

**EXECUTIVE SUMMARY OF
ENVIRONMENTAL IMPACT ASSESSMENT /
ENVIRONMENT MANAGEMENT PLAN**

(As Per EIA Notification No. S.O. 1533(E) dated 14th September 2006)

For
**Bauxite Mining Lease Capacity of 0.1 MTPA over area 149.3376 Ha located
at Village Pakhritola, Tehsil Bagicha, District Jashpur , Chhattisgarh**
(Project Category 'B')

Submission for
Public Hearing
to
Chhattisgarh Environment Conservation Board

PROJECT PROPONENT



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EXECUTIVE SUMMARY

1.0 PROJECT DESCRIPTION :

Government of Chhattisgarh has given Letter of Intent to M/s. Chhattisgarh Mineral Development Corporation Limited for 149.3376 Ha area vide letter no. F 3-10/2021/12, dated 17.12.2021 for bauxite Ore mining. The mining lease area covers 149.3376 Ha consisting of 98.164 Ha Private land and 51.1736 Ha Government land. The present land use is rain-fed agriculture and Government wasteland.

It is a green field project. Only Exploration is carried out within the mining lease area. The Pakhritola Bauxite Ore Deposit (Major Mineral) Block is situated on The bauxite bearing laterite capping is found on the top of the basaltic plateau (Deccan traps). The laterite and bauxite are the weathering products of Deccan traps (Upper Cretaceous to Palaeocene) developed as a result of intense, substrata alteration under tropical and sub-tropical climatic conditions. The Pakhritola Bauxite Ore Deposit (Major Mineral) Block is located in and around village Pakhritola, Tahsil – Bagicha , District – Jashpur and falls in Toposheet No. 64 M/12. The area is approachable through the tar road from the District headquarter Jashpur which is about 56 km. The proposed project is an opencast Bauxite (major) mine project and is classified as “CATEGORY B” by Ministry of Environment, Forests & Climate Change, New Delhi.

The exploration work in Pakhritola Bauxite Ore Deposit (Major Mineral) Block was carried out by CMDC bauxite ore under category G-2 and G-3 levels as per the Minerals (Evidence of Mineral Contents) Rules 2015. The reserves of bauxite will be 11,54,849 tonnes on +30% Al_2O_3 cut off grade and proposed annual production rate will be 87,685 tonnes, but during 7th years and onwards the production of saleable bauxite will be 1,00,000 tonnes, hence the anticipated life of the mine will be about 15 years. The life of the mine will be increased after the proposed exploration is completed.

The Pakhritola Bauxite Ore Deposit (Major Mineral) Block Projects of Chhattisgarh Mining Corporation Ltd. covers land of Villages – Pakhritola, Tahsil – Bagicha , District – Jashpur, State – Chhattisgarh. The area of the leasehold is 149.3376 Ha. It is bounded by Latitude 23°40'42" N to 23°05'14.5" N and Longitude 83°36'22" E to 83°36'55" E and is included in Survey of India Toposheet No. 64 M/12.



The Project envisages mining with ROM Quantity of 153846 MTPA & 692000 MTPA OB with total excavation of 845846 MTPA. The saleable bauxite from the ROM is envisaged to be 100000 TPA (Max 65% of ROM) and Waste Quantity 53846 TPA (Max 35% of ROM) by Mechanized Opencast Mining Methodology. The mining lease area covers 149.3376 Ha consisting of 98.164 Ha Private land and 51.1736 Ha Government land. The present land use is rain-fed agriculture and Government wasteland.

The Mining Plan envisages peak production capacity of 153846MTPA in 149.3376 Ha Mining Lease Area. The Mining Project has been proposed to be worked by Opencast Mining Methodology for extraction of bauxite. The envisaged Project Capital Cost is Rs. 558 Lakhs.

An application for the grant of Terms of Reference (TOR) was submitted on PARIVESH portal on 01.04.2022. The Expert Appraisal Committee of MoEF&CC considered the Project for grant of Terms of Reference in its 49th EAC Meeting held on 19 to 21.04.2022 and accorded TOR for the Project. The MoEF&CC issued the TOR vide its Letter No. IA-J-11015/21 /2022-IA-II (NCM), Dated 25th May 2022.

