

# **EXECUTIVE SUMMARY**

**OF**

## **ENVIRONMENTAL IMPACT**

### **ASSESSMENT REPORT**

**FOR**

## **PUBLIC HEARING**

**OF**

## **Mainpat Bauxite Mine**

**(M. L. Area 639.169 ha)**

**Expansion in Production Capacity from**

**0.75 Million TPA to 2.25 Million TPA**

**(Dispatchable Bauxite)**

**At**

**Villages- Kesra, Kudaridih & Sapnadar,**

**Tehsil- Mainpat, District- Surguja (Chhattisgarh)**

#### **APPLICANT**

**M/s. Bharat Aluminium Company Ltd.**

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## INDEX

POINT NO.	TOPIC	PAGE NO.
1.0	PROJECT DESCRIPTION	1
1.1	INTRODUCTION	1
1.2	TYPE OF PROJECT	1
1.3	NEED FOR THE PROJECT	2
1.4	BREIF DESCRIPTION OF THE PROJECT	2
1.5	LOCATION MAP	4
1.6	MINE DESCRIPTION	5
1.6.1	MINING LEASE STATUS	5
1.6.2	MINING DETAILS	5
1.6.3	METHOD OF MINING	6
2.0	DESCRIPTION OF THE ENVIRONMENT	6
2.1	PRESENTATION OF RESULTS (AIR, NOISE, WATER & SOIL)	6
2.2	BIOLOGICAL ENVIRONMENT	7
2.3	SOCIO – ECONOMIC ENVIRONMENT	7
3.0	ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES	7
4.0	POST PROJECT ENVIRONMENTAL MONIOTIRNG PROGRAMME	8
5.0	ADDITIONAL STUDIES	8
6.0	PROJECT BENEFITS	8
7.0	ENVIRONMENT MANAGEMENT PLAN	9
7.1	AIR QUALITY MANAGEMENT	9
7.2	WATER QUALITY MANAGEMENT	9
7.3	NOISE POLLUTION CONTROL	10
7.4	GREENBELT DEVELOPMENT AND PLANTATION PROGRAM	10
7.5	SOCIO- ECONOMIC ENVIRONMENT	10



## 1.0 PROJECT DESCRIPTION

### 1.1 INTRODUCTION

Bharat Aluminium Co. Ltd. (BALCO) since its inception in the year 1965 as a Public Sector Undertaking (PSU), with commencement of production at a capacity of 1.0 Lac TPA of Aluminium, in the year 1973, has been closely associated with the Indian Aluminium Industry, in a pivotal role and is playing a crucial role in introducing Aluminium as a potential alternative to other metals like Steel in construction, and Copper in power transmission industry with an aim to be a world class Integrated Aluminium and Power producer generating sustainable value for all stakeholders.

Over the years, to meet the domestic requirement of aluminium, BALCO has been gradually ramping up its production capacity and currently it stands at 5.70 lakh tons per annum.

Government of India (GoI), in the year 2001, divested 51% equity of BALCO in favour of Vedanta Limited (formerly known as Sesa Sterlite Ltd.) and remaining 49% stake is still with Government of India (GoI).

BALCO has an integrated aluminium plant at Korba in the state of Chhattisgarh with a smelter capacity of 5.70 Lac TPA with capabilities to produce ingots, wire-rods, billets, busbars and rolled products. The major operations of BALCO in Korba are as given below:

- Smelter of capacity 5.70 Lac TPA
- Captive Power Plant of capacity 270 MW
- Captive Power Plant of capacity 540 MW
- New power plant with rated capacity of 1,200 MW (600 MW IPP and 600 MW CPP)

The Company has two captive Bauxite mines in Chhattisgarh state Viz. Mainpat Bauxite Mine with production capacity 0.75 Million TPA at District- Surguja and Bodai Daldali Bauxite Mine with production capacity of 1.25 Million TPA at District- Kabirdham.

