justification for non-compliance with any of the conditions: which shall be due to events beyond the control of Kirloskar Ferrous Industries Limited.
- 4.2. If the Government of Karnataka is satisfied that a longer period is required to enable Kirloskar Ferrous Industries Limited to satisfy all or any of the above conditions, it may extend the validity of this letter of intent for such period or periods as the Government of Karnataka may specify.
- 4.3. It is amply clarified that Kirloskar Ferrous Industries Limited is obligated to make Annual Payments as per the provisions of the Tender Document.

Kindly return the duplicate copy of this Letter of Intent duly signed by authorized signatory of the Company and furnish a suitable Board Resolution in token of having accepted the above terms and conditions. The accepted copy of Letter of Intent along with Board resolution should be submitted latest by 22.10.2018.

  
DIRECTOR

Department of Mines & Geology.

6/10/2018

**MONITORING COMMITTEE**

No.MC/R&amp;R/CCA/2018-19/124

Khanija Bhavan, Race Course Road  
Bangalore-1, date. 26.03.2019.**NOTICE**

Sub: Concurrence of CEC on final Rehabilitation &amp; Reclamation Plan-intimation reg.

Ref.1: Letter of CEC No.2-61/CEC/SC/2017-Pt.III, dated 5<sup>th</sup> March, 2019.

2: LOI issued to the Preferred Bidder dated 06.10.2018.

3: Letter of Director, DMG dated 25.03.2019.

\*\*\*\*\*

The ICFRE has submitted the final Rehabilitation & Reclamation Plan of M/s Bharat Mines and Minerals and the same has been approved by the Central Empowered Committee vide letter cited above in the reference 1 recommending the annual production of iron ore as below;

| Name of the Mining Lease                                                     | ML No. | Permissible annual production of iron ore mine |
|------------------------------------------------------------------------------|--------|------------------------------------------------|
| M/s Kirloskar Ferrous Industries Ltd erstwhile M/s Bharat Mines and Minerals | 2245   | 0.124 MMT                                      |

The Monitoring Committee has also been informed by the Director, Department of Mines and Geology vide reference 2 above that you have been declared as Preferred Bidder for the said mine by submitting the highest bid in the auction conducted by the Government of Karnataka. Accordingly, Letter of Intent has also been issued to you on 06.10.2018. As per the orders of the Hon'ble Supreme Court, the R&R Plan proposed by ICFRE and approved by the CEC shall have to be implemented before starting of mining operations. You are requested to start implementation of the R&R Plan only after obtaining approval from the Director, DMG. You are also directed to submit one copy of the approved Mining Plan, Environmental Clearance, approval under the Forest (Conservation) Act, 1980, and other statutory clearances in tune with the annual production of 0.124 MTPA.

  
Chairman,  
Monitoring Committee

To,  
M/s Kirloskar Ferrous . Ltd,  
Laxmanrao Kirloskar Road,  
Khadki, Pune- 411003,  
Maharashtra.  
Copy with compliments to,

1. Director, Department of Mines & Geology, Bangalore for information and necessary action.
2. Regional Controller of Mines, IBM, No.29 Industrial Suburb, II Stage, Tumkur Road, Goruguntepalya, Yeshwanthpur, Bangalore for information and necessary action.
3. Principal Chief Conservator of Forests, Aranya Bhavana, Malleshwaram, 18<sup>th</sup> Cross, Bangalore for information and necessary action.
4. Member Secretary, KSPCB, No.49, Parisara Bhavan, Church Street, Bangalore-560001 for information and necessary action.
5. Deputy Director General, Department of Mines Safety, No.5, 17<sup>th</sup> Main, 100 Feet Road, Bangalore for information and necessary action.
6. Deputy Commissioner, Bellary District for information and necessary action.
7. DCF, Bellary district for information and necessary action.
8. Deputy Director, Department of Mines & Geology, Hospet for needful action.

  
SRIPATH PUJAR  
QUALIFIED PERSON

  
B.V.R. ACHAR  
QUALIFIED PERSON



7 of 32



प्रारूप आई० आर०  
Form I. R.

निगमन का प्रमाण-पत्र

## CERTIFICATE OF INCORPORATION

ता० ..... का सं० .....  
No. 11-63223 of 1991

मैं एतद्वारा प्रमाणित करता हूँ कि आज का .....  
.....

कम्पनी अधिनियम 1956 (1956 का 1) के अधीन निगमित की गई है और यह  
कम्पनी परिसीमित है।

I hereby certify that KIRLOSKAR FERROUS INDUSTRIES  
LIMITED.

is this day incorporated under the Companies Act, 1956 (No. 1 of 1956)  
and that the Company is limited.

मेरे हस्ताक्षर से आज ता० ..... को दिया गया।

Given under my hand at BOMBAY this TENTH

day of SEPTEMBER One thousand nine hundred and NINETYONE



(B.L. PANIGAR)

कम्पनियों का रजिस्ट्रार

Addl. Registrar of Companies  
Maharashtra

"Certified"

For Kirloskar Ferrous Industries Limited

N. B. Ektare  
Authorised Signatory

SRIPAD PUJAR  
QUALIFIED PERSON

B.V.R. ACHAR  
QUALIFIED PERSON



# KIRLOSKAR FERROUS INDUSTRIES LIMITED

A Kirloskar Group Company

Enriching Lives

Composition of the Board of Directors of Kirloskar Ferrous Industries Limited  
[As on 1 April 2019]

|    | Name of Director and Designation                | Director Identification Number (DIN) | Income Tax PAN | Date of Birth (DD/MM/YYYY) |
|----|-------------------------------------------------|--------------------------------------|----------------|----------------------------|
| 1  | Mr. Atul Kirloskar<br>Chairman                  | 00007387                             | ABIPK5776G     | 13/02/1956                 |
| 2  | Mr. Rahul Kirloskar<br>Vice Chairman            | 00007319                             | ABIPK5774E     | 07/07/1963                 |
| 3  | Mr. R. V. Gumaste<br>Managing Director          | 00082829                             | ADUPG8685L     | 21/03/1958                 |
| 4  | Mr. A. N. Alawani<br>Non Independent Director   | 00036153                             | AAXPA8052D     | 24/08/1945                 |
| 5  | Mr. A. R. Jamenis<br>Independent Director       | 00082620                             | AASPJ4276H     | 02/05/1943                 |
| 6  | Mr. B. S. Govind<br>Independent Director        | 06912189                             | AAOPG1791J     | 19/02/1946                 |
| 7  | Mr. R. Sampathkumar<br>Independent Director     | 06894180                             | AGAPR3547D     | 06/10/1947                 |
| 8  | Mrs. Nalini Venkatesh<br>Independent Director   | 06891397                             | ABPPV0432K     | 27/12/1949                 |
| 9  | Mr. Y. S. Bhawe<br>Independent Director         | 00057170                             | AAHPB4223B     | 16/07/1949                 |
| 10 | Mr. Mahesh Chhabria<br>Non Independent Director | 00166049                             | ADCPM8911H     | 19/04/1964                 |

For Kirloskar Ferrous Industries Limited

C. S. Panicker  
Executive Vice President (Corporate Finance) and  
Company Secretary



*SRIPAD PUJAR*  
SRIPAD PUJAR  
QUALIFIED PERSON



*B.V.R. ACHAR*  
B.V.R. ACHAR  
QUALIFIED PERSON

**KIRLOSKAR FERROUS INDUSTRIES LIMITED**  
A Kirloskar Group Company



ANNEXURE-4



Enriching Lives

**COPY OF THE RESOLUTION PASSED BY THE BOARD OF DIRECTORS AT ITS MEETING HELD ON THURSDAY, 7 MARCH 2019**

**APPROVAL TO AUTHORISE THE MANAGING DIRECTOR TO DEAL WITH MATTERS RELATING TO MINES**

**"RESOLVED THAT, Sri. Ravindranath Venkatesh Gumaste, Managing Director of the Company, be and is hereby appointed :**

1. As 'Owner', within the meaning of the section 2 (i) of Mines Act, 1952
  2. As 'Owner', within the meaning of the section 3 (i) of Mines & Minerals (Regulation and Development) Amendment Act, 2015 and
  3. As 'Owner', within the meaning of Rule 2(37) of the Explosive Rules, 2008;
- of all the Company's Iron ore, Manganese Ore, Quartz and any other Mines owned/to be owned/operated by the Company.

**RESOLVED FURTHER THAT, Sri. Ravindranath Venkatesh Gumaste, Managing Director of the Company be and is hereby authorized to appoint Managers having prescribed qualifications in respect of every mine owned/to be owned/operated by the Company, to discharge the duties and responsibilities of Owner and shall be responsible for the overall management, control, supervision and direction of the mines.**

**RESOLVED FURTHER THAT, Sri. Ravindranath Venkatesh Gumaste, Managing Director of the Company be and is hereby authorized to sign all the documents / forms and returns as may be necessary/required for these purposes so as to comply with the provisions of the Mines Act, 1952, Explosive Rules 2008, MMRD Amendment Act, 2015 and other Labour and Industrial laws."**

**CERTIFIED TRUE COPY**

**FOR KIRLOSKAR FERROUS INDUSTRIES LIMITED**



**C. S. PANICKER  
EXECUTIVE VICE PRESIDENT (CORPORATE FINANCE) AND  
COMPANY SECRETARY**

**SRIPAD PUJAR  
QUALIFIED PERSON**

**B.V.R. ACHAR  
QUALIFIED PERSON**





ANNEXURE -5

ಭಾರತೀಯ ಏಕೀಕೃತ ಗುರುತು ಪ್ರಾಧಿಕಾರ

ಭಾರತ ಸರ್ಕಾರ

Unique Identification Authority of India

Government of India

ಸೇವಾದಾರನ ಕ್ರಮ ಸಂಖ್ಯೆ / Enrollment No. : 1189/03269/00774



To

ಗುರುತ್ವ ಲೇಖಕರಾದ ವಸಂತ  
Gurutha Raveendranath Venkatesh  
S/O Venkatesh Jappa Gurutha  
House No 27/34 1 S H School Road  
Near Municipal Ground Annapurna Badavane,  
Channarayana

ಹಾಸ್ಟೆಲ್

ಹಾಸ್ಟೆಲ್

ಹಾಸ್ಟೆಲ್ ಬೆಲೆ

ಹಾಸ್ಟೆಲ್ ಬೆಲೆ 583201

3445491832



MA265320357FT



ನಿಮ್ಮ ಆಧಾರ್ ಸಂಖ್ಯೆ / Your Aadhaar No. :

**3813 9113 5794**

ಆಧಾರ್ - ಶ್ರೀಸಾಮಾನ್ಯನ ಅಧಿಕಾರ



ಭಾರತ ಸರ್ಕಾರ  
Government of India

ಗುರುತ್ವ ಲೇಖಕರಾದ ವಸಂತ  
Gurutha Raveendranath Venkatesh  
ಹುಟ್ಟು ದಿನಾಂಕ / DOB : 21/05/1958  
ಪ್ರಾಕಾರ / Gender

**3813 9113 5794**

ಆಧಾರ್ - ಶ್ರೀಸಾಮಾನ್ಯನ ಅಧಿಕಾರ

*Sripad Pujar*  
**SRIPAD PUJAR**  
QUALIFIED PERSON

*B.V.R. Achan*  
**B.V.R. ACHAN**  
QUALIFIED PERSON





We, the Chancellor, Vice-Chancellor  
and Members of the Senate of  
the Gulbarga University

*Shri Pujar Sripad*

having been examined the Report of Master of  
Science Mineral Exploration and  
in the Senate of the Gulbarga University

MASTER OF SCIENCE

Mineral Exploration

has been examined in the Senate of the Gulbarga University  
in the Senate of the Gulbarga University

