

# EXECUTIVE SUMMARY

## Introduction

Environmental Impact Assessment (EIA) is a process, used to identify the environmental, social and economic impacts of a project prior to decision-making. It is a decision making tool, which guides the decision makers in taking appropriate decisions for proposed projects. EIA systematically examines both beneficial and adverse consequences of the proposed project and ensure that these impacts are taken into account during the project designing.

## Project Description

### The Project

Narmadapur Bauxite mine is situated at village-Narmadapur, Tehsil- Sitapur, District- Sarguja and State- Chhattisgarh. Proposed rate of production will be 4, 00,000 TPA. The mine lease area is 47.812 Ha and the project cost is about ₹14.85crores. No forest land is involved in the mine lease area. The project falls under Category "B" as per EIA Notification 2006 and as amended so far. Life of mine will be 7 years.

### Project Proponent

CMDC limited was in Corporate under Section-21 of the Company Act 1986 by registrar of the Company 7-6-2001. The State's Chhattisgarh Mineral Development Corporation (CMDC), singly or in joint venture, undertakes scientific exploration, commercial exploitation and viable trading of minerals in the State.

The Main Object of the Company is to search Major and Minor Minerals and precious stone in the state of Chhattisgarh and to acquire mining rights for Exploration and Exploitation of minerals and for development of mines.

Our Mission is to exploration and exploitation of mineral resources, establishment and Promotion of Mineral Based Industries and explores the new Areas of Mining in Chhattisgarh and lead the mining sector of Chhattisgarh and turn it to be a safe and good position.

### Location of the Project

The proposed bauxite mine is at village-Narmadapur, Tehsil- Sitapur, District- Sarguja and State- Chhattisgarh. The silent features of the project site are given in **Table E.1**.

**Table E-1: Silent Features of the Project Site**

<b>Project Site</b>	Village-Narmadapur, Tehsil- Sitapur, District- Sarguja and State- Chhattisgarh.		
<b>Site Coordinate</b> (Refer <b>Figure 1.2</b> for map of	<b>Location</b>	<b>Latitude</b>	<b>Longitude</b>
	A	22°45'44.0" N	83°20'49.7" E
	B	22°46'10.6" N	83°20'57.9" E

## EXECUTIVE SUMMARY

coordinates superimposed on topographical sheet)	BLOCK-1	C	22°45'59.8" N	83°21'8.8" E
		D	22°45'44.5" N	83°21'12.7" E
		E	22°45'44.7" N	83°21'1.0" E
	BLOCK-II	Location	Latitude	Longitude
		F	22°45'34.2" N	83°20'47.7" E
		G	22°45'28.2" N	83°20'54.4" E
		H	22°45'32.8" N	83°21'6.7" E
		I	22°45'37.1"N	83°21'3.9" E
		J	22°45'41.6"N	83°21'01.0" E
		K	22°45'41.9"N	83°20'57.8" E
<b>Elevation above MSL</b>		1051 m to 1035 m AMSL		
<b>Nearest Highway</b>		NH-78, about 13 km (Aerial) in Eastern direction		
<b>Nearest Town/Village</b>		Ambikapur, about 45 km (Aerial) in Eastern direction		
<b>Nearest Railway Line</b>		Ambikapur Railway Station, about 45 km (Aerial) in NNW direction		
<b>Nearest Airport</b>		Raipur Airport, about 180 km (Aerial) in SW direction		
<b>Nearest Reserve Forests</b>		Kumarta RF-About 2km in SW direction Barima RF-3 km NW direction		
<b>Ecological Sensitive Zones</b>		Only Reserved Forests		
<b>Seismicity</b>		Seismic Zone II		
<b>Climatology</b>				
<b>Annual IMD Ambikapur</b>		Mean Max Temp: 44.9°C (June); Mean Min Temp: 4.4°C (January) Mean Relative Humidity: 22% (Apr) to 88% (August) Maximum Wind Speed: 7.8 kmph (June) Annual Total Rainfall: 1526.9 mm		
<b>Pre-monsoon IMD Ambikapur</b>		Mean Max Temp: 44.8°C ; Mean Min Temp: 11.1°C Mean Relative Humidity: 22.0% to 49.0% Average Wind Speed: 6.23 kmph Total Rainfall: 56.0 mm		
<b>On-site Data for Pre- Monsoon Season</b>		Mean Max Temp: 43.9 <sup>0</sup> C; Mean Minimum Temp:14.3 <sup>0</sup> C Mean Relative Humidity: 21.0% to 85.0% Wind Speed: 5.4 kmph Total Rainfall: 32 mm		

**Topography**

In the regional topography, elevation of Mainpat Plateau is about 1060 m MSL. The plateau extends about 40 kms in length towards east-west direction and about 14 kms in width towards north-south direction and is characterized by steep scarps along its edge. At places, these scarps are dissected by steep valleys in certain instances are up to 150 m deep.