### 1.2 TYPE OF PROJECT

BALCO has now proposed expansion in Bauxite production capacity from 0.75 Million TPA to 2.25 Million TPA (dispatchable) of Mainpat Bauxite Mine (ML Area 639.169 ha) located at Villages Kesra, Kudaridih and Sapnadar, Tehsil- Mainpat, District- Surguja (Chhattisgarh).

As per EIA Notification, dated 14<sup>th</sup> September, 2006 and amended as on date, the mining project falls under Category "A", Project or Activity (1a) - (3).

### 1.3 NEED FOR THE PROJECT

BALCO has an existing Integrated Aluminium Plant of capacity 5.70 Lac TPA located at Korba (Chhattisgarh), requiring about 4 Million TPA of Bauxite. Out of 4 Million TPA of Bauxite, 2 Million TPA of bauxite requirement is being met from its two captive mines in Chhattisgarh, with shortfall of 2 Million TPA of Bauxite. Currently, BALCO is importing remaining equivalent quantity of Alumina.

Therefore, BALCO has now proposed expansion in Bauxite production capacity from 0.75 Million TPA to 2.25 Million TPA (despatchable) of Mainpat Bauxite Mine (ML Area 639.169 ha) located at Villages Kesra, Kudaridih and Sapnadar, Tehsil- Mainpat, District- Surguja (Chhattisgarh).

### 1.4 BRIEF DESCRIPTION OF THE PROJECT

Table – 1

Brief Description of the Project

S. No.	Particulars	Details			
A.	Nature of project	Bauxite Mining Project			
B.	Size of project				
(i)	Mining Lease area	Total lease area: 639.169 ha ➤ Govt. Forest Land: 376.924 ha ➤ Govt. Land : 40.107 ha ➤ Private Land : 222.138 ha			
(ii)	Proposed Chrome ore Production capacity	Existing: 0.75 Million TPA dispatchable Bauxite Proposed: 2.25 Million TPA dispatchable Bauxite (after processing of ROM)			
C.	Project location (Location Map showing general and specific location of Mine site has been given as Figure- 1)				
(i)	Villages	Kesra, Kudaridih and Sapnadar			
(ii)	Tehsil	Mainpat			
(iii)	State	Chhattisgarh			
(iv)	Extent of Geographical Coordinates	S.N.	Block Name	Latitude	Longitude
		1.	Kesra	22°46'14.49" to 22°47'13.34" N	83°14'26.50" to 83°15'58.80" E
		2.	Kudaridih East	22°46'03.79" to 22°47'21.47" N	83°17'11.31" to 83°18'10.83" E
		3.	Kudardih West	22°46'24.81" to 22°48'40.26" N	83°16'46.91" to 83°17'50.84" E
		4.	Sapnadar Block -A	22°51'48.06"N to 22°52'7.36"N	83°17'45.65"E to 83°18'4.36"E
		5.	Sapnadar Block -B	22°51'05.73" to 22°51'53.67" N	83°17'14.08" to 83°18'17.83" E
(vi)	Toposheet No.	F44L1, F44L2, F44L5, F44L6			
D.	Environmental Setting Details (with approx. aerial distance and direction from the mining lease boundary)				