The University and the Senate of the Gulbarga University

*Shri Pujar Sripad*  
Vice-Chancellor

ಗುಲ್ಬರ್ಗಾ ವಿಶ್ವವಿದ್ಯಾಲಯದ ಕುಲಾಧಿಪತಿ,  
ಕುಲಪತಿ, ಡಾಕ್ಟರ್ ಸೆನೆಟ್ ಸದಸ್ಯರಾದ ನಾವು

*ಶ್ರೀ ಪುಜಾರ್ ಶ್ರೀಪಾದ*

ಅವರು ಪ್ರಾಚಾರ್ಯ ಅಥವಾ ಸಮಾಜ (ಮಾಸ್ಟರ್ ಆಫ್ ಸೈನ್ಸ್) ಮತ್ತು  
ಸದರಿ ಪರೀಕ್ಷೆಯಲ್ಲಿ (ಮಾಸ್ಟರ್ ಆಫ್ ಸೈನ್ಸ್) ಪಾಸ್ ಆಗಿದ್ದು,  
ಅಂತಿಮ ಪರೀಕ್ಷೆಯಲ್ಲಿಯೂ ಅಂತಿಮ

ಮಾಸ್ಟರ್ ಆಫ್ ಸೈನ್ಸ್

(ಮಾಸ್ಟರ್ ಆಫ್ ಸೈನ್ಸ್)

ಪರೀಕ್ಷೆಯನ್ನು ಗುಲ್ಬರ್ಗಾ ವಿಶ್ವವಿದ್ಯಾಲಯದ ಸದರಿ  
ಸದರಿ ಪರೀಕ್ಷೆಯಲ್ಲಿಯೂ ಪಾಸ್ ಆಗಿದ್ದು, ಅಂತಿಮ  
ಪರೀಕ್ಷೆಯಲ್ಲಿಯೂ ಅಂತಿಮ ಪರೀಕ್ಷೆಯಲ್ಲಿಯೂ  
ಅಂತಿಮ ಪರೀಕ್ಷೆಯಲ್ಲಿಯೂ ಅಂತಿಮ ಪರೀಕ್ಷೆಯಲ್ಲಿಯೂ

*Sripad Pujar*  
SRIPAD PUJAR  
QUALIFIED PERSON

*B.V.R. Achar*  
B.V.R. ACHAR  
QUALIFIED PERSON



Tungabhadra Minerals Ltd.,

ADMINISTRATIVE OFFICE

TARANAGALLU-563119.

BELLARY DIST.

KARNATAKA STATE

Telex: 0817 221

0845-8834

TMLIN

07445: AGGREGATES, SANDUR.

3786

1453

3152

TARANAGALLU

TML/ 362 /93-94

28th June, 1993.

SERVICE CERTIFICATE

This is to certify that Mr. SRIPAD PUNAR has been working in our Organisation in the capacity of Junior Geologist since 1st August, 1992. He is sincere and hard working. To the best of our knowledge his conduct and character are found to be good.

We wish him best of luck in his endeavours.

For TUNGABHADRA MINERALS LTD.,

*[Signature]*

ASST. ADMINISTRATIVE OFFICER.



TELEX: 196-252 TPL IN

TEL. ADD.: TIMBLO MARGAO

**TIMBLO PRIVATE LIMITED**

PHONE: 27165 (5 LINES)

Registered Office  
KADAR MANZIL  
MARGAO - GOA  
403 601

POST BOX NO. 36

19th July, 1989.

TO WHOMSOEVER IT MAY CONCERN

THIS IS TO CERTIFY that Shri P. Shripad was in our employment as a Trainee Geologist at our Head Office Margao Goa, from 3.2.1987 to 31.1.1989 and as a Jr. Geologist from 1.2.88 to 18.7.1989.

During the period of his service we have found him to be diligent, honest and hard working and his services were found to be satisfactory.

He left our service of his own accord for better prospects.

We wish him a bright future career.

This certificate is issued at his request.

TIMBLO PRIVATE LIMITED

(SATISH TIMBLO)  
Director.

*P. Shripad*

*Dr. - 2/11/89*  
f- PRINCIPAL

B.E.S. Arts Science & Commerce College  
SANDUR-583 118.



Vijayanagara Srikrishnadevaraya University, Ballari  
Director, Post Graduate Centre, Nandihalli-sandur

Ph. No(Off) : 08395-278235  
: 08395-278226  
mail:directorpgcn@gmail.com  
web: www.vskub.ac.in



No:VSKUPGCN/ADM/2017-18/379

Date: 23.06.2017

To whomsoever it may concern

This is to certify that Shri Sripad Pujar has been awarded Master of Science (Mineral Exploration) during May 1985 from the PG Centre, Nandihalli under Gulbarga University, Karnataka, which is recognised under University Grants Commission.

Currently, this PG Centre, Nandihalli comes under the jurisdiction of Vijayanagara Srikrishnadevaraya University, Ballari, which is also recognised under University Grants Commission.

This is certified that the Master of Science (Mineral Exploration) is equivalent to Master of Science in Applied Geology.

Further, the Master of Science in Mineral Exploration started in the year 1976 was renamed as Master of Science in Applied Geology in 1993 with same curriculum.

*[Signature]*  
DIRECTOR

Vijayanagara Srikrishnadevaraya University  
PG Centre, Nandihalli-Sandur



සංචාරක සංරක්ෂණය

ಕವಿಗಳ ಮೇಲೆ ಈ ಪಾಠ್ಯ (ಪ್ರಾಕೃತಿಕವಾದ) ಮಾನ್ಯತೆ ನೀಡಿ ೧೯೮೮  
 ಪ್ರಥಮ ಮಹಿಳಾ ಉತ್ಸಾಹವನ್ನು ಕರೆಸಿ

संस्कृत-विश्वकोषः

(புதிதான வரலாற்றுச் செய்தி)

ಇದನ್ನು ಸುಲಭವಾಗಿಟ್ಟು ಜನರು ಸಾಮಾನ್ಯರಾಗಿ ಅರಿತು, ಸರ್ವಜನಿಕವಾಗಿ ಅಭ್ಯಾಸಿಸುವಂತೆ ಮಾಡುವುದು  
ಅಭ್ಯಾಸದ ಉದ್ದೇಶವಾಗಿದೆ. ಇದನ್ನು ಸುಲಭವಾಗಿಟ್ಟು ಜನರು ಸಾಮಾನ್ಯರಾಗಿ ಅರಿತು, ಸರ್ವಜನಿಕವಾಗಿ ಅಭ್ಯಾಸಿಸುವಂತೆ ಮಾಡುವುದು  
ಅಭ್ಯಾಸದ ಉದ್ದೇಶವಾಗಿದೆ.

We, the Chancellor, Vice-Chancellor and Members of the Senate of the Guelbarga University  
 Certify that Bazar Vaji Rajendrachar  
 having been examined for the Degree of Master of Science (Mineral  
 Exploration)  
 and adjudged to have passed the examination May 1988 in the  
First Class the Degree of

MASTER OF SCIENCE  
(Exact Sciences)

has been considered on his/her at Chicago on the Twenty Sixth day of the month of February in the year One thousand nine hundred and Eighty nine

On Certificates whereof are set the seal of the said University and the signature of the Vice-Chancellor.

ROBERT  
Gilberg

92-0000

Dated : 26.2.1989

W. H. Gustave Raper

**Theresa (Vice-Chancellor)**

SRIPAD PUJAR  
QUALIFIED PERSON

**B.V.R. ACHAR**  
**QUALIFIED PERSON**



मिनरल एक्सप्लोरेशन कॉर्पोरेशन लिमिटेड  
( भारत सरकार का उद्यम )

Mineral Exploration Corporation Limited

( A Government of India Enterprise )

पंजीकृत कार्यालय : डॉ. बाबासाहेब आंबेडकर भवन, हाईलैण्ड ड्राइव रोड, सेमिनरी हिल्स, नागपुर - ४४० ००६.  
Regd. Office : Dr. Babasaheb Ambedkar Bhavan, Highland Drive Road, Seminary Hills, Nagpur-440 006.  
Telephone : 510310, 510316, 510317, 510419, 510421, 510442, 510443, 510111  
Fax : 091-0712-510133, 510548 E-mail : mecl @ nagpur.dot.net.in. website:www.meclindia.com

No: SMPA/Adm/Misc/2000/5469

Dated: 6-11-2001

SERVICE CERTIFICATE

This is to certify that Shri B.V.R.Achar joined this Organisation as Officer Trainee(Geology) on 28.5.1990 and he resigned from the services of this Corporation with effect from 30.9.2001. At the time of leaving the services he was holding the post of Senior Geologist in the scale of pay of Rs.4800-200-5800-225-8275/- with a basic pay of Rs.6025/- per month.

(R K PANIGRAHI)

SENIOR MANAGER ( PERS. & ADMN. )-HOD

To

Shri B.V.R.Achar,  
Ex-Sr. Geologist,  
MECL, HARUR.

Through : The Project Manager, MECL, Harur Project.





Vijayanagara Sri Krishnadevaraya University, Ballari  
Director, Post Graduate Centre, Nandihalli-Sandur

Ph. No(Off) : 08395-278236  
: 08395-278225

email: directorpgcn@gmail.com  
web: www.vskub.ac.in



No:VSKUPGCN/ADM/2017-18/378

Date: 23.06.2017

To whomsoever it may concern

This is to certify that **Shri Vajirajendrachar B.** has been awarded Master of Science (Mineral Exploration) during May 1988 from the PG Centre, Nandihalli under Gulbarga University, Karnataka, which is recognised under University Grants Commission.

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DIRECTOR  
Vijayanagara SriKrishnadevaraya University  
PG Centre, Nandihalli-Sandur



**GOVERNMENT OF KARNATAKA**

No.DMG/MLS/CCA/12/2017-18

Office of the Director  
Department of Mines and Geology  
Khanija Bhavan, Race Course Road  
Bangalore-1, dated: 01.03.2018



**DGPS Co-ordinates of M/s Bharath Mines and Minerals (M.L. No.-2245)**

In pursuance to the NIT dated: 30.01.2018, read the following DGPS co-ordinates at Sl. No. 1 (Latitude, Longitude of Corner Points as per DGPS) of the summary of mine block in respect of M/s Bharath Mines and Minerals (M.L. No.-2245).

| SL. NO. | PILLAR ID | LATITUDE         | LONGITUDE        |
|---------|-----------|------------------|------------------|
|         |           | dd - mm - ss     | dd - mm - ss     |
| 1       | BLR-09    | N15°01'46.93700" | E76°34'38.49700" |
| 2       | LBS-A     | N15°01'43.84657" | E76°35'25.62412" |
| 3       | LBS-B     | N15°01'54.22593" | E76°35'21.37669" |
| 4       | LBS-C     | N15°01'55.32583" | E76°35'24.80892" |
| 5       | LBS-D     | N15°01'51.75250" | E76°35'26.60598" |
| 6       | LBS-E     | N15°01'53.95940" | E76°35'32.05997" |
| 7       | LBS-F     | N15°01'58.34472" | E76°35'32.97602" |
| 8       | LBS-G     | N15°02'03.69878" | E76°35'22.30861" |
| 9       | LBS-H     | N15°02'05.14264" | E76°35'25.34458" |
| 10      | LBS-I     | N15°02'03.03593" | E76°35'30.97060" |
| 11      | LBS-J     | N15°02'05.72812" | E76°35'37.45262" |
| 12      | LBS-K     | N15°02'07.18386" | E76°35'29.51739" |
| 13      | LBS-L     | N15°02'11.39010" | E76°35'38.33528" |
| 14      | LBS-M     | N15°01'53.16930" | E76°35'45.54410" |
| 15      | LBS-N     | N15°01'52.64912" | E76°35'44.32019" |
| 16      | LBS-O     | N15°01'54.28842" | E76°35'41.05733" |
| 17      | LBS-P     | N15°01'49.33657" | E76°35'31.05125" |
| 18      | LBS-Q     | N15°01'45.68789" | E76°35'29.67496" |