However, subsequently, MoEF&CC vide its Notification No. S.O. 1886(E) dated 20th April 2022 amended the categorization. As per the recent amendment, now the Non-Coal Mining Project with lease area of more than 250 Ha has been classified as Category “A” Projects. Considering all the above, The Pakhritola Bauxite Ore Deposit Mine project of M/s CMDC can now be considered as Category “B” Project from Environment Angle. The Project shall be appraised by SEAC/SEIAA, Chhattisgarh of Ministry of Environment, Forest & Climate Change at State level for grant of Environment Clearance.

This Proposed production rate from the 7th year and onwards will be about 1,00,000 TPA of saleable bauxite ore. Hence life of the mine will be about 15 years, the life of the mine will be increased after the proposed exploration is completed..

The Project shall provide direct employment to nearly 117 persons besides creating many indirect employment opportunities. The local persons shall be given preference in employment for mine as per their eligibility.



Necessary training shall be given to train the unemployed youths of the nearby villages. The indirect employment opportunities shall automatically be created with the opening of the Project in the region.

Water requirement is for the purpose of domestic/drinking, dust suppression and plantation. About 3.5 KLPD of water will be required including drinking 0.5 KLD, dust suppression along haul road /faces, cleaning, washing 2 KLD as well as plantation 1 KLD. Water requirement will be met from tanker water and pit water

The electric power requirement for mine facilities will be received from Chhattisgarh State Electricity Board.

Bauxite produced from the mine shall be transported by road to the consumers by 80-90 dumpers.

After removal of bauxite the mined-out areas are concurrently backfilled with generated OB (hard /soft laterite), reject material, and top soil. The backfilling of materials shall be done in same sequence as it is found in the nature, i.e., hard laterite in bottom, then soft laterite and top soil. Levelling and compaction of backfilled area will be done from time to time by dozer so as to restore the topography in its original shape. Land will be returned to the respective owners after backfilling as per the Government land procurement act.

2.0 DESCRIPTION OF THE ENVIRONMENT

Base Line Environmental Status

The Baseline Environmental quality data for various components of environment viz. Air, Noise, Water, Land and Socio-Economic were generated during March 2022 to May 2022 in the Study Area covering 10 Kms around the Pakhritola Bauxite Ore Deposit Mine. Other environmental data on Flora and Fauna, Land Use Pattern, etc were also generated through field surveys and also collected from different State Government Departments.

Air Quality Monitoring was carried out at 6 Stations consisting 1 Sampling Stations within the Core Zone (Project Area) and 5 Sampling Stations in Buffer Zone (10 Kms around Core Zone). Parameters of twelve air pollutants viz. PM₁₀, PM_{2.5}, Sulphur Dioxide (SO₂), Oxides of Nitrogen (NO_x), Ozone (O₃), Carbon Monoxide (CO) and Heavy Metals were monitored.



These parameters were included for representing baseline status of ambient air quality within the Study Area.

Results & Discussion:

Air Environment: On the basis of observations, the parameter wise result for monitored parameters are discussed below compared with National Ambient Air Quality Standards.

Particulate Matter (PM₁₀): The maximum PM₁₀ concentration covering all the air quality monitoring stations i.e. A-1 to A-6 were observed in the range of 43.9 to 55.8 µg/m³. Almost all the stations have PM₁₀ concentrations less than half of 24 hours average permissible limit i.e. 100 µg/m³ as prescribed by MoEF&CC for industrial, residential, rural and other area.

Particulate Matter (PM_{2.5}): The maximum PM_{2.5} concentration covering all the air quality monitoring stations A-1 to A-6 were observed in the range of 20.2 to 28.7 µg/m³ as against the NAAQ Standards of MoEF& CC prescribed limit of 60 µg/m³ for industrial, residential, rural and other areas.