(i)	Nearest Town	Ambikapur (~34 km, NE direction)																											
(ii)	Nearest Highway	N.H.-78 (~16.0 km in East direction)																											
(iii)	Nearest Railway Station	Ambikapur Railway Station (~34 km in NE direction)																											
(iv)	Nearest Airport	Raipur Airport (~235 km in SW direction)																											
(v)	National Parks, Wild Life Sanctuaries, Biosphere Reserves, Tiger Reserves, Ramsar Site, Wildlife Corridors etc.	No National Park, Wild Life Sanctuary, Biosphere Reserves, Wildlife corridors, Tiger/Elephant Reserves, etc. within 10 km radius of the project site.																											
(vi)	Protected Forests within 10km radius	The study area is covered with various Protected Forests, Open Mixed Jungle and Dense Mixed Jungle. Other than this, the following Reserved Forests are also there within the study area: <table border="1" data-bbox="716 659 1344 940"> <thead> <tr> <th>S. No.</th> <th>Reserve Forest</th> <th>Distance (from nearest mine block)</th> </tr> </thead> <tbody> <tr> <td>I.</td> <td>Kumartha RF</td> <td>(0.1 km, S) from Kudaridih East Block</td> </tr> <tr> <td>II.</td> <td>Barima RF</td> <td>(2.5 km, ENE) from Kudaridih East Block</td> </tr> <tr> <td>III.</td> <td>Patkura RF</td> <td>8.5 km in West from Kesra</td> </tr> <tr> <td>IV.</td> <td>Reserve Forest</td> <td>(8.0 km, SSW) from Kesra Block</td> </tr> </tbody> </table>	S. No.	Reserve Forest	Distance (from nearest mine block)	I.	Kumartha RF	(0.1 km, S) from Kudaridih East Block	II.	Barima RF	(2.5 km, ENE) from Kudaridih East Block	III.	Patkura RF	8.5 km in West from Kesra	IV.	Reserve Forest	(8.0 km, SSW) from Kesra Block												
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(viii)	Seismic Zone	Zone – II as per IS: 1893 (Part-I) : 2002 Which means area comes under low seismicity zone																											
<b>E.</b>	<b>Cost Details</b>																												
(i)	Total Project Cost	Rs. 11.0 Crore/-																											
(ii)	Cost for Environmental Protection Measures	Capital Cost: Rs. 38.50 Lacs. Recurring Cost – Rs. 218.69 Lac/ annum																											

Note- All distances and direction measured are aerial distances  
 Source: Toposheet, Site Visit and Pre- Feasibility Report