The lease area is a part of this belt and is divided into two Blocks which are separated by small first order drainage. Block I is the Northern portion (35.587 Ha) and Block II is the Southern portion (12.225 Ha).

The highest elevation of Block I is 1051 mRL on the northern side and gradually sloping towards south-east direction with lowest elevation is 1041 mRL.

The highest elevation of Block II is 1049 mRL on the north-eastern side and sloping towards south-east direction with lowest elevation is 1035 mRL.

**Reserves**

**Table E-2:- Category-wise Updated Mineral Reserves as per UNFC Classification**

<i>Classification</i>			<i>Code</i>	<i>Quantity</i> (Million tonnes)	<i>Grade</i>
<b>Total (A+B)</b>	<b>Mineral Resources</b>			<b>2.91</b>	+30% Al <sub>2</sub> O <sub>3</sub>
<b>A. Mineral Reserve</b>	(1) Proved Mineral Reserve	Mineral	111	<b>2.69</b>	---do--
	(2) Probable Mineral Reserve	Mineral	121	---	
	(3) Probable Mineral Reserve	Mineral	122	---	
<b>B. Remaining Resources</b>	(1) Feasibility Mineral Resources	Mineral	211	<b>0.22 (blocked reserve)</b>	---do--
	(2) Prefeasibility Mineral Resources	Mineral	221	---	---
	(3) Prefeasibility Mineral Resources	Mineral	222	---	---
	(4) Measured Mineral Resources	Mineral	331	---	---
	(5) Indicated Mineral Resources	Mineral	332	---	---
	(6) Inferred Mineral Resources	Mineral	333	---	---do--
	(7) Reconnaissance Mineral Resources		334	---	---

**Mining**

The mining operation will be done in fully mechanized method; the excavator-dumper combination will be used for handling of OB /ROM and blasting for loosening of hard strata. The sizing and sorting of ROM will be carried out partly manual (about 30%) and major quantity (about 70%) will be through mechanized method.

The top soil will be scrapped by a dozer and kept separately by transporting through excavator-dumper combination to No Ore Zone area / sub-grade ore zone, for future spreading and covering the backfilled area finally and thereafter for future plantation will be taken up.

**Land Use Pattern**

The entire lease hold area of 47.812 Ha lies in private land. The break-up of the land use of mining lease area is given below in **Table –E3**

**Table E3:- Land Use Pattern of the Mining Area**

Sl. No.	Item	Type of Land (In Ha)					Total
		Forest Land	Agriculture Land	Barren land & rocky land	Grassing land	Any Other Type	
1	A. Lease Area	-	38.412	8.50	-	-	<b>46.912</b>
2	B. Mining & allied activities						
	Pits	-	-	-	-	-	-
	Dumps	-	-	-	-	-	-
	Roads	-	0.45	-	-	-	<b>0.45</b>
	Site Services	-	-	-	-	-	-
	Plantation	-	0.45	-	-	-	<b>0.45</b>
	Undisturbed Area	-	-	-	-	-	-
	<b>Total</b>	-	-	-	-	-	<b>47.812</b>

*Source:- Mining Plan for Narmadapur Bauxite Mine prepared by Shalabh Saha*

**Analysis of Alternatives**

In the proposed project, an opencast mining will be carried out. For that, no other methodology is going to be changed, depending upon the geological set up, strata of the rock, boulders and its structural behaviour. So, all the parameters of REIA/ EMP will be implemented as per the open cast mining.

**Description of Environment**

This section contains the description of baseline studies of the 10 km radius of the area surrounding “Narmadapur Bauxite Mine”. The data collected has been used to understand the existing environment scenario around the proposed mining project against which the potential impacts of the project can be assessed.

Baseline data was generated for various environmental parameters including air, water (surface and ground water), land and soil, ecology and socio-economic status to determine quality of the prevailing environmental settings. The study was conducted during Post-monsoon (March to May, 2014) season.