Sulphur Dioxide (SO₂): The maximum SO₂ concentrations covering all sampling stations A-1 to A-6 were in the range of 11.0 to 13.9 µg/m³. All monitored stations have SO₂ concentrations well within the stipulated (annual 24 hours) limit of 80 µg/m³ as prescribed for industrial, residential, rural and other areas under revised NAAQ Standards of MoEF&CC.

Oxides of Nitrogen (NO_x): The maximum NO_x concentrations covering all sampling stations A-1 to A-6 were observed in the range of 8.9 to 11.3 µg/m³. All monitored stations have NO_x concentrations well within the stipulated (annual 24 hours) limit of 80 µg/m³ as prescribed for industrial, residential, rural and other areas under NAAQ Standards of MoEF&CC .

Heavy Metals: Representative samples from all sampling stations were collected and analyzed for heavy metals i.e. Lead, Arsenic & Nickel. The concentrations of heavy metals were observed below detectable limit at all the stations.

Free Silica: A few samples of PM₁₀ were analyzed for free silica which was found to be always below 0.0001 percent. In summary, the ambient air quality of Pakhritola Ore Bauxite Mine area and its buffer zone showed that the concentrations of all monitored parameters were within the stipulated standards of MoEF&CC.



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Surface & Ground Water Environment

In summary, overall quality of water samples indicated that the water quality of all the sources is satisfactory of the area are not polluted except the surface water samples which showed bacteriological contamination possibly from surface run-off.

Pakhritola Ore Bauxite Mine falls under safe zone of Central Ground Water Authority (CGWA). The hydrogeological study concludes that there is no intersection of ground water during mining down to the depth of 16 m bgl. Hence, there will not be any abstractions of ground water in this mine. Further, impact of surface and ground water due to Bauxite ore mining will infer either natural or positive phenomena.

Noise Environment

The noise Levels in the Proposed bauxite Mine lease buffer zone was observed in the range of 35.1 to 53.9 dB (A), which are below the prescribed regulatory limits.

Flora & Fauna

There is no forest land involved within the Mining Lease. There is no any National Park, Wildlife Sanctuary, Biosphere Reserve and Migratory Corridor of Wild Animals up to 15 km from the Mining Lease Area. No endangered or threatened species was found in the study area.

Land Environment

Land use of Study Area: The land use pattern of the study area has been estimated by using satellite image. The Forest land (deciduous and scrub forest) occupying the 49.21 % of the total buffer zone area is the dominant land use. Agriculture lands are 43.26%. Wasteland/ Follow land and Mining area are found to be sharing 0.86% and 1.78% respectively. Whereas area under Habitation is 2.61%. Karmanima Nala, other streams and surface water bodies in the form of various sizes of the pond are found to share 2.07% of the share in the land use of the 10 Km radius of the buffer zone.



Soil Environment

A total of 3 Samples were collected from 3 different locations representing waste land, agriculture land and forest land at 3 different depths viz. 0-30, 30-60 and 60-90 cm below the surface. The forest land soil is found to have sufficient nutrients. The agricultural land soils are also found suitable for cultivation of climatic crops and have good fertility.

Socio-Economic Environment

As per Census 2011, demographic characteristics of the study area are represented by a number of criteria, namely population composition, sex ratio, family structure, and age distribution pattern.

Attempt has been made to compare the demographic features between the census data whenever corresponding data are available. The area selected for the study constitutes 23 inhabited villages.

3.0 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

3.1 Anticipated Environmental Impacts

- **Impact on Climate** : The proposed Project is not expected to have any major irreversible impact on the climatological features like temperature, rainfall, wind speed, humidity etc.
- **Impact on Topography**: The mining operations will change the topography and the landscape of mineral bearing area and its immediate vicinity in the core zone only. As indicated the Revised Mining Plan, after removal of bauxite the mined-out areas are concurrently backfilled with generated OB (hard /soft laterite), reject material, and top soil. The backfilling of materials shall be done in same sequence as it is found in the nature, i.e., hard laterite in bottom, then soft laterite and top soil. Leveling and compaction of backfilled area is being done from time to time by dozer so as to restore the topography in its original shape
- **Impact on Drainage**: Due to mining activities proposed on the plateau top, where rainwater/ prone to water logging will not be logged. The run off rate will also reduce due to formation of temporary pit at the top. This will change the hydrological condition of the area especially the surface water flow following the natural drainage lines along the slopes.