1.5 Location Map

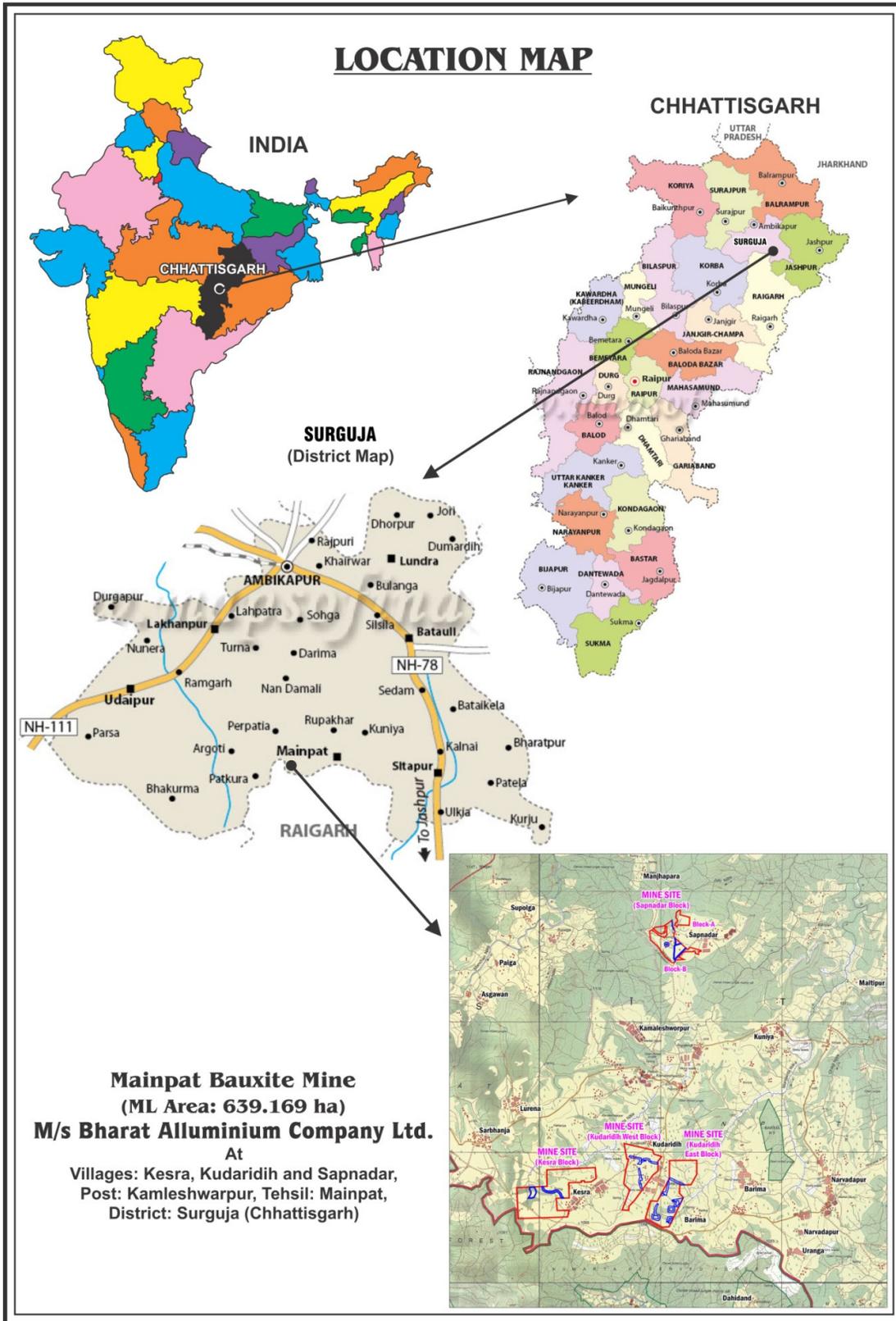


Fig. 1 Location Map

## 1.6 MINE DESCRIPTION

### 1.6.1 Mining Lease Status

Mining lease over an area of (639.169 ha) was initially granted to BALCO vide order no. 3/74/89/12307 dated 27.03.1992 of Govt. of Madhya Pradesh for a period of 20 years from 09.07.1992 to 08.07.2012. The mining lease period was extended up to 08.07.2042 under provision of 8 (A) 5 of the MMDR Amendment Act, 2015 and supplementary lease agreement between Govt. of Chhattisgarh and BALCO has been signed dated 30.07.2015.

The validity of Environmental Clearance (EC) was extended by MoEF and CC for period up to 16.09.2038, vide letter No F. No. J-11015/235/2007.IA-II (M) dated 27.10.2015, in line with MMDR (amendment Act 2015).

The of extension of validity of forest clearance was granted by State Govt. with validity extended up to 8<sup>th</sup> July'2042, i.e, co terminus with lease period, vide letter No. F-5-62/2008/10-2 dated 03.09.2016 of Conservator of Forest, Surguja.

### 1.6.2 Mining Details

**Table – 2**  
**Mining Details**

S. No.	Particulars	Details
1.	Method of Mining	Opencast Mechanized
2.	Expansion in Production Capacity	Existing: 0.75 Million TPA dispatch able bauxite Proposed: 2.25 Million TPA dispatch able bauxite (after processing of ROM)
3.	Mineable reserves	6.970 Million Tonnes
4.	Life of mine	4 years
5.	Bench Height	➤ O.B. Benches: 6 m ➤ Ore bench: 1 to 4 m
6.	Elevation Range	Kesra Block : 1070 to 1090 mRL Kudaridih Block: 1040 to 1075 m RL Sapnadar Block: 1100 to 1115 m RL
7.	Ground Water Table	20 to 25 m bgl
8.	Ultimate Working Depth	avg. 6.0 m
9.	Overall Pit Slope	27°
10.	Stripping Ratio (Ore: O.B)	1:2.63 (average)
11.	Number of Working Days per year	300
12.	Number of shifts per day	Three
13.	Top Soil Generation	909284 CuM till end of life of mine
14.	Waste Generation (SOB + HOB +	18349687 tonnes till end of life of mine