**Meteorological Data**

The data on meteorological parameters in the study area were monitored for the period Pre-monsoon (March to May, 2014). The data was monitored with an automated weather-

monitoring station placed near the proposed mining site. The data collected during Pre monsoon season are presented in **Table E4**

**Table E4:- Summary of the Site Specific Meteorological Data**

Months	Temperature (°C)			Relative Humidity (%)			Avg. Wind Speed (m/s)	Total Rainfall (mm)
	Max	Min	Avg.	Max	Min	Avg.		
March	40.7	14.3	26.3	85	23	49	1.5	32.0
April	43.9	23.5	31.5	53	21	34	1.4	0.0
May	43.9	18.5	32.8	56	22	34	1.7	0.0
<b>Average</b>	<b>42.8</b>	<b>18.8</b>	<b>30.2</b>	<b>64.7</b>	<b>22</b>	<b>39</b>	<b>1.5</b>	<b>T.Rainfall= 32mm</b>

Source: On-site monitoring by GREENC Laboratory Services

The average maximum temperature recorded during the study period was 42.8°C and the minimum temperature was 18.8°C. The average maximum RH for the study area was 64.7% while the minimum average was 22%. The average wind speed recorded was 3.6 kmph.

Wind rose diagram from the monitored data shows that the predominant wind direction during the study period was mainly in North direction.

**Air Environment**

Ten Ambient Air Quality Monitoring (AAQM) Stations were selected. Criteria used for designing the network were principally governed by the wind rose pattern for Pre monsoon seasons and the accessibility of the selected sites. Attempts were made to locate most of the AAQ stations in predominant downwind direction with respect to the project site.

The tables show the highest P98 values of PM10, PM2.5 SO<sub>2</sub> and NO<sub>x</sub> during the study periods.

**Table E-5:- Consolidated Values of AAQ (98<sup>th</sup> Percentile Values in µg/m<sup>3</sup>)**

Location	Station Code	PM-10	PM-2.5	SO <sub>2</sub>	NO <sub>x</sub>
On Site	AQ1	48.5	21.6	10.9	14.4
Uranga	AQ2	48.8	19.3	9.5	13.4
Dahidand	AQ3	49.2	18.0	10.2	13.5
Pidiya	AQ4	47.8	16.6	9.3	13.2
Kandraja	AQ5	50.4	18.6	8.9	13.2
Barima	AQ6	48.0	15.4	9.9	12.8
Bandana	AQ7	47.2	17.7	7.9	12.8
Kuniya	AQ8	46.9	15.3	7.7	12.6

Source: On-site monitoring by GREENC Labourtory Services

The value of parameters at all the location is found within the limits prescribed by Central Pollution Control Board (CPCB).

**Noise Environment**

The noise levels recorded in the monitoring locations during daytime were found to be in the range of 43.1 to 52.5 dB (A) and during night time the Leq value was between 34.1 and 40.8 dB. As the study area is sparsely populated and there are no traffic movements, the noise

level was found to be low. The noise level of all the stations was well within the prescribed norms.

### **Water Environment**

Two surface and five ground water samples were collected for analysing the water quality of the study area.

The parameters for water quality are well within tolerance limit of IS 2296 CLASS C considering the concentrations of relevant parameters. Total dissolve solids, hardness and alkalinity was found well within prescribed standards. Heavy metals such as aluminum, arsenic, cadmium, chromium, lead, manganese, mercury was found below detectable limit.

The ground water sources monitored were open wells, where water is being drawn through hand pump or manually by pulling a bucket tied with rope. Since the ground water is used without treatment by a large portion of population. It was observed that ground water samples contains and Iron=0.51 to 0.74 against permissible limit as per IS 10500, of 0.3mg/l.

### **Soil Analysis Report**

#### **Physical Parameters**

**Colour:** Colour of soil along the proposed study area varies from Yellowish to Brownish Gray .

**Moisture Content:** Moisture content of soil along the proposed study area ranges from 3.9% to 4.9%.

**Texture:** - Texture of soil along the proposed study area samples is Sandy loam.

**Bulk Density:** Bulk Density of soil is found to be in the range from 1.43 to 1.50 g/cm<sup>3</sup>.

#### **Chemical Parameters**

A brief summary of chemical characteristics are given below:

**pH:** pH is determined by taking (1:2.5) ratio of soil and distilled water. pH of soil in the proposed study area is found to be in the range of 7.3 to 8.1, The soil are, therefore, slightly alkaline.

**Conductivity:** - Conductivity is determined by taking (1:2) ratios of soil and distilled water. Conductivity of soil in the proposed study area is found to be in the range of 198 to 244 µmhos /cm.

**Available Phosphorous:** Available phosphorous of soil samples in the proposed study area ranges from 63 to 78 %

**Potassium:** Potassium content as K in soil samples in the study area is found in the range of 166 to 203 kg/ha.

**Total Organic Carbon:** Total organic carbon content in soil samples in the Study area is found to be fairly high (0.97-1.24%) and therefore the soil is fertile in terms of productivity.