- **Impact on Land Use:** The proposed opencast bauxite ore will result in change of the land use pattern of the Mining Lease Area. The land degradation is expected during mining activities of excavation, overburden dumps, mineral Storage etc.
- **Impact on Soil:** Soil erosion may also get accelerated on areas where the overburden will be dumped. As there is neither a toxic effluent nor solid waste from the mines, quality of soil is not expected to be adversely affected. Impact on soil will be localized i.e. around the mine site. Likelihood of any adverse impact from soil erosion and disturbance in quality is remote.
- **Impact on Air Quality due to Mining:** In order to estimate the ground level concentrations, due to the emission from the proposed increase in production, EPA approved Industrial Source Complex AERMOD View Model has been employed. Predicted 24 hourly Ground Level Incremental Concentrations of PM₁₀, PM_{2.5}, SO₂ and NO_x are 1.58 µg/m³, 0.23 µg/m³, 0.116 µg/m³ and 2.13 µg/m³ respectively. This prediction is based on various mining operations and site specific meteorological data in worst scenario.
- **Impact on Air Quality due to Transportation:** The maximum ground level concentration due to proposed transport is estimated to be increased by 1.62 µg/m³.
- **Impact on Noise Quality:** From the Noise Modelling results, it is observed that the maximum resultant noise levels near the mine lease boundary will be about 65 dB(A). The noise levels will be further reduced and the predicted resultant noise levels at the nearest village habitation i.e. Pakhritola village will be below 52 dB(A).
- **Impact due to Ground Vibrations & Fly Rocks:** The proposed maximum charge per blast of 90 kg will result in ground vibrations well below the minimum Peak Particle Velocity limit of 5 mm/s for domestic houses located in Pakhritola village. However, since the mine lease area is located on top of a plateau, blasting near the boundary of mine lease area may cause breakage of parting left in the form of safety zone. This may result in rolling of loose boulders along the lease boundary. So, protective measures need to be adopted while blasting on the top benches near boundary of the mine lease area. Apart from this, additional control measures needs to be adopted to avoid the impacts due to ground vibrations and fly rocks due to blasting.
- **Impact on Water Regime:** It is expected that surface water runoff will decrease and ground water recharge will increase in nearby area. The mine operation will be above water table as such there is no shallow aquifer exists in the core zone. Accordingly there will not be any adverse impact on ground water. It is expected that suspended particle in surface water



during rainy season may increase. The suspended solids generated during the mining operations pose major problem for contamination of surface water.

- **Impact on Flora & Fauna:** Due to mining and associated activities, fugitive dust in the atmosphere may deposit on different parts of the plants in the surrounding area leading to the destruction of flora. During operation phase, various vehicle/ machinery movement and blasting activities would create excessive noise that may force the movement of animals from nearby forest patches. There is no Wildlife Sanctuary or National Park in 15 Km radius of the Pakhritola Bauxite Ore Deposit (Major Mineral) Mine. There is no reported migratory path of wildlife or bird species of threatened or protected species. The transport route of the mineral also lies away from these areas.
- **Impact on Socio-Economic Aspects:** The project is likely to create positive impacts due to creation of employment opportunities both direct and indirect. Generation of employment opportunities is important as the project region is devoid of any industrial activities and agriculture is the only main source of income.

3.2 Mitigation Measures

Mitigation Measures at the source level and an overall Management Plan at the Study Area Level are elicited so as to improve the supportive capacity of the Study Area and also to preserve the assimilative capacity of the receiving bodies. The Report provides detailed Action Plan for each pollutant viz. Air, Water, Noise, Socio-Economic, Land Use and Plantation Activities. The proposed Mitigative Measures to be adopted during operation of the Pakhritola Bauxite Ore Deposit (Major Mineral) Mining Project are briefly described below under various head:

4 ENVIRONMENTAL MONITORING PROGRAMME

In order to mitigate the anticipated impacts of the Bauxite Mining & Allied Activities, implementation and monitoring of the suggested EMP is an important aspect of the Environmental Impact Assessment / Environment Management Plan Document.