S. No.	Particulars	Details
	rejects)	

Reference: Modified Mining Plan with Progressive Mine Closure Plan

### 1.6.3 Method of Mining

Open cast mechanized method of mining using HEMM with concurrent backfilling will continue to be adopted along with drilling and blasting to remove O.B/Ore body. Mechanized sorting and sizing by means of Crusher, screening will be adopted in place of manual system. Mechanized sorting by Vibrating grizzly screen (25 mm size) will be used for segregating the soil and murrum from ROM. After which size reduction will be done by double stage crusher (300 TPH). One set of the two stage crusher with screening plant will be installed at Sapnadar and the other will be installed at Kudaridih East block for serving Kesra and Kudaridih block.

Dry beneficiation for quality improvement is proposed by sorting the Laterite chunks and segregating the fines below 10 mm, this will upgrade the quality of alumina (1.0 to 1.25%), and reduction in silica content by 1 to 1.5%, to make it suitable for the alumina refinery plant. The expected final quality will be 44% alumina and 3.75 - 4.0% silica.

The Bauxite for dispatch, top soil and waste generated will be loaded by loader/excavator and transported respective destinations. Transportation of Ore in separate lease blocks (from mine face to crusher) is done with 35 tonne dumpers, and from crushers to the Pratapgarh stock yard (~ 36 km from Mainpat) at the toe of plateau is done with 20 tonne trucks (due to undulated area) and further transportation of mineral from stockyard to Bhupdeopur Railway siding (~ 131 km from Pratapgarh) is done with 35 tonne trucks for further transportation via rail to Alumina refinery located in Lanjigarh, Odisha. From Lanjigarh refinery, the alumina is transported via rail to the company's Aluminium Plant at Korba.

## 2.0 DESCRIPTION OF THE ENVIRONMENT

### 2.1 PRESENTATION OF RESULTS (AIR, NOISE, WATER and SOIL)

The Baseline study of the study area has been conducted during Post Monsoon Season, October to December 2016. The concentrations of PM<sub>10</sub> and PM<sub>2.5</sub> for all the 10 AAQM stations were found between 47.52 to 74.11 µg/m<sup>3</sup> and 18.19 to 35.10 µg/m<sup>3</sup>, respectively. SO<sub>2</sub> ranges between 6.30 to 15.42 µg/m<sup>3</sup> and NO<sub>2</sub> ranges between 10.26 to 24.80 µg/m<sup>3</sup>. All the parameters were found within the prescribed limits.

Ambient noise levels were measured at 10 locations in and around the Mine site. Noise levels varies from 43.2 to 52.3 Leq dB(A) during day time and during night time noise levels ranges from 40.1 to 44.6 Leq dB (A).

The surface water analyses for the 13 sampling stations show pH ranges between 6.49 to 7.51, Total Hardness ranges between 13.0 to 44.62 mg/l and Total Dissolved Solids ranges between 46.00 to 87.00 mg/l.

The ground water analysis for all the 9 sampling stations shows that pH varies from 6.64 to 7.52. Total Hardness varies from 33.58 to 102.82 mg/l and Total Dissolved Solid varies from 85 to 171 mg/l

The analysis results of soil shows that soil is moderately acidic to moderately alkaline in nature as pH value ranges from 5.62 to 8.24 and soil texture is sandy clay at some places. The concentration of organic matter % ranges from 0.26 % to 1.13 %. Nitrogen is found to be in less amount as it ranged from 74.1kg/ha to 104.0 kg/ha and Phosphorous in very less amount i.e. from 5.88 to 16.48 kg/ha, whereas the Potassium is found to be ranging from 103.6 to 286.0 kg/ha which is medium in quantity.