### **Ecological Environment**

The lease area as well as buffer zone area reveals no endangered and endemic species of flora and fauna in the area.

**Water Requirement**

The total water requirement in the Narmadapur Bauxite Mine is about 9 KLD. The water is used in the following purpose.

- ❖ For dust suppression;
- ❖ For domestic consumption;
- ❖ For greenbelt development;

The domestic use will be met from ground water & rest will be met from water supplier.

**Air Modelling**

In order to predict the particulate emissions, Gaussian’s mathematical expression was used to predict changes in air quality i.e., maximum ground level concentration (GLC’s) of particulate matter, due to the various mining activities of the proposed mine.

**Environment Management Plan**

The mining activities involve, dozing, excavation, loading, haulage and transportation of OB and ore. These activities lead to generation of air borne dust, which can cause air pollution in and around the mining lease area, if appropriate control measures are not taken. Similarly mining causes Land Degradation, Noise and Water Pollution etc. in the area.

In order to minimize impacts of mining on different environmental parameters and to keep air and water quality within prescribed limits of CPCB, a rapid Environmental Management Plan (EMP) is prepared to strictly follow it. The environmental management plan includes all measures and safety precautions necessary for safe mining along with rehabilitation measures for mined out areas.

It is necessary to include the environmental cost as a part of the budgetary cost component. The project authorities propose to undertake the following environmental works to achieve the environmental quality as desired. The budget for environmental protection has been formulated and given in **Table E.6**.

**Table E-6:- Details of Capital Investment (Project Cost)**

SI. No.	Measures	Capital cost (Rs.)	Annual recurring cost (Rs.)
		Proposed	Proposed
1	Pollution Control	1,50,000	-
2	Pollution Monitoring	-	50,000
3	Occupational Health	50,000	50,000
4	Green Belt	50,000	850,000
5	Reclamation / Rehabilitation of mined out area	-	50,000
6	Others	1,00,000	20,000
<b>Total</b>		<b>3,50,000</b>	<b>1,020,000</b>

### Proposed Management Setup

Environment management has to be executed by a multidisciplinary team headed by a senior executive reporting to head of the mines. The team should be responsible for planning, execution and monitoring of all aspects of the environment, starting from start to closure of mines. The organization chart is prepared with a core group only for environment management and a supporting group from allied disciplines and area of activities. This supporting group would consist of civil, mechanical, electrical, commercial/finance, while core group should have experts from mining, geology, horticulture/forestry and laboratory.

The said team will be responsible for:

- ❖ Collecting water and air samples, to monitor air and water
- ❖ Analyzing the water and air samples
- ❖ Implementing the control and protective measures
- ❖ Coordinating the environmental environment related activities within the project as well as with outside agencies
- ❖ Collecting statistics of health of workers
- ❖ Green belt development and inventory of flora
- ❖ Monitoring the progress of implementation of environmental management programme
- ❖ Ambient noise level monitoring
- ❖ Management of drainage system, dumps, reclamation & restoration etc.
- ❖ The laboratory will be suitably equipped for sampling/testing of various environmental pollutants.

A well-defined environmental monitoring program would be emphasized with trained and qualified staff that would monitor the ambient air to ensure that the pollutants level is maintained always within the permissible levels. The locations will be finalized in consultation with SPCB.

### Social Environment

The mine area does not cover any habitation. Hence the mining activity does not involve any displacement of human settlement. No public buildings, places, monuments etc exist within the lease area or in the vicinity. The mining operation will not disturb/ relocate any village or need resettlement. Thus no adverse impact is anticipated.

The impact of mining activity in the area is positive on the socio-economic environment of the region. ***The negative impact will be limited to some sporadic health problems, which may occur due to increase in fugitive emission in the vicinity of the mines.*** Narmadapur Bauxite Mine is providing employment to local population and it will be give preference to the local people whenever there is requirement of man power.

### Anticipated Impacts and Mitigation measures

Environmental impact assessment (EIA) of the proposed project has been carried out with reference to air, soil, water, noise, flora, fauna and socio economic.

### **Conclusion**

As discussed, it is safe to say that the proposed facilities are not likely to cause any significant impact to the ecology of the area, as adequate preventive measures will be adopted to keep the various pollutants within the permissible limits. Green belt development around the area will also be taken up as an effective pollution mitigation technique, as well as to serve as biological indicators for the pollutants released from the premises of “Narmadapur Bauxite Mine”.