CMDC proposes a full-fledged Environment Department consisting of two separate Cells viz. EMP Implementation Cell and Environment Monitoring Cell to review, implement, supervise and monitor the environmental related issues. As regards to air quality monitoring two continuous ambient air monitoring stations will be installed one in the core zone and one in the buffer zone. The water quality, noise level, vibration monitoring, ground water level



(using piezometers) will be carried out and the records will be submitted to the competent authorities besides uploading the same on CMDC website.

The Mitigation Measures suggested in the Report shall be implemented in a phased manner so as to reduce the impact on environment due to operations of the proposed mining activities.

A separate budgetary allocation of the funds has been made for the Environmental Protection Measures. The monitoring of the pollution due to mining to know the effectiveness of the applied control measures shall be carried out at regular interval.

CMDC consider protection of workers' health and well-being as their prime concern and responsibility. The company accordingly proposes to adopt certain measures for providing proper occupational health services which will ensure optimal physical and mental health of employees & workers.

The Capital Budget for Environmental Protection Measure is estimated to be Rs. 16.70 Lakhs and the Recurring Budget is estimated to be Rs. 14.40 Lakhs.

5 ADDITIONAL STUDIES

As per the Terms of Reference (ToR) issued by MoEF&CC for Pakhritola Bauxite Ore Mining Project and also the prescribed Generic Structure of the EIA/EMP Document, the following Additional Studies were conducted / shall be conducted:

- a. Occupational Health & Safety
- b. Risk Assessment & Disaster Management Plan
- c. Social Impact Assessment
- d. Corporate Social Responsibility (CSR)
- e. Corporate Environment Responsibility (CER)

The Mining Lease Area of 149.3376 Ha is a partly Govt. land and partly Private land. The private land will be acquired through direct negotiation with land holders. Thus, neither there will be any Land Oustee nor any R & R of the Project Affected Persons shall be involved in the Pakhritola Bauxite Mining Project.



6 PROJECT BENEFITS

The primary benefits to the Government (State as well as Central) from any mining project are generation of additional revenues in terms of receipt of royalties and other statutory levies against the Bauxite mined. The secondary benefits to the Government are socio-political benefits in terms of enhanced economic activities and employment opportunities in the Project Area resulting into overall development of the area.

The Project shall have positive impacts in the Project Area and surrounding villages in terms of development of infrastructure facilities like roads and communication, transport, schools as well as basic amenities viz. drinking water, sanitation, hospitals, health care, and overall socio economic development.

The direct requirement of manpower for Pakhritola Bauxite Ore Deposit (Major Mineral) Mining Project has been assessed at 117 along with indirect manpower. The Company shall initiate necessary steps to create above facilities which will ultimately help in uplifting the living standards of local communities. The Project shall offer creation of Secondary & Tertiary Business Opportunities for the local people in the form of Service Industry resulting in development of ancillary & allied services like Security, Canteen & Mess, Transport, Civil Repair & Maintenance, HEMM Repair and Maintenance etc.

Corporate Social Responsibility (CSR)

CMDC proposes to undertake a number of activities under the Corporate Social Responsibility Initiative during the operation of Pakhritola Bauxite Ore Deposit (Major Mineral) Mining Project. The capital CSR budget has been worked out as per the expressed felt needs of villagers during Rapid Rural Appraisal. The proposed total budget is to the extent Rs 12.0 lakhs and will be spent in core and buffer villages of study area. About Rs 7.0 lakhs would be spent as annual recurring expenditure for CSR activities. The total CSR plan outlay is for five years.

Corporate Environment Responsibility (CER)

In addition to the CSR, CMDC proposes to undertake a number of activities as one time measure under the Corporate Environment Responsibility Initiative during the operation of Pakhritola Bauxite Ore Deposit (Major Mineral) Mining Project. A budgetary provision of Rs. 12.0



lakhs is proposed to be made and utilized for the implementation of issues raised during the Public Hearing.