**SRIPATH PUJAR**  
QUALIFIED PERSON

**B.V.R. ACHAR**  
QUALIFIED PERSON

## Reserves / Resources Estimation at 45% Fe cutoff

| S.No.                                  | BH. No. | Intersection (m) |       | Diff. (m) | True Width (m) | Average sectional influence (m) | Area (Sq. m) |           |           | Reserves (Tonnes) |             |             | Total Reserves (Tonnes) |     |     | Grade (%) |                  |                                |
|----------------------------------------|---------|------------------|-------|-----------|----------------|---------------------------------|--------------|-----------|-----------|-------------------|-------------|-------------|-------------------------|-----|-----|-----------|------------------|--------------------------------|
|                                        |         | From             | To    |           |                |                                 | G-1          | G-2       | G-3       | G-1               | G-2         | G-3         | G-1                     | G-2 | G-3 | Fe        | SiO <sub>2</sub> | Al <sub>2</sub> O <sub>3</sub> |
| S-2                                    | MBMR-4  | 0.00             | 9.00  | 9.00      | 7.74           | 88.30                           | 144.3194     |           |           | 44264.7201        |             |             | 44264.7201              |     |     | 48.76     | 5.81             | 9.67                           |
|                                        |         | 30.00            | 35.00 | 5.00      | 4.30           | 88.30                           | 452.1314     |           |           | 138674.8412       |             |             | 138674.8412             |     |     | 49.91     | 9.42             | 10.48                          |
|                                        | MBMR-7  | 13.00            | 18.00 | 5.00      | 4.30           | 88.30                           | 811.0984     |           |           | 248774.8956       |             |             | 248774.8956             |     |     | 53.19     | 11.47            | 1.92                           |
| S-2a                                   | MBMR-18 | 0.00             | 26.90 | 26.90     | 23.13          | 88.30                           | 1796.3023    |           |           | 550950.3128       |             |             | 550950.3128             |     |     | 57.90     | 11.43            | 3.75                           |
|                                        | MBMR-12 | 0.00             | 18.30 | 18.30     | 15.48          | 48.60                           | 1716.1997    | 1002.0451 |           | 289718.6117       | 169159.2856 |             | 458877.8973             |     |     | 49.78     | 6.76             | 10.19                          |
|                                        |         | 0.00             | 15.30 | 15.30     | 13.16          | 60.80                           | 788.3394     | 650.4121  |           | 166532.6674       | 137361.3327 |             | 303893.9401             |     |     | 49.26     | 1.66             | 10.61                          |
| S-3                                    | MBMR-17 | 31.80            | 40.80 | 9.00      | 7.74           | 60.80                           | 726.9339     | 670.7554  |           | 153522.0659       | 141657.6593 |             | 295179.7252             |     |     | 46.18     | 0.83             | 12.53                          |
|                                        |         | 53.00            | 56.70 | 3.70      | 3.18           | 60.80                           | 478.5192     | 529.8493  |           | 101059.0594       | 111899.5264 |             | 212958.3858             |     |     | 55.71     | 2.81             | 6.47                           |
|                                        | MBMR-8  | 0.00             | 8.00  | 8.00      | 6.88           | 60.80                           | 902.1123     | 535.9654  |           | 190518.2080       | 113191.1931 |             | 303709.4012             |     |     | 60.98     | 8.14             | 3.31                           |
| S-4                                    | MBMR-11 | 0.00             | 76.00 | 76.00     | 65.36          | 69.15                           | 6143.9323    | 3958.4913 | 2201.2155 | 1475743.6067      | 950810.9697 | 528721.5976 | 2955276.1740            |     |     | 50.86     | 10.05            | 10.13                          |
|                                        | MBMR-19 | 0.00             | 19.65 | 19.65     | 16.90          | 69.15                           | 2683.6794    | 965.7614  |           | 644607.1544       | 231971.3405 |             | 876578.4949             |     |     | 49.13     | 24.80            | 2.61                           |
|                                        | MBMR-10 | 13.00            | 43.00 | 30.00     | 25.80          | 69.15                           | 2227.4636    | 1616.4198 | 791.5302  | 535026.2676       | 388256.4242 | 190121.8267 | 1113404.5186            |     |     | 50.53     | 17.44            | 2.65                           |
| S-4a                                   | MBMR-15 | 0.00             | 15.00 | 15.00     | 12.90          | 50.15                           | 1663.9829    | 1226.4851 |           | 289862.5448       | 212651.2895 |             | 503513.8343             |     |     | 62.28     | 4.24             | 3.53                           |
|                                        | MBMR-14 | 9.00             | 15.00 | 6.00      | 5.16           | 81.45                           | 466.0702     | 473.0109  |           | 131860.5032       | 133824.1648 |             | 265684.6680             |     |     | 49.82     | 20.15            | 4.35                           |
|                                        | MBMR-16 | 0.00             | 31.85 | 31.85     | 27.39          | 81.45                           | 2624.7703    | 1145.4804 |           | 742599.5749       | 324079.1235 |             | 1066678.6984            |     |     | 52.41     | 10.30            | 8.55                           |
| S-6                                    | MBMR-9  | 0.00             | 9.00  | 9.00      | 7.74           | 75.00                           | 948.7997     | 202.4244  |           | 246655.9972       | 52734.6938  |             | 299390.6910             |     |     | 48.39     | 10.00            | 8.93                           |
|                                        |         |                  |       |           |                |                                 |              |           |           |                   |             |             | 9637811.3085            |     |     | 52.19     | 9.74             | 6.05                           |
|                                        |         |                  |       |           |                |                                 |              |           |           |                   |             |             | 8674037.2866            |     |     | 52.19     | 9.74             | 6.05                           |
| Total in-situ Reserves                 |         |                  |       |           |                |                                 |              |           |           | 52734.6938        |             |             | 299390.6910             |     |     | 4839.10   |                  |                                |
| Net Reserves (Tonnes)                  |         |                  |       |           |                |                                 |              |           |           | 52734.6938        |             |             | 299390.6910             |     |     | 4839.10   |                  |                                |
| After application of Correction factor |         |                  |       |           |                |                                 |              |           |           | 52734.6938        |             |             | 299390.6910             |     |     | 4839.10   |                  |                                |
| Net Reserves (Million Tonnes)          |         |                  |       |           |                |                                 |              |           |           | 52.7346938        |             |             | 299.3906910             |     |     | 4.83910   |                  |                                |

*[Signature]*  
SRIPAD PUJAR  
QUALIFIED PERSON

*[Signature]*  
B.V.R. ACHAR  
QUALIFIED PERSON



**PART -IV A**  
**REPORTING OF MINERAL RESOURCES**



| Sl.no | Contents                                    | Explanation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-------|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1     | Title & Ownership                           | M/s BHARAT MINES & MINERALS LIMITED (ML No.2245), KUMARASWAMY RANGE, SANDUR SCHIST BELT, DISTRICT: BALLARI, KARNATAKA, GOVT. OF KARNATKA<br>Period of prospecting: 02.03.2016 to 18.03. 2016<br>Analysis completed on 23.06.2016.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 2     | Details of the area                         | Longitudes 76°35'21.4" and 76°35'45.4" and Latitudes 15°01'44.0" and 15°02'11.3". The block falls in Dharampur village of Kumaraswamy range. The block is covered in Survey of India Topo sheet No.57 A/12. Lease area is 24.47 Hectares.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 3     | Infrastructure and environment              | The mine lease area is 20 km from Sandur town which can be approached from Bellary, Hospet, Donimalai and from Toranagallu railway station.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 4     | Previous Exploration                        | Nil, while the mine area has been exploited for iron ore                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 5     | Geology                                     | The Sandur Schist Belt is known for its economic deposits of Iron and Manganese and studied in detail by many prominent workers like New Bold (1839), Foote (1895), Roy and Biswas(1983), Martin and Mukhopadhyay (1987 & 1993), Naqvi et.al. (1987) on various aspects like depositional environment, structure etc. Iron ore, banded ferruginous cherty quartzite, are intimately associated with gabbro of pre-tectonic and post tectonic origin. The hill ranges trend in NNW-SSE direction, which are similar to regional tectonic trend of the Sandur Schist Belt. The area has under gone two phases of deformation [F1 and F2] and metamorphism. The axial trace of F1 have NNW-SSE trend which is refolded by open F2 folds trending in ENW-WSE direction. The primary structure of banded iron ore formation is bedding and pane-contemporaneous faults; schistosity and fracture cleavage are also common. Repetitions of iron ore bands, which cause the thickening of ore at places, are due to diastrophic folds. |
| 6     | Aerial/Ground geophysical /Geochemical data | —                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 7     | Technological Investigation                 | Exploratory drilling at 100m x 100m (G1, G2 and G3 level of UNFC )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 8     | Location of data points                     | Provided in the topographical and geological map on 1:1000 scale                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |





| Sl.no | Contents                                       | Explanation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 9     | Sampling techniques                            | <p>The core recovered by drilling was divided into two longitudinal halves. One half was taken for sampling, whereas the second half was kept for future reference [with DGM, Karnataka]. The first half was subjected to uniform size reduction of 1mm size. It is thoroughly mixed, pounded and powdered to (-) 100 mesh size by pestle and mortar and then coned and quartered. 3 sample packets of 100 gram each have been prepared; out of the three, one packet was handed over to DGM, Karnataka and the other one has been labeled and sent to MECL laboratory for Fe, SiO<sub>2</sub> and Al<sub>2</sub>O<sub>3</sub> analyses, whereas the third packet has preserved for future reference.</p> <p>The entire lot of chips and powder material were collected from boreholes drilled by Reverse Circulation drill. 50% mostly of chip samples have been thoroughly mixed to have the desired quantity of 500-600 gram and pounded to (-)100 mesh size by progressive reduction. 3 sample packets of 200 gram each has been prepared; out of the three, one has been labeled and sent to MECL lab. for Fe, SiO<sub>2</sub> and Al<sub>2</sub>O<sub>3</sub> analyses and the other packet was handed over to DGM, Karnataka, and the 3<sup>rd</sup> packet of the sample has been preserved for further studies at camp. Total no. of primary samples analysed is 1113. Check samples – 61 nos.</p> |
| 10    | Drilling Technique and drill sampling employed | <p>Exploratory core drilling - 189.80m (4 BHs)<br/> RC Drilling - 691.00m (15BHs)<br/> Total Drilling - 880.80m (19 BHS)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 11    | Sub sampling techniques and sample preparation | As explained above at Sl.no.9.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 12    | Quality of assay data and laboratory tests     | Assayed at MECL Lab. by MECL, Chemical Laboratory, Utilities Complex, Nagpur by XRF method.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 13    | Moisture                                       | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 14    | Bulk Density                                   | The specific gravity was determined on 5 no. of samples at Lab. and for computation of reserves, the factor 3.50 has been considered.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 15    | Resource estimation techniques                 | Reserves have been estimated by geological cross section method. In order to delineate the ore and non-ore, the grade or threshold value of 45% Fe has been adopted, thus non ore above and below ore zones has been demarcated. The rule of gradual change or law of linear function has been applied [Constantine C. Popoff, 1965] along with the rule of nearest points for application of influence of half way between successive boreholes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |



| S.No              | Contents                          | Explanation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                   |                   |                    |           |             |         |        |       |       |       |    |  |        |       |       |       |    |  |        |       |        |       |    |  |
|-------------------|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-------------------|--------------------|-----------|-------------|---------|--------|-------|-------|-------|----|--|--------|-------|-------|-------|----|--|--------|-------|--------|-------|----|--|
|                   |                                   | <p>At threshold cutoff of 45% Fe as stipulated by IBM, the mineralized zone within the lease hold area and the ore reserves are estimated. Estimation is also been made at 55% Fe cut-off</p> <table><tr><th>Strike length (m)</th><th>Average thick (m)</th><th>Net Reserves (M.T)</th><th>Grade Fe%</th><th>Cut-off Fe%</th><th>Remarks</th></tr><tr><td>473.45</td><td>32.46</td><td>7.577</td><td>52.19</td><td>45</td><td></td></tr><tr><td>317.00</td><td>12.17</td><td>2.917</td><td>59.18</td><td>55</td><td></td></tr><tr><td>585.00</td><td>31.04</td><td>17.024</td><td>42.18</td><td>35</td><td></td></tr></table> <p>Raw assay data and zone data have been subjected for statistical studies to derive various parameters including sichel's 't' estimator.</p> | Strike length (m) | Average thick (m) | Net Reserves (M.T) | Grade Fe% | Cut-off Fe% | Remarks | 473.45 | 32.46 | 7.577 | 52.19 | 45 |  | 317.00 | 12.17 | 2.917 | 59.18 | 55 |  | 585.00 | 31.04 | 17.024 | 42.18 | 35 |  |
| Strike length (m) | Average thick (m)                 | Net Reserves (M.T)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Grade Fe%         | Cut-off Fe%       | Remarks            |           |             |         |        |       |       |       |    |  |        |       |       |       |    |  |        |       |        |       |    |  |
| 473.45            | 32.46                             | 7.577                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 52.19             | 45                |                    |           |             |         |        |       |       |       |    |  |        |       |       |       |    |  |        |       |        |       |    |  |
| 317.00            | 12.17                             | 2.917                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 59.18             | 55                |                    |           |             |         |        |       |       |       |    |  |        |       |       |       |    |  |        |       |        |       |    |  |
| 585.00            | 31.04                             | 17.024                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 42.18             | 35                |                    |           |             |         |        |       |       |       |    |  |        |       |       |       |    |  |        |       |        |       |    |  |
| 16                | Further work                      | <p>An approximately 19.06 ha falling in north-eastern side and south-eastern side of the block could also be assessed for resource estimation by exploratory drilling of 8 boreholes. This would eventually augment the ore reserves, so that, it is prudent to auction the mine as single block in the interest of scientific mining. (After joint inspection report) dtd.25.02.2016 of office of the commissioner, DMG-Karnataka, Bangalore. No.DMG/MLS/MECL/2015-16.</p>                                                                                                                                                                                                                                                                                                   |                   |                   |                    |           |             |         |        |       |       |       |    |  |        |       |       |       |    |  |        |       |        |       |    |  |
| 17                | Annexure/enclosures to the report | <p>MECL reports includes all the relevant maps, sections, logs, analytical reports &amp; fields photos</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                   |                   |                    |           |             |         |        |       |       |       |    |  |        |       |       |       |    |  |        |       |        |       |    |  |
| 18                | Any other information             | <p>Though the ore zone thickness is quite appreciable and impressive at 45% Fe cut-off, an attempt has also been made to evaluate the ore resources at a planning cut-off of 35% Fe. The mineralized zone has been persistent over the entire strike length of 585.00m along the wide area of 125m - 230m with an average thickness of 31.04m and the ore resources estimated is 17.024 million tonnes with the grade of 42.18 % Fe, 19.38% SiO<sub>2</sub> and 9.83% Al<sub>2</sub>O<sub>3</sub>.</p>                                                                                                                                                                                                                                                                        |                   |                   |                    |           |             |         |        |       |       |       |    |  |        |       |       |       |    |  |        |       |        |       |    |  |

### CERTIFICATE

This is to certify that the details exploration for iron ore has been carried out in M/s Bharat Mines & Minerals Limited (ML No.2245), district Ballari, Karnataka by Mineral Exploration Corporation Limited (MECL) on behalf of Department of Mines & Geology (DMG), Karnataka. The exploration has been done upto G1 and G2 level of UNFC and the report has been prepared in accordance with the Minerals (Evidence of Mineral Contents) Rule 2015 specified under Mineral Auction Rule, 2015. The duly filled in format Part-IV-A of the report as per MEMC Rule is attached herewith.

  
 (Signature)

Mineral Exploration Corporation Limited  
 (CPSE under Ministry of Mines, Govt. of India)  
 Nagpur, Maharashtra

## YEARWISE PRODUCTION &amp; DEVELOPMENT PROGRAM (Bench &amp; Section wise)

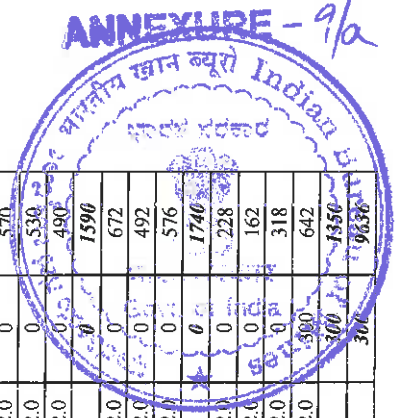
| 1st YEAR      |                   |                           |             |              |             |                    |                    |                 |             |              |             |             |                    |                 |   |    |     |   |      |  |
|---------------|-------------------|---------------------------|-------------|--------------|-------------|--------------------|--------------------|-----------------|-------------|--------------|-------------|-------------|--------------------|-----------------|---|----|-----|---|------|--|
| Sec-<br>tions | No. of<br>Benches | IRON ORE                  |             |              |             | SILICEOUS IRON ORE |                    |                 |             | WASTE        |             |             |                    |                 |   |    |     |   |      |  |
|               |                   | Level (mRL)<br>Top Bottom | Area<br>sqm | Influ<br>Mtr | Volu<br>Cum | BD<br>t/cum        | Quantity<br>tonnes | Recovery<br>90% | Area<br>sqm | Influ<br>Mtr | Volu<br>Cum | BD<br>t/cum | Quantity<br>tonnes | Total<br>Waste* |   |    |     |   |      |  |
| S2-S2'        | 4                 | 970                       | 963         | 0            | 60          | 0                  | 3.0                | 0               | 0           | 35           | 60          | 2100        | 2.8                | 5880            | 0 | 60 | 2.0 | 0 | 420  |  |
|               |                   | 963                       | 956         | 0            | 60          | 0                  | 3.0                | 0               | 0           | 42           | 60          | 2520        | 2.8                | 7056            | 0 | 60 | 2.0 | 0 | 504  |  |
|               |                   | 956                       | 949         | 61           | 60          | 3660               | 3.0                | 10980           | 9882        | 0            | 60          | 0           | 2.8                | 0               | 0 | 60 | 2.0 | 0 | 732  |  |
|               |                   | 949                       | 942         | 96           | 60          | 5760               | 3.0                | 17280           | 15552       | 0            | 60          | 0           | 2.8                | 0               | 0 | 60 | 2.0 | 0 | 1152 |  |
| sub-total     |                   |                           |             |              |             |                    |                    |                 |             |              |             |             |                    |                 |   |    |     |   |      |  |
| S2a-S2a'      | 3                 | 963                       | 956         | 20           | 50          | 1000               | 3.0                | 3000            | 2700        | 35           | 50          | 1750        | 2.8                | 4900            | 0 | 50 | 2.0 | 0 | 2808 |  |
|               |                   | 956                       | 949         | 24           | 50          | 1200               | 3.0                | 3600            | 3240        | 102          | 50          | 5100        | 2.8                | 14280           | 0 | 50 | 2.0 | 0 | 1260 |  |
|               |                   | 949                       | 942         | 190          | 50          | 9500               | 3.0                | 28500           | 25650       | 21           | 50          | 1050        | 2.8                | 2940            | 0 | 50 | 2.0 | 0 | 2110 |  |
|               |                   | sub-total                 |             |              |             |                    |                    |                 |             |              |             |             |                    |                 |   |    |     |   |      |  |
| S3-S3"        | 3                 | 963                       | 956         | 30           | 60          | 1800               | 3.0                | 5400            | 4860        | 0            | 60          | 0           | 2.8                | 0               | 0 | 60 | 2.0 | 0 | 360  |  |
|               |                   | 956                       | 949         | 60           | 60          | 3600               | 3.0                | 10800           | 9720        | 0            | 60          | 0           | 2.8                | 0               | 0 | 60 | 2.0 | 0 | 720  |  |
|               |                   | 949                       | 942         | 83           | 60          | 4980               | 3.0                | 14940           | 13446       | 0            | 60          | 0           | 2.8                | 0               | 0 | 60 | 2.0 | 0 | 996  |  |
|               |                   | sub-total                 |             |              |             |                    |                    |                 |             |              |             |             |                    |                 |   |    |     |   |      |  |
| S4a-S4a'      | 4                 | 970                       | 963         | 0            | 30          | 0                  | 3.0                | 0               | 0           | 0            | 30          | 0           | 2.8                | 0               | 0 | 30 | 2.0 | 0 | 2076 |  |
|               |                   | 963                       | 956         | 11           | 30          | 330                | 3.0                | 990             | 891         | 0            | 30          | 0           | 2.8                | 0               | 0 | 30 | 2.0 | 0 | 0    |  |
|               |                   | 956                       | 949         | 46           | 30          | 1380               | 3.0                | 4140            | 3726        | 0            | 30          | 0           | 2.8                | 0               | 0 | 30 | 2.0 | 0 | 66   |  |
|               |                   | 949                       | 942         | 33           | 30          | 990                | 3.0                | 2970            | 2673        | 0            | 30          | 0           | 2.8                | 0               | 0 | 30 | 2.0 | 0 | 276  |  |
| sub-total     |                   |                           |             |              |             |                    |                    |                 |             |              |             |             |                    |                 |   |    |     |   |      |  |
| Grand Total   |                   |                           |             |              |             |                    |                    |                 |             |              |             |             |                    |                 |   |    |     |   |      |  |
| 2nd YEAR      |                   |                           |             |              |             |                    |                    |                 |             |              |             |             |                    |                 |   |    |     |   |      |  |
| Sec-<br>tions | No. of<br>Benches | IRON ORE                  |             |              |             | SILICEOUS IRON ORE |                    |                 |             | WASTE        |             |             |                    |                 |   |    |     |   |      |  |
|               |                   | Level (mRL)<br>Top Bottom | Area<br>sqm | Influ<br>Mtr | Volu<br>Cum | BD<br>t/cum        | Quantity<br>tonnes | Recovery<br>90% | Area<br>sqm | Influ<br>Mtr | Volu<br>Cum | BD<br>t/cum | Quantity<br>tonnes | Total<br>Waste  |   |    |     |   |      |  |
| S2-S2'        | 6                 | 984                       | 977         | 43           | 60          | 2580               | 3.0                | 7740            | 6966        | 0            | 60          | 0           | 2.8                | 0               | 0 | 60 | 2.0 | 0 | 516  |  |
|               |                   | 977                       | 970         | 47           | 60          | 2820               | 3.0                | 8460            | 7614        | 23           | 60          | 1380        | 2.8                | 3864            | 0 | 60 | 2.0 | 0 | 840  |  |
|               |                   | 970                       | 963         | 0            | 60          | 0                  | 3.0                | 0               | 0           | 40           | 60          | 2400        | 2.8                | 6720            | 0 | 60 | 2.0 | 0 | 480  |  |
|               |                   | 963                       | 956         | 0            | 60          | 0                  | 3.0                | 0               | 0           | 55           | 60          | 3300        | 2.8                | 9240            | 0 | 60 | 2.0 | 0 | 660  |  |
| S2a-S2a'      | 3                 | 956                       | 949         | 75           | 60          | 4500               | 3.0                | 13500           | 12150       | 30           | 60          | 1800        | 2.8                | 5040            | 0 | 60 | 2.0 | 0 | 1260 |  |
|               |                   | 949                       | 942         | 100          | 60          | 6000               | 3.0                | 18000           | 16200       | 0            | 60          | 0           | 2.8                | 0               | 0 | 60 | 2.0 | 0 | 1200 |  |
|               |                   | sub-total                 |             |              |             |                    |                    |                 |             |              |             |             |                    |                 |   |    |     |   |      |  |
|               |                   |                           |             |              |             |                    |                    |                 |             |              |             |             |                    |                 |   |    |     |   |      |  |
| S3-S3'        | 3                 | 963                       | 956         | 57           | 50          | 2850               | 3.0                | 8550            | 7695        | 0            | 50          | 0           | 2.8                | 0               | 0 | 50 | 2.0 | 0 | 4956 |  |
|               |                   | 956                       | 949         | 38           | 50          | 1900               | 3.0                | 5700            | 5130        | 15           | 50          | 750         | 2.8                | 2100            | 0 | 50 | 2.0 | 0 | 530  |  |
|               |                   | 949                       | 942         | 43           | 50          | 2150               | 3.0                | 6450            | 5805        | 6            | 50          | 300         | 2.8                | 840             | 0 | 50 | 2.0 | 0 | 490  |  |
|               |                   | sub-total                 |             |              |             |                    |                    |                 |             |              |             |             |                    |                 |   |    |     |   |      |  |
| S4a-S4a'      | 4                 | 963                       | 956         | 24           | 60          | 1440               | 3.0                | 4320            | 3888        | 32           | 60          | 1920        | 2.8                | 5376            | 0 | 60 | 2.0 | 0 | 1590 |  |
|               |                   | 956                       | 949         | 41           | 60          | 2460               | 3.0                | 7380            | 6642        | 0            | 60          | 0           | 2.8                | 0               | 0 | 60 | 2.0 | 0 | 672  |  |
|               |                   | 949                       | 942         | 48           | 60          | 2880               | 3.0                | 8640            | 7776        | 0            | 60          | 0           | 2.8                | 0               | 0 | 60 | 2.0 | 0 | 492  |  |
|               |                   | sub-total                 |             |              |             |                    |                    |                 |             |              |             |             |                    |                 |   |    |     |   |      |  |
| S4a-S4a'      | 4                 | 970                       | 963         | 38           | 30          | 1140               | 3.0                | 3420            | 3078        | 0            | 30          | 0           | 2.8                | 0               | 0 | 30 | 2.0 | 0 | 228  |  |
|               |                   | 963                       | 956         | 27           | 30          | 810                | 3.0                | 2430            | 2187        | 0            | 30          | 0           | 2.8                | 0               | 0 | 30 | 2.0 | 0 | 162  |  |
|               |                   | 956                       | 949         | 53           | 30          | 1590               | 3.0                | 4770            | 4293        | 0            | 30          | 0           | 2.8                | 0               | 0 | 30 | 2.0 | 0 | 318  |  |
|               |                   | 949                       | 942         | 57           | 30          | 1710               | 3.0                | 5130            | 4617        | 0            | 30          | 0           | 2.8                | 0               | 0 | 30 | 2.0 | 0 | 642  |  |
| sub-total     |                   |                           |             |              |             |                    |                    |                 |             |              |             |             |                    |                 |   |    |     |   |      |  |
| Grand Total   |                   |                           |             |              |             |                    |                    |                 |             |              |             |             |                    |                 |   |    |     |   |      |  |