## 2.2 BIOLOGICAL ENVIRONMENT

Flora: species which are most commonly found in the study area: *Acacia Nilotica* (Babul), *Albizzia Lebbeck* (Kala Siras), *Ficus racemosa* (Gular), *Ficus religiosa* (Pipal), *Mangifera indica* (Mango), *Pongamia pinnata* (Karani), *Tecomella undulate* (Rohida), etc.

Fauna: species which are most commonly found in the study area: *Vulpes bengalensis* (Common fox), *Canis aureus* (Jackal), *Felis chaus* (Jungle cat), *Herpestes edwardsii* (Common Mongoose), *Hemidactylus flaviviridis* (House Gecko/Chhipkali), *Rana tigrina* (Common Frog), etc.

## 2.3 SOCIO-ECONOMIC ENVIRONMENT

As per 2011 Census records, population of study area of mine site is 58354. Sex ratio is 977 (females per 1000 males). SC population distribution is 1770 and ST population distribution is 41724.

Literacy rate (in %) is 43.79 %. The percentage of total working population is 48.98% (Out of which 27.46% are main workers and 21.52% are marginal workers), Remaining, 51.02% of the total population is considered as non-workers.

## 3.0 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

- **Impact on Air Environment** - The key air emissions from the mining activities (drilling, blasting, loading, haulage, screening, crushing and transportation) are Particulate Matter, Oxides of Nitrogen (NO<sub>x</sub>) and Sulphur dioxide (SO<sub>2</sub>). Gaseous emissions generated from operation of HEMM, transportation of vehicles. Use of proper mitigation measures will be taken like wet drilling; controlled blasting; regular water spraying on haul roads, loading-unloading points for dust suppression and development of green belt along the road sides to control fugitive emissions.
- **Impact on Water Environment** - There is no surface water body/ streams flowing through ML area except few streamlets originating from the ML area which activate during rains only. The study area has various seasonal nallahs/ ponds however small check dams have been constructed on these streamlets in and around lease area to prevent sedimentation/ siltation.

Industrial waste water generated from workshop is being properly collected, treated and reused for dust suppression and equipment washing. Domestic waste water generated from mine office/rest shelter is being disposed off in soak pit, septic tank and STP. There will be no outside discharge of liquid effluent from the mine site. Therefore, no significant impact on surface water bodies is anticipated due to mining operations. Mining operations will be carried out above ground water table. Mineral is non – toxic in nature. No waste water is generated during mining activities.

- **Impact of Noise** - Major noise generating sources of the mining activity will be drilling, blasting, crushing, screening and HEMM movement used for transportation of Bauxite. The instant noise level from blasting will be high but for a very short duration. Adequate measures like use of controlled blasting, use of rock breaker, maintenance of HEMM, use of PPEs are being carried to keep noise levels below prescribed norms. The plantation and the green belt around the mining lease boundary also check propagation of noise in the surrounding areas.
- **Impact on Land Environment** – Opencast mining activities may alter the landscape of the lease area but will not have any impact on the surface features of the surrounding areas. At the conceptual stage, out of the total mining lease area (i.e. 639.169 ha), total mined-out area will be 602.38 ha; out of which, about 588.98 ha area will be backfilled and remaining 13.40 ha area will be developed as water reservoir. About, 617.10 ha area will be under greenbelt and plantation at the conceptual stage including greenbelt along lease periphery, plantation on backfilled area, un-worked area including statutory barrier etc. At the end of life of mine 6.719 ha area will remain undisturbed.

#### 4.0 POST PROJECT ENVIRONMENTAL MONITORING PROGRAMME

Table 4

S. No.	DESCRIPTION	FREQUENCY OF MONITORING
1.	Ambient Air Quality	Twice a Week
2.	Water Quality and Level	Quarterly
3.	Noise Level Monitoring	Monthly
4.	Vibration Monitoring	Monthly

#### 5.0 ADDITIONAL STUDIES

The Additional Studies (Land Use Study, Biological Study, Hydro Geological Study and Need Assessment study including R&R Plan) as per the Terms of References issued vide letter no. J-11015/166/2016 – IA-II (M) dated 17<sup>th</sup> August, 2016 are covered in Draft EIA/EMP Report.