\*Note-Total waste includes 10% intercalated waste in ore zone

SRIPAD PUJAR  
QUALIFIED PERSON

B.V.R. ACHAR  
QUALIFIED PERSON

ANNEXURE - 9/a



## YEARWISE PRODUCTION &amp; DEVELOPMENT PROGRAM (Bench &amp; Section wise)

| 3rd YEAR                                                       |                |             |          |           |          |                    |                 |              |          |           |          |          |                 |
|----------------------------------------------------------------|----------------|-------------|----------|-----------|----------|--------------------|-----------------|--------------|----------|-----------|----------|----------|-----------------|
| Sec-tions                                                      | No. of Benches | IRON ORE    |          |           |          | SILICEOUS IRON ORE |                 |              |          | WASTE     |          |          |                 |
|                                                                |                | Level (mRL) | Area sqm | Influ Mtr | Volu Cum | BD t/cum           | Quantity tonnes | Recovery 90% | Area sqm | Influ Mtr | Volu Cum | BD t/cum | Quantity tonnes |
| S2-S2'                                                         | 3              | Top         | Bottom   | 956       | 949      | 8                  | 60              | 480          | 3.0      | 1440      | 1296     | 0        | 0               |
|                                                                |                | 949         | 942      | 41        | 60       | 2460               | 3.0             | 7380         | 6642     | 0         | 0        | 0        | 0               |
|                                                                |                | 942         | 935      | 251       | 60       | 15060              | 3.0             | 45180        | 40662    | 0         | 0        | 0        | 0               |
|                                                                |                | sub-total   |          |           |          |                    |                 | 18000        |          |           |          |          |                 |
|                                                                | 1 each         | 942         | 935      | 260       | 50       | 13000              | 3.0             | 39000        | 35100    | 0         | 0        | 0        | 0               |
| S2a-S2a'                                                       |                | 942         | 935      | 212       | 60       | 12720              | 3.0             | 38160        | 34344    | 0         | 0        | 0        | 0               |
| S3-S3'                                                         |                | 942         | 935      | 15        | 70       | 1050               | 3.0             | 3150         | 2835     | 0         | 0        | 0        | 0               |
| S4-S4'                                                         |                | 942         | 935      | 38        | 30       | 1140               | 3.0             | 3420         | 3078     | 0         | 0        | 0        | 0               |
| Grand Total                                                    |                |             |          |           |          | 45910              |                 |              | 123957   |           |          |          |                 |
| 4th YEAR                                                       |                |             |          |           |          |                    |                 |              |          |           |          |          |                 |
| Sec-tions                                                      | No. of Benches | IRON ORE    |          |           |          | SILICEOUS IRON ORE |                 |              |          | WASTE     |          |          |                 |
|                                                                |                | Level (mRL) | Area sqm | Influ Mtr | Volu Cum | BD t/cum           | Quantity tonnes | Recovery 90% | Area sqm | Influ Mtr | Volu Cum | BD t/cum | Quantity tonnes |
| S2-S2'                                                         | 5              | Top         | Bottom   | 963       | 956      | 8                  | 60              | 480          | 3.0      | 1440      | 1296     | 0        | 0               |
|                                                                |                | 956         | 949      | 52        | 60       | 3120               | 3.0             | 9360         | 8424     | 0         | 0        | 0        | 0               |
|                                                                |                | 949         | 942      | 65        | 60       | 3900               | 3.0             | 11700        | 10530    | 0         | 0        | 0        | 0               |
|                                                                |                | 942         | 935      | 58        | 60       | 3480               | 3.0             | 10440        | 9396     | 0         | 0        | 0        | 0               |
|                                                                | sub-total      | 935         | 928      | 155       | 60       | 9300               | 3.0             | 27900        | 25110    | 0         | 0        | 0        | 0               |
| S2a-S2a'                                                       |                | 949         | 942      | 26        | 50       | 1300               | 3.0             | 3900         | 3510     | 0         | 0        | 0        | 0               |
| S3-S3'                                                         |                | 942         | 935      | 54        | 50       | 2700               | 3.0             | 8100         | 7290     | 0         | 0        | 0        | 0               |
| S4-S4'                                                         |                | 935         | 928      | 115       | 50       | 5750               | 3.0             | 17250        | 15525    | 0         | 0        | 0        | 0               |
| Grand Total                                                    |                |             |          |           |          | 20280              |                 | 60840        | 54756    |           |          |          |                 |
| S3-S3'                                                         | 3              | Top         | Bottom   | 949       | 942      | 0                  | 60              | 0            | 2.8      | 0         | 0        | 0        | 0               |
|                                                                |                | 942         | 935      | 65        | 60       | 3900               | 3.0             | 11700        | 10530    | 0         | 0        | 0        | 0               |
|                                                                |                | 935         | 928      | 100       | 60       | 6000               | 3.0             | 18000        | 16200    | 0         | 0        | 0        | 0               |
|                                                                |                | sub-total   |          |           |          |                    |                 | 9900         |          |           |          |          |                 |
|                                                                | 1              | 935         | 928      | 85        | 70       | 5950               | 3.0             | 17850        | 16065    | 0         | 0        | 0        | 0               |
| Grand Total                                                    |                |             |          |           |          | 5950               |                 | 17850        | 16065    |           |          |          |                 |
| *Note- Total waste includes 10% intercalated waste in ore zone |                |             |          |           |          |                    |                 |              |          |           |          |          |                 |

\*Note- Total waste includes 10% intercalated waste in ore zone

  
 B.V.R. ACHAR  
 QUALIFIED PERSON

  
 SRIDHAR PUJAR  
 QUALIFIED PERSON



## YEARWISE PRODUCTION &amp; DEVELOPMENT PROGRAM (Bench &amp; Section wise)

| 5th YEAR      |                   |             |        |             |              |             |             |                    |                 |             |              |             |                    |                    |                 |             |              |             |             |                    |                 |             |              |             |             |                    |                |      |
|---------------|-------------------|-------------|--------|-------------|--------------|-------------|-------------|--------------------|-----------------|-------------|--------------|-------------|--------------------|--------------------|-----------------|-------------|--------------|-------------|-------------|--------------------|-----------------|-------------|--------------|-------------|-------------|--------------------|----------------|------|
| IRON ORE      |                   |             |        |             |              |             |             |                    |                 |             |              |             | SILICEOUS IRON ORE |                    |                 |             |              |             |             |                    |                 |             |              | WASTE       |             |                    |                |      |
| Sec-<br>tions | No. of<br>Benches | Level (mRL) |        | Area<br>sqm | Influ<br>Mtr | Volu<br>Cum | BD<br>t/cum | Quantity<br>tonnes | Recovery<br>90% | Area<br>sqm | Influ<br>Mtr | Volu<br>Cum | BD<br>t/cum        | Quantity<br>tonnes | Recovery<br>90% | Area<br>sqm | Influ<br>Mtr | Volu<br>Cum | BD<br>t/cum | Quantity<br>tonnes | Recovery<br>90% | Area<br>sqm | Influ<br>Mtr | Volu<br>Cum | BD<br>t/cum | Quantity<br>tonnes | Total<br>Waste |      |
|               |                   | Top         | Bottom |             |              |             |             |                    |                 |             |              |             |                    |                    |                 |             |              |             |             |                    |                 |             |              |             |             |                    |                |      |
| S2-S2'        | 7                 | 977         | 970    | 0           | 60           | 0           | 3.0         | 0                  | 0               | 0           | 60           | 0           | 2.8                | 0                  | 0               | 0           | 28           | 60          | 1680        | 2.0                | 3360            | 0           | 28           | 60          | 1680        | 2.0                | 3360           | 3360 |
|               |                   | 970         | 963    | 0           | 60           | 0           | 3.0         | 0                  | 0               | 0           | 60           | 0           | 2.8                | 0                  | 0               | 0           | 19           | 60          | 1140        | 2.0                | 2280            | 0           | 19           | 60          | 1140        | 2.0                | 2280           | 2280 |
|               |                   | 963         | 956    | 0           | 60           | 0           | 3.0         | 0                  | 0               | 0           | 60           | 0           | 2.8                | 0                  | 0               | 0           | 49           | 60          | 2940        | 2.0                | 5880            | 0           | 49           | 60          | 2940        | 2.0                | 5880           | 5880 |
|               |                   | 956         | 949    | 48          | 60           | 2880        | 3.0         | 8640               | 7776            | 0           | 60           | 0           | 2.8                | 0                  | 0               | 0           | 0            | 0           | 60          | 0                  | 2.0             | 0           | 60           | 0           | 2.0         | 0                  | 576            |      |
|               |                   | 949         | 942    | 49          | 60           | 2940        | 3.0         | 8820               | 7938            | 0           | 60           | 0           | 2.8                | 0                  | 0               | 0           | 0            | 0           | 60          | 0                  | 2.0             | 0           | 60           | 0           | 2.0         | 0                  | 588            |      |
|               |                   | 942         | 935    | 49          | 60           | 2940        | 3.0         | 8820               | 7938            | 0           | 60           | 0           | 2.8                | 0                  | 0               | 0           | 0            | 0           | 60          | 0                  | 2.0             | 0           | 60           | 0           | 2.0         | 0                  | 588            |      |
|               |                   | 935         | 928    | 188         | 60           | 11280       | 3.0         | 33840              | 30456           | 0           | 60           | 0           | 2.8                | 0                  | 0               | 0           | 0            | 0           | 60          | 0                  | 2.0             | 0           | 60           | 0           | 2.0         | 0                  | 2256           |      |
| sub-total     |                   |             |        |             |              | 20040       |             | 60120              | 54108           |             |              | 0           |                    | 0                  | 0               |             |              | 5760        |             | 0                  | 0               |             |              | 5760        |             | 0                  | 15528          |      |
| S2a-S2a'      | 9                 | 991         | 984    | 0           | 50           | 0           | 3.0         | 0                  | 0               | 0           | 50           | 0           | 2.8                | 0                  | 0               | 0           | 40           | 50          | 2000        | 2.0                | 4000            | 0           | 40           | 50          | 2000        | 2.0                | 4000           | 4000 |
|               |                   | 984         | 977    | 0           | 50           | 0           | 3.0         | 0                  | 0               | 0           | 50           | 0           | 2.8                | 0                  | 0               | 0           | 42           | 50          | 2100        | 2.0                | 4200            | 0           | 42           | 50          | 2100        | 2.0                | 4200           | 4200 |
|               |                   | 977         | 970    | 0           | 50           | 0           | 3.0         | 0                  | 0               | 0           | 50           | 0           | 2.8                | 0                  | 0               | 0           | 38           | 50          | 1900        | 2.0                | 3800            | 0           | 38           | 50          | 1900        | 2.0                | 3800           | 3800 |
|               |                   | 970         | 963    | 0           | 50           | 0           | 3.0         | 0                  | 0               | 0           | 50           | 0           | 2.8                | 0                  | 0               | 0           | 40           | 50          | 2000        | 2.0                | 4000            | 0           | 40           | 50          | 2000        | 2.0                | 4000           | 4000 |
|               |                   | 963         | 956    | 0           | 50           | 0           | 3.0         | 0                  | 0               | 0           | 50           | 0           | 2.8                | 0                  | 0               | 0           | 46           | 50          | 2300        | 2.0                | 4600            | 0           | 46           | 50          | 2300        | 2.0                | 4600           | 4600 |
|               |                   | 956         | 949    | 0           | 50           | 0           | 3.0         | 0                  | 0               | 0           | 50           | 0           | 2.8                | 0                  | 0               | 0           | 34           | 50          | 1700        | 2.0                | 3400            | 0           | 34           | 50          | 1700        | 2.0                | 3400           | 3400 |
|               |                   | 949         | 942    | 0           | 50           | 0           | 3.0         | 0                  | 0               | 0           | 50           | 0           | 2.8                | 0                  | 0               | 0           | 40           | 50          | 2000        | 2.0                | 4000            | 0           | 40           | 50          | 2000        | 2.0                | 4000           | 4000 |
| sub-total     |                   |             |        |             |              | 10300       |             | 30900              | 27810           |             |              | 0           |                    | 0                  | 0               |             |              | 14000       |             | 7400               | 0               |             |              | 14000       |             | 7400               | 30060          |      |
| S3-S3'        | 8                 | 984         | 977    | 0           | 60           | 0           | 3.0         | 0                  | 0               | 0           | 60           | 0           | 2.8                | 0                  | 0               | 0           | 30           | 60          | 1800        | 2.0                | 3600            | 0           | 30           | 60          | 1800        | 2.0                | 3600           | 3600 |
|               |                   | 977         | 970    | 0           | 60           | 0           | 3.0         | 0                  | 0               | 0           | 60           | 0           | 2.8                | 0                  | 0               | 0           | 40           | 60          | 2400        | 2.0                | 4800            | 0           | 40           | 60          | 2400        | 2.0                | 4800           | 4800 |
|               |                   | 970         | 963    | 0           | 60           | 0           | 3.0         | 0                  | 0               | 0           | 60           | 0           | 2.8                | 0                  | 0               | 0           | 43           | 60          | 2580        | 2.0                | 5160            | 0           | 43           | 60          | 2580        | 2.0                | 5160           | 5160 |
|               |                   | 963         | 956    | 0           | 60           | 0           | 3.0         | 0                  | 0               | 0           | 60           | 0           | 2.8                | 0                  | 0               | 0           | 40           | 60          | 2400        | 2.0                | 4800            | 0           | 40           | 60          | 2400        | 2.0                | 4800           | 4800 |
|               |                   | 956         | 949    | 0           | 60           | 0           | 3.0         | 0                  | 0               | 0           | 60           | 0           | 2.8                | 0                  | 0               | 0           | 48           | 60          | 2880        | 2.0                | 5760            | 0           | 48           | 60          | 2880        | 2.0                | 5760           | 5760 |
|               |                   | 949         | 942    | 0           | 60           | 0           | 3.0         | 0                  | 0               | 0           | 60           | 0           | 2.8                | 0                  | 0               | 0           | 48           | 60          | 2880        | 2.0                | 5760            | 0           | 48           | 60          | 2880        | 2.0                | 5760           | 5760 |
|               |                   | 942         | 935    | 0           | 60           | 0           | 3.0         | 0                  | 0               | 0           | 60           | 0           | 2.8                | 0                  | 0               | 0           | 48           | 60          | 2880        | 2.0                | 5760            | 0           | 48           | 60          | 2880        | 2.0                | 5760           | 5760 |
| sub-total     |                   |             |        |             |              | 9240        |             | 27720              | 24948           |             |              | 0           |                    | 0                  | 0               |             |              | 17840       |             | 7400               | 0               |             |              | 17840       |             | 7400               | 30060          |      |
| S4-S4'        | 3                 | 949         | 942    | 0           | 70           | 0           | 3.0         | 0                  | 0               | 0           | 70           | 0           | 2.8                | 0                  | 0               | 0           | 16           | 70          | 1120        | 2.0                | 2240            | 0           | 16           | 70          | 1120        | 2.0                | 2240           | 2240 |
|               |                   | 942         | 935    | 0           | 70           | 0           | 3.0         | 0                  | 0               | 0           | 70           | 0           | 2.8                | 0                  | 0               | 0           | 20           | 70          | 1400        | 2.0                | 2800            | 0           | 20           | 70          | 1400        | 2.0                | 2800           | 2800 |
|               |                   | 935         | 928    | 90          | 70           | 6300        | 3.0         | 18900              | 17010           | 0           | 70           | 0           | 2.8                | 0                  | 0               | 0           | 19           | 70          | 1330        | 2.0                | 2660            | 0           | 19           | 70          | 1330        | 2.0                | 2660           | 2660 |
| sub-total     |                   |             |        |             |              | 6300        |             | 18900              | 17010           |             |              | 0           |                    | 0                  | 0               |             |              | 3850        |             | 7700               | 0               |             |              | 3850        |             | 7700               | 8960           |      |
| Grand Total   |                   |             |        |             |              | 45880       |             |                    | 123876          |             |              | 0           |                    | 0                  | 0               |             |              | 41430       |             | 32380              | 0               |             |              | 41430       |             | 32380              | 92036          |      |

\*Note-Total waste includes 10% intercalated waste in ore zone

ANNEXURE-9/c

  
 SRIPAD PUJAR  
 QUALIFIED PERSON

  
 B.V.R. ACHAR  
 QUALIFIED PERSON







ANNEXURE - 1D

## State Level Environment Impact Assessment Authority-Karnataka

(Constituted by MoEF, Government of India, under section 3(3) of E(P) Act, 1986)

No. SEIAA 12 MIN 2007

Date: 31-01-2019



### TRANSFER OF ENVIRONMENTAL CLEARANCE

#### Preamble:

Attention is invited to the Environment Clearance Letter No. SEIAA 12 MIN 2007 dated 9<sup>th</sup> October 2009 regarding grant of Environmental Clearance to M/s. Bharat Mines and Minerals for undertaking mining of iron ore production (M.L.No. 2245) in Nandihalli Village, Sandur Taluk, Bellary District.

The Department of Mines and Geology vide letter No.DMG/MLS/AUC/'C'-2245/2018-19 Dated: 06-10-2018 has issued letter of intent from "M/s. Bharat Mines and Minerals, ML No: 2245" Block for iron ore in Nandihalli Village, Sandur Taluk, Bellary District of 24.47 Hectare Area Forest Land to M/s Kirloskar Ferrous Industries Limited as "Preferred Bidder".

Request is made by M/s Kirloskar Ferrous Industries Limited vide letter Dated: 19<sup>th</sup> January 2019 who has been declared by the Department of Mines and Geology, Government of Karnataka vide letter dated 06-10-2018 as the "preferred bidder" for the "C category" of mine - M/s. Bharat Mines and Minerals in an e-auction process to transfer the EC granted to M/s. Bharat Mines and Minerals vide E.C. letter No. SEIAA 12 MIN 2007 dated 9<sup>th</sup> October 2009 in their favour has been considered by the SEIAA during the meeting held on 25<sup>th</sup> January 2019 in the light of the provision for "Transferability of Environmental Clearance (EC)" under para 11 of the Notification No. S.O. 1533(E) dated September 14, 2006 read with the Notification No. S.O. 4241 (E) dated December 30, 2016 issued by the Ministry of Environment Forests and Climate Change, Government of India. The Authority has decided to transfer the Environmental Clearance issued vide letter SEIAA 12 MIN 2007 dated 9<sup>th</sup> October 2009 in favour of M/s Kirloskar Ferrous Industries Limited, Laxmanrao Kirloskar Road, Khadki, Pune - 411003, Maharashtra subject to the following conditions in addition to the terms and conditions under which the prior Environmental Clearance has been granted and for the same validity period.

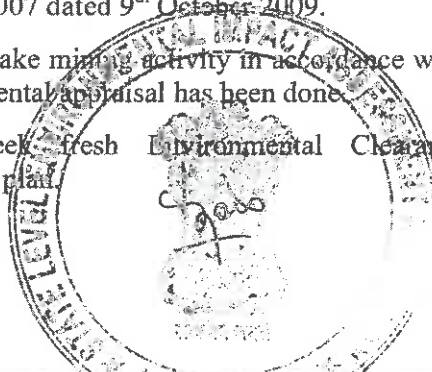
The transferee shall abide by all commitments made by the earlier proponent and honor them in the letter and spirit.

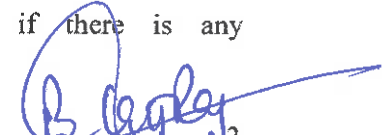
The transferee shall comply all the terms and conditions traversed directly or indirectly in the EC letter SEIAA 12 MIN 2007 dated 9<sup>th</sup> October 2009.

The transferee shall undertake mining activity in accordance with the approved mining plan based on which the environmental appraisal has been done.

The transferee shall seek fresh Environmental Clearance if there is any change/modification in the mining plan.

  
**SRIPAD PUJAR**  
**QUALIFIED PERSON**



  
**B.V.R. ACHAR**  
**QUALIFIED PERSON**

Room No. 706, 7th Floor, 4th Gate, M.S. Building, Bangalore - 560 001 Phone : 080-22032497 Fax: 080-22254377

Website : <http://seiaa.kar.nic.in> <http://seiaa.karnataka.gov.in> <http://environmentclearance.nic.in>

e-mail: [msseiaakarnataka@gmail.com](mailto:msseiaakarnataka@gmail.com)





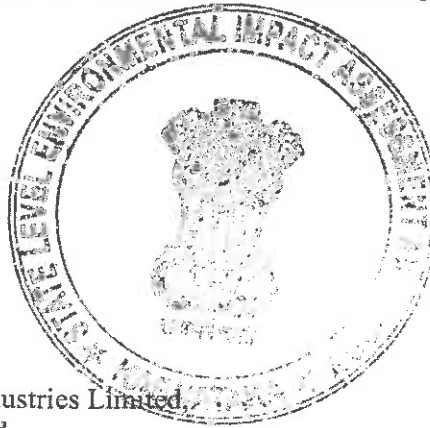
The transferee shall comply all orders, guidelines and additional conditions imposed by the Hon'ble Supreme Court, CEC and others with regard to environment safety, R&R Plan, etc

Hence the order.

### ORDER

Pursuant to the facts and circumstances traversed in the preamble, the Environmental Clearance issued in favour of M/s. Bharat Mines & Minerals, "Singhi Sadan", Infantry Road, Cantonment, Bellary-583 104 Karnataka by the State Level Environment Impact Assessment Authority, Karnataka vide letter No. SEIAA 12 MIN 2007 dated 9<sup>th</sup> October 2009 for Iron Ore Mines at Nandihalli Village, Sandur Taluk, Bellary District stands transferred to M/s. Kirloskar Ferrous Industries Limited, Laxmanrao Kirloskar Road, Khadki, Pune - 411003, Maharashtra subject to the following conditions in addition to the terms and conditions under which the prior Environmental Clearance has been granted and for the same validity period.

1. The transferee shall abide by all commitments made by the earlier proponent and honor them in the letter and spirit.
2. The transferee shall comply all the terms and conditions traversed directly or indirectly in the E.C. letter SEIAA 12 MIN 2007 dated 9<sup>th</sup> October 2009.
3. The transferee shall undertake mining activity in accordance with the approved mining plan based on which the environmental appraisal has been done.
4. The transferee shall seek fresh Environmental Clearance if there is any change/modification in the mining plan.
5. The transferee shall comply all orders, guidelines and additional conditions imposed by the Hon'ble Supreme Court, CEC and others with regard to environment safety, R&R Plan, etc.



*[Signature]*  
(N.L. Shanthakumar)  
Member Secretary,  
SEIAA

To,

M/s Kirloskar Ferrous Industries Limited,  
Laxmanrao Kirloskar Road,  
Khadki, Pune - 411003,  
Maharashtra.