#### 6.0 PROJECT BENEFITS

Proposed Expansion of Bauxite mining project will result in growth of the surrounding areas by community development to be undertaken by the company. Direct and indirect

employment will be generated in nearby villages and surroundings. Several developmental activities in the surrounding areas will be done under Corporate Social Responsibility (CSR).

## **7.0 ENVIRONMENT MANAGEMENT PLAN**

### **7.1 Air Pollution Control Measures**

The in-situ bauxite ore deposit has moisture content of 1.5-2% even during dry season; therefore the dust generation is considerably reduced due to the inherent moisture in the deposit. However the following measures are being adopted to control air pollution from mining operations:

- Wet drilling system to prevent dust from getting air borne.
- Controlled Blasting technique to control and prevent fly rock and minimize ground vibrations.
- Use of Rock breaker to avoid secondary blasting.
- Black topping of Main haul road
- Transportation vehicles are being maintained regularly and checked for Pollution under Control.
- Preventive maintenance of the mining equipment will be performed on regular basis to reduce generation of smoke.
- Green Belt and plantation development will be continued around the lease boundary, reclaimed area, etc.
- Regular water sprinkling over haul roads for dust suppression.
- Overloading of mineral is not allowed.
- Workers are being provided with PPEs like dust masks.
- Fort nightly ambient air quality monitoring is being carried out.

### **7.2 Water Quality Management**

- The water from garland drains is channelized to siltation pond and then to mine sump. Water thus collected is utilized for plantation, dust suppression etc.
- Check dams have been constructed in ML Area, retaining wall and garland drains around mine pits has been constructed to arrest surface run-offs.
- No wet process involved in mining operation hence, there is no waste water generation.
- Ground water table will be not be intersected during mining operations.
- Dry beneficiation process does not generate any tailings.
- Industrial waste water generated from workshop is properly collected, treated and reused for dust suppression and equipment washing after passing through oil-water separator.

- Domestic waste water generated from mine office/rest shelter will be disposed off in soak pit, septic tank and STP.
- Periodical monitoring of water quality and level is being carried out.

### 7-3 Noise Pollution Control

- Controlled Blasting with proper delay will be done.
- Rock breaker is being used to avoid secondary blasting resulting in lesser noise.
- Proper preventive maintenance, oiling and greasing of machines at regular intervals is being done to reduce generation of noise.
- HEMMs are being equipped with closed cabins to protect operators from high noise level.
- Workers operating in high noise level area are being provided with PPEs like ear muffs and ear plugs.
- Greenbelt development and plantation has been and will continue to be carried out to attenuate noise level.
- Periodical monitoring of ambient noise level is being done on regular basis.

### 7-4 GREENBELT DEVELOPMENT AND PLANTATION PROGRAM

- Out of the total ML area i.e. 639.169 ha, greenbelt and plantation will be developed on 617.10 ha area including statutory barrier along lease periphery, backfilled area etc. The trees will be planted @2500 saplings per hectare of land.
- Local plant species like Karanj, Bamboo, Silver Oak, Acacia, Neem, Jetropha, Teak, Khamar, Jacaranda, Shisham, Gulmohar, Imli, Anwla, Jamun, Ber, Guava, Kathal, Mango and other fruit bearing plants are being planted in consultation with Forest department.

### 7-5 SOCIO-ECONOMIC ENVIRONMENT

The Mainpat Bauxite Mine project by Bharat Aluminium Company Ltd. (BALCO) has generated a fair amount of direct and indirect employment in the study region. The local economy has received a boost due to employees spending and services generated by BALCO. The overall effect had improved buying power of employees and thus a higher standard of living viz. better education, improved health and drinking and sanitation facilities. This is envisaged as a major positive benefit and will ultimately lead to the sustainable development of the region. The same will be continued for the proposed expansion project.