Copy to:

- (1) The Secretary, Ministry of Environment, Forests and Climate Change, Indira Paryavaran Bhavan, Jor Bagh Road, Aliganj, New Delhi- 110003.
- (2) The Commissioner, Bruhat Bengaluru Mahanagara Palike (BBMP), N.R. Square, Bengaluru- 560002.
- (3) The Member Secretary, Karnataka State Pollution Control Board, Bengaluru.

- (4) The APCCF, Regional Office, Ministry of Environment & Forests (SZ) Kendriya Sadan, IV Floor, E & F wings, 17<sup>th</sup> Main Road, Koramangala II Block, Bangalore-560 034.
- (5) M/s. Bharat Mines & Minerals, "Singhi Sadan", Infantry Road, Cantonment, Bellary 583 104 Karnataka.
- (6) Guard File.



No. 8-63/2000-FC  
Government of India  
Ministry of Environment and Forests  
F.C. Division



ANNEXURE - II

Parvatan Bhawan,  
CGO Complex, Lodhi Road,  
New Delhi - 110 003.  
Dated: 20.3.2001

To,  
The Secretary (Forests)  
Govt. of Karnataka  
Bangalore

Sub: Renewal of mining lease No. 2245 in favour of M/s Bharat Mines & Minerals over 37.225 hectare of forest land in Bellary District

Sir,

(13)  
6/3  
29/3  
I am directed to refer to your letters No.FEE 32 FFM 2000 dated 24.6.2000, 14.8.2000 and 24.10.2000 on the above mentioned subject seeking prior approval of the Central Govt. in accordance with Section-2 of Forest (Conservation) Act, 1980 and to say that the proposal has been examined by the Advisory Committee constituted by the Central Government under Section 3 of the aforesaid Act.

2. After careful consideration of the proposal of the State Government and on the basis of the recommendation of the above mentioned Advisory Committee, the Central Government hereby conveys its approval under Section-2 of the Forest (Conservation) Act, 1980 for renewal of mining lease No. 2245 in favour of M/s Bharat Mines & Minerals over 26.20 hectare of forest land in Bellary District i.e. the forest land which was granted approval earlier under Forest (Conservation) Act, 1980 in 1997 and has since been totally broken up subject to following conditions:-

- Legal status of forest land shall remain unchanged.
- Lease period shall be for 20 years w.e.f. 6.4.2001.
- The user agency will be allowed use of 0.30 ha. forest land (road) which is the only route to access the mining lease area subject to condition that the user agency gives a commitment to maintain the road.
- Phased reclamation plan will be implemented by the user agency at their cost.
- The forest land shall not be used for any purpose other than that specified in the proposal.
- Fencing, protection and regeneration of the safety zone area will be done at the project cost. Besides this, afforestation over one and a half times of safety zone area in degraded forest elsewhere will be done at the project cost.
- Demarcation of mining lease area will be done on the ground using four feet high, reinforced cement concrete pillars with serial numbers, forward & back bearings and distance from pillar to pillar at project cost.

SRIPAD PUJAR  
QUALIFIED PERSON

B.V.R. ACHAR  
QUALIFIED PERSON



- 2 -

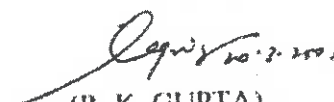
- h. The approval under the Forest (Conservation) Act, 1980 is subject to the clearance under the Environmental Protection Act, 1986, if required.
- i. Any other condition that the State Govt. or the Chief Conservator of Forests (Central), Regional Office, Bangalore may impose from time to time in the interest of conservation, protection or development of forests.

Yours faithfully,

(R. K. GUPTA)  
Asst. Inspector General of Forests

Copy to,

- ✓ 1. The Principal Chief Conservator of Forests, Government of Karnataka, Bangalore.
2. The Nodal Officer, Office of the Principal Chief Conservator of Forests, Government of Karnataka, Bangalore.
3. The Chief Conservator of Forest (Central), Regional Office, Bangalore.
4. RO(IHQ), New Delhi
5. M/s Bharat Mines & Minerals, Pannaraja Compound, Fort, Bellary-583102, Karnataka.
6. Guard file.

  
(R. K. GUPTA)  
Asst. Inspector General of Forests

8-63/2000-FC



PROCEEDINGS OF THE GOVERNMENT OF KARNATAKA

Sub:- Renewal of mining lease No.2245 in favour of M/s. Bharath Mines and Minerals, Bellary for Iron Ore Mines over an area of 26.20 ha. in Nandihally Village, Sandur Taluk, Bellary District.

READ:

- 1) Letter No.A5(B1)MNG.CR.1/2000-2001, dated 12-5-2000 of the Principal Chief Conservator of Forests, Bangalore
- 2) Letter No.A5(B1)MNG.CR.11/2000-2001, dated 11-7-2000 of the Principal Chief Conservator of Forests, Bangalore.
- 3) Letter No.A5(B1)MNG.CR.13/92-93, dated 19-8-2000 of the Principal Chief Conservator of Forests, Bangalore.
- 4) Letter No.A5(B1) MNG.CR.13/92-93(II), dated 20-10-2000 of the Principal Chief Conservator of Forests, Bangalore.
- 5) Letter No.A5(B1)MNG.CR.13/92-93, dated 3-1-2001 of the Principal Chief Conservator of Forests, Bangalore.
- 6) State Government letter No. even number dated 24-6-2000, 14-8-2000, 30-8-2000, 19-9-2000, 24-10-2000 and 24-1-2001.
- 7) Government of India, Regional Office, Bangalore letter No.F(C)A/11.1/105/KAR/MIN dated 26-4-2000 and 5-10-2000.
- 8) Government of India letter No.8-63/2000, dated 24-8-2000 and 20-3-2001.

PREAMBLE:

The Principal Chief Conservator of Forests, Bangalore had sent proposal vide his letter dated 12-5-2000 read at (1) above for diversion of forest land over an area of 26.20 ha. in Nandihally Village of Sandur Taluk of Bellary District in favour of M/s. Bharat Mines and Minerals, Bellary for a period of 10 years with effect from 6-4-2001, in accordance with Forest (Conservation) Act, 1980 subject to certain conditions.

The Proposal of Principal Chief Conservator of Forests was recommended to Government of India, Ministry of Environment and Forests, New Delhi vide letter of even number dated 24-6-2000 read at (6) above and its approval was sought under section (2) of the Forest (Conservation) Act, 1980 for the renewal of mining lease No.2245 Nandihally village, Sandur Taluk, Bellary District.

The Government of India, Regional Office, Bangalore vide its letter dated 26-4-2000 and 5-10-2000 read at (7) above had sought certain clarifications and additional information on the proposal. They were also sent through subsequent letter dated 30-8-2000 and 24-1-2001 read at (6) above.

The Principal Chief Conservator of Forests had again submitted proposal for the surrendered area of 13.86 hectare in Nandihally Village, S.M. Block, Sandur Taluk, Bellary District in favour of M/s. Bharat Mines and Minerals, Bellary under the





Forest (Conservation) Act, 1980 with certain terms and conditions for a period of 10 years with effect from 7-4-2001. This was also recommended to Government of India by Government of Karnataka vide letter of even number dated 14-8-2000 read at (6) above.

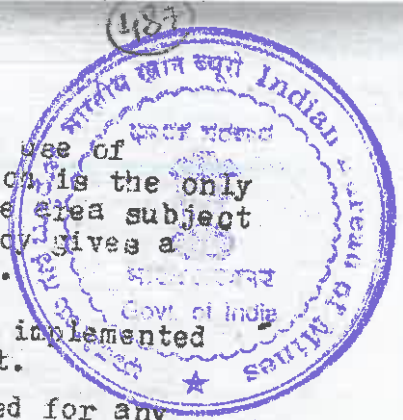
The Principal Chief Conservator of Forests vide his letter dated 20-10-2000 and 3-1-2001 read at (4) and (5) respectively has informed Government that the User agency has remitted a sum of Rs.4,13,700/- through D.D.No.202612 dated 26-9-2000 being penalty amount imposed for 2.10 ha. X 4 times Rs.49,250/- per hectare for having encroached the Forest area of 2.10 ha. outside the leased area. This report of the Principal Chief Conservator of Forests was forwarded to Government of India on 24-10-2000 by the State Government read at (6) above.

After careful consideration of the proposal of the State Government and on the recommendation of the Advisory Committee constituted by the Central Government under section 2 of the Forest (Conservation) Act, 1980 for renewal of mining lease No.2245 in favour of M/s. Bharat Mines and Minerals over 26.20 ha. of forest land in Bellary District i.e. the forest land which was granted approval earlier under Forest (Conservation) Act, 1980 in 1 subject to certain conditions.

GOVERNMENT ORDER NO.FEE 32 FPM 2000, BANGALORE, DATED:4-4-2001

After examining all aspects of the matter and in view of the approval accorded to the proposal by the Ministry of Environment and Forests, Government of India, New Delhi, Government are pleased to accord its approval (under section of the Forests Conservation Act, 1980) for the renewal of mining lease No.2245 in favour of M/s. Bharat Mines and Minerals, Bellary over an area of 26.20 hectare of forest land in Nandihally village of Sandur Taluk of Bellary District i.e. the forest land which was granted approval earlier under Forest (Conservation) Act, 1980 in 1997 and has since been totally broken up subject to following conditions:-

1. Legal status of forest land shall remain unchanged.
2. Lease period shall be for 20 years with effect from 6-4-2001.



3. The User agency will be allowed use of 0.30 ha. forest land (road) which is the only route to access the mining lease area subject to condition that the User agency gives a commitment to maintain the road.
4. Phased reclamation plan will be implemented by the User agency at their cost.
5. The forest land shall not be used for any purpose other than that specified in the proposal.
6. Fencing, protection and regeneration of the safety zone area will be done at the project cost. Besides this, afforestation over one and a half times of safety zone area in degraded forest elsewhere will be done at the project cost.
7. Demarcation of mining lease area will be done on the ground using four feet high reinforced concrete pillars with serial numbers, forward and back bearings and distance from pillar to pillar at project cost.
8. The approval under the Forest (Conservation) Act, 1980 is subject to the clearance under the Environmental protection Act, 1986, if required.
9. Any other condition that the State Government or the Chief Conservator of Forests (Central), Regional Office, Bangalore may impose from time to time in the interest of conservation, protection or development of forests.
10. The lessee shall pay usual lease rent and supervision charges as prescribed by the Government from time to time.
11. The lessee shall open a firewood depot to supply firewood to the employees and labourers at the subsidised rates and the quantity to be prescribed by the Deputy Conservator of Forests concerned.
12. The lessee shall undertake the afforestation measures in vacant area of the leased area.
13. The lessee shall carry out soil and water conservation measures and other necessary measures as advised by the Forest Department.
14. The lessee shall undertake to protect rigidly the leased area and forest area surrounding the area upto one Km. from the leased area.





15. The lessee shall not cut any trees without prior permission of the Forest Department and all produce of permitted fellings shall be handed over to Forest Department under cover of receipt.
16. The lessee shall abide by all the conditions prescribed by Government of India and Government of Karnataka.
17. The lessee shall execute an agreement with the Forest Department binding himself to abide by all usual conditions and terms as per orders of the Government as well as Principal Chief Conservator of Forests.
18. In case of violation of agreement condition of Forest Department shall have right to suspend the mining activities.
19. The lessee shall take-up the planting work on the static dumps during the advance mining operations.

BY ORDER AND IN THE NAME OF THE  
GOVERNOR OF KARNATAKA,

*K.T. Vijayaraj Urs*  
(K.T. VIJAYARAJ URS)  
Under Secretary to Government  
Forest, Environment & Ecology Dept.

TO

The Compiler, State Gazettee with a request to publish the government order and to send 50 copies to the Government and also to the Principal Chief Conservator of Forests and others.

Copy to:-

1. Accountant General (Audit and Accounts), Karnataka, Bangalore.
2. The Secretary to Government of India, Ministry of Environment and Forests, C.G.O. Complex, Lodhi Road, New Delhi.
3. The Chief Conservator of Forests (C), Regional Office, Southern Zone, Kendriya Sadana, II Block, 4th Floor, C & F Wing, 17th Main, Koramangala, Bangalore.
4. The Principal Secretary to Government, Commerce and Industries Department.
5. The Secretary to Government-II, Commerce and Industries.
6. Principal Chief Conservator of Forests, Aranya Bhavan, Bangalore.
7. The Director, Mines and Geology Department, Bangalore.
8. The Chairman, Karnataka State Pollution Control Board, Bangalore.
9. The Conservator of Forests, Bellary Circle, Bellary.
10. The Deputy Conservator of Forests, Bellary.
11. The Deputy Commissioner, Chitradurga.
12. The Deputy Conservator of Forests, Bellary Division, Bellary.
13. The Under Secretary to Government, Forest, Environment and Ecology Department (E & F).
14. M/s. Bharat Mines and Minerals, Bellary District (Pannara Compound, Fort, Bellary-583102).
15. Spare copies/ Section Guard File.

## FEASIBILITY STUDY REPORT



### 1. General Mine description.

M/s Bharath Mines & Minerals Limited (ML No.2245) mine lease block in Sandur Taluka, Bellary District Over an extent of 24.47 Ha area of Forest Land of Kumarswamy range (Devadarigudda) is a C category iron ore mining lease auctioned by GoK, and KFIL, is the 'Preferred Bidder' as per the Letter of Intent of Govt of Karnataka after e-auction.

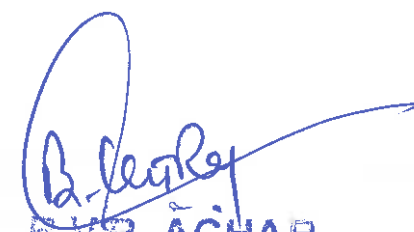
### 2. Exploration- pitting/trenching/drilling.

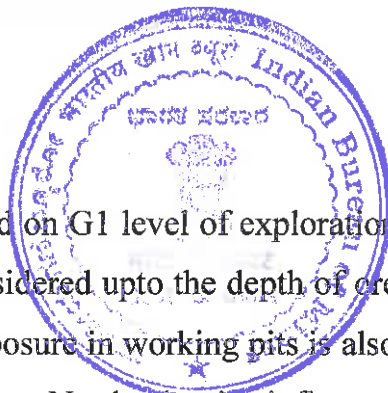
M/s MECL has drilled 4 nos. of Core drill holes (189.80m) and 15 nos. of RC drill holes (691m) during 2016. These Bore holes are marked in Geological Plan and borehole logs are enclosed in Annexure.

### 3. Reserve assessment-sampling, chemical analysis, recovery with cut – off grade & tonnage factor method of assessment.

Resource/reserves were updated by cross sectional method considering the IBM threshold values (+45% Fe for Iron Ore, +35% Fe for Siliceous ore) based on the level of exploration conducted by MECL. Geological cross sections are prepared at 50 to 100m interval. Sectional areas are calculated, and these areas are multiplied by sectional influence to arrive at the volume of the individual lithology. This volume is multiplied by bulk density to calculate tonnages.

  
S. R. PUJAR  
QUALIFIED PERSON

  
B. V. R. ACHAR  
QUALIFIED PERSON



Proved Mineral Reserves (111) are estimated based on G1 level of exploration data (drilling- 50mx100m grid). Proved ore is considered upto the depth of ore intersection in individual boreholes. Actual ore exposure in working pits is also considered as proved ore limit at individual sections. No depth wise influence is considered for estimation of proved mineral reserves.

Some portion of the ore is not minable as it is blocked outside the pit limit along the lease boundary in 7.5m safety zone. These are classified as Feasibility Mineral Resources (211).

Ore present up to 20-30m below the proved reserves based on the structure of the ore body is classified as Inferred mineral resources (333).

Although MECL has considered Bulk Density as 3.5 tons/cum which is high. However, a Bulk density of 3.0 tons/cum is considered for iron ore and for Siliceous ore, it is 2.8 tons/cum based on the experience in the sector. BD for waste is 2.0 tons/cum. Field testing of Bulk Density will be carried out after the start of the mine operation. A recovery of 90% has been considered.

#### Summary of updated Reserves

| Category                     | UNFC    | Iron ore in tonnes |           |           |           |
|------------------------------|---------|--------------------|-----------|-----------|-----------|
|                              |         | Normal             | Siliceous | Total     | Avg Grade |
| A. Total Mineral Reserves    |         |                    |           |           |           |
| Proved Mineral Reserves      | G1 -111 | 2,995,326          | 328,079   | 3,323,405 | 52.19%    |
| Probable Mineral Reserves    | G2- 121 | 81,000             | -         | 81,000    |           |
| B. Total Remaining Resources |         |                    |           |           |           |
| Feasibility Mineral Resource | G1-211  | 1,094,445          | 68,040    | 1,162,485 |           |
| Prefeasibility Mineral       | G2-221  |                    |           |           |           |
| Measured Mineral Resource    | G1- 331 |                    |           |           |           |
| Indicated Mineral Resource   | G2- 332 |                    |           |           |           |
| Inferred Mineral Resource    | G3- 333 | 2,880,927          | -         | 2,880,927 |           |
| Total (A+B)                  |         | 7,051,698          | 396,119   | 7,447,817 |           |



4. **Production schedule-mine capacity, total handling/ROM ore & OB/waste handling,rate of production,dilution,recovary grade control /blending.**

Production capacity as per CEC approved production limit is 1.24 LTPA and same is proposed in this plan period.

#### **Summary of production program**

| <b>Year</b> | <b>Iron Ore<br/>In tonnes</b> | <b>Waste in<br/>tonnes</b> | <b>Ore to waste<br/>ratio</b> |
|-------------|-------------------------------|----------------------------|-------------------------------|
| First       | 124,000                       | 9,344                      | 1:0.08                        |
| Second      | 124,000                       | 9,636                      | 1:0.08                        |
| Third       | 124,000                       | 9,182                      | 1:0.07                        |
| Fourth      | 124,000                       | 16,276                     | 1:0.13                        |
| Fifth       | 124,000                       | 92,036                     | 1:0.74                        |

5. **Mining method- bench dimensions,slope angle,strippng ratio & drilling, mining & transport equipment/Machinery.**

Mining is by Fully mechanized open cast mining method involving extraction of iron ore. Bench height and width will be 7m. The overall pit slope angle will be 45° max from the horizontal. Drilling and blasting techniques will be used to break the ore/waste formation. ROM will be fed to crushing and screening plants to produce saleable fractions. All waste material will be dumped systematically in the area earmarked.

Ore haulage will be by road through trucks of 16 ton capacity. Loading will be carried out systematically and care will be taken to prevent spillage and dust generation. All loaded trucks will be covered by tarpaulins to avoid generation of dust during haulage. Other activities like water supply for domestic use, water sprinkling and afforestation will be done by water tankers.

#### ***Machinery:***

The lessee will provide sufficient machinery. The list of them is given below.

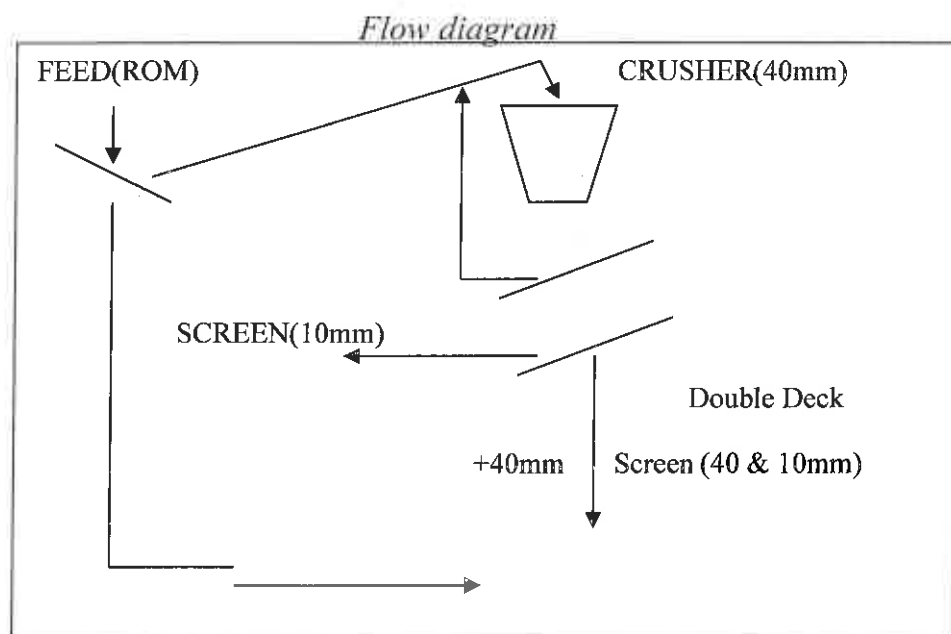
| Type                     | Nos. | Size / Capacity |
|--------------------------|------|-----------------|
| Wagon drill / Compressor | 1    | 115mm           |
| Excavator                | 2    | 0.9cum          |
| Wheel Loader             | 1    | 1.0 cum         |
| Tipper                   | 5    | 16 tons         |
| Jeep                     | 1    | 5 Seat          |
| Water Tanker             | 2    | 8000 Ltrs.      |
| DG Set                   | 1    | 33KVA           |
| Crusher/Screening plants | 1    | 100 TPH         |



**6. Benefication-crushing/manual dressing, sorting, sizing & washing.**

No wet mineral processing, only dry crushing and screening for size separation as per buyer's requirement. Crushing/Screening Plant will be of 100 tph. ROM will be fed to plant to bifurcate the same in to -10mm fines and +10 to -30/40mm calibrated ore.

In the plant, the ROM shall be separated first into -10mm and +10mm material by screening. +10mm will be crushed in the crusher, set to crush at 40mm. The crushed material will be screened on 40mm and 10mm screens as Calibrated Ore and Fines respectively. The lumps if required are crushed to -40mm size and then treated in the Screening Plant.



### Likely material balance

| Description        | Rate    |
|--------------------|---------|
| Feed (ROM)         | 100 tph |
| Cal. Ore(-40+10mm) | 70 tph  |
| Fines (-10mm)      | 30 tph  |



**7. Marketing –type of commodity with use, prospective buyers, present sale price & forecasts.**

Since this mine is a captive mine, entire production will be utilized in the KFIL Plant. All iron ore of +45% Fe will be used in the steel industry run by KFIL.

**8. Infrastructure-road, power source, labour supply and skill:**

All the required infrastructural facilities like office, resting area, canteen, water facilities etc will be set up inside lease area. Sandur-Narayanapura village road is passing at the NE side of the lease at a km away. Water for drinking and domestic purposes will be sourced from the Borewell from the nearby area. Ranjitpura (2km) is the nearest railway station and Marmugoa is the nearest port (400km). Donimalai township (3km) is having all facilities like Police outpost, Hospital, Post Office, School, Workshops etc.

### Category wise employment

| Sl. No            | Description     | Nos. | Sl. No | Description | Nos. |
|-------------------|-----------------|------|--------|-------------|------|
| 1                 | Mine Manager    | 1    | 6      | Mechanic    | 1    |
| 2                 | Mining Engineer | 1    | 7      | Supervisors | 4    |
| 3                 | Geologist       | 1    | 8      | Drivers     | 5    |
| 4                 | Foremen         | 1    | 9      | Operators   | 2    |
| 5                 | Mining Mate     | 1    | 10     | Helpers     | 4    |
| <b>Total - 21</b> |                 |      |        |             |      |

- 9. Environmental requirements-EIA&EMP, mine closure and reclamation plan, sustainable development strategy etc.**

EIA studies and EMP including socio-economic impact, rehabilitation of project affected persons, waste disposal/reclamation detailed land use data were carried out by a reputed environmental consultancy firm and Environmental clearance is taken for this lease earlier. A progressive mine closure plan is enclosed in the Mining Plan.

- 10. Others like legal factors like tribal issues, national parks etc.**

Not applicable

- 11. Economic evaluation-capital cost, production & transportation costs, royalty & other taxes, the availability of financing & profits to indicate that the mine is technically and economically viable under foreseeable operating scenario.**

As the mine is captive for KFIL Ltd and all ore production will be sent to the Steel Plant, hence economic viability issue will not arise.

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