7 ENVIRONMENT MANAGEMENT PLAN

7.1 Air Pollution Management:

- a) Bauxite transportation Roads shall be frequently sprinkled with water for which truck mounted water tankers with atomized mist spray sprinkler arrangement have been provided and have plantation on both sides of this road.
- b) Bauxite shall be covered by tarpaulins to prevent spread of dust from it during transportation.
- c) Regular maintenance of vehicles and machineries shall be carried out in order to control vehicular emissions.
- d) Green Belt Development shall be taken up at various places.
- e) The dust respirators shall be provided to all the workers.
- f) Good housekeeping and proper maintenance shall be practiced which shall help in controlling the pollution.
- g) Maintenance of the road.

7.2 Water Pollution Management:

The Mining Project shall require continuous supply of water for various purposes during mining, plantation etc. apart from drinking water supply. The main source of water pollution in opencast mining project is the surface run-off due to rainfall. There may be accumulation of rain water during monsoon season and the accumulated water may contain fine silt. This shall be treated in Settling Tank of adequate dimensions. The treated water (overflow) will be used for plantation and dust suppression.

The mine water pumped from the mine pit, shall be collected in a Settling Tank at surface and after treatment part of it shall be utilized for water spraying in the mine, plantation and the excess balance (if any) shall be discharged to natural water course.

It is proposed to prepare Water Security Plan for adjoining villages. WSP aims for drinking water security in selected villages by means of Ensuring Quality and quantity of water



supply, storage management (aquifer management, demand management), capacity building and training.

In order to restrict the surface runoff from mines to control the soil erosion and wash off from dumps following measures shall be adopted;

- i) Garland Drains shall be provided around the mine wherever required to arrest any soil from the mine area being carried away by the rain water;
- ii) Loose material slopes shall be covered by plantation by making contour trenches at 2 m interval to check soil erosion both due to wind and rain;
- iii) Retaining walls (concrete or local stone) shall be provided, around the dump or wherever required to support the benches or any loose material as well as to arrest sliding of loose debris.

7.3 Noise & Vibration Management:

Noise is best abated at source by choosing machinery and equipment suitably, by proper mounting of equipment and by providing noise insulating enclosures or padding where practicable. Regular and proper maintenance of vehicles shall be done which keeps the noise level within limits.

7.4 Solid Waste and Soil Management:

No proposal for external OB dumping. The mining operation will generate about 16548 cum top soil and about 10,24,200 of waste during first five years. After removal of bauxite the mined-out areas are concurrently backfilled with generated OB (hard /soft laterite), reject material, and top soil. The backfilling of materials shall be done in same sequence as it is found in the nature, i.e., hard laterite in bottom, then soft laterite and top soil. Levelling and compaction of backfilled area is being done from time to time by dozer so as to restore the topography in its original shape.

7.5 Plantation:

Plantation in the core zone will not be carried out in agricultural land, which will be returned to the respective owners after backfilling as per the Government land procurement



act. However, equivalent area will be brought under plantation in nearby villages with consultation of Gram Panchayat.

M/s CMDC proposes to develop about 25 ha (including safety & reclaimed area) of land with 50,000 saplings under plantation and greenbelt development programme in progressive manner during the life of the mine. As per the MoEF&CC guidelines, it is proposed to plant local tree species @ 2000 trees/ ha in consultation with the Forest Department.

AN EPILOGUE

In compliance with the environmental procedure the environmental clearance application is made. Necessary scientific studies have been undertaken as per the guidelines set by the Ministry of Environment Forests & Climate Change (MoEF&CC). The suggestions/recommendations of all the experts, competent authorities, and government officials are being sought for the impacts of the proposed project. Views and guidance of the local residents, community based organizations, social organizations are extremely important in order to devise a full proof Environment Management Plan for the proposed mining project and also mitigate the damages caused due to the project. Allocation of necessary funds, manpower and machinery will be made to for the protection and conservation of all the components of environment. It is ensured that all mandatory clearances will be sought from respective competent authorities before operating the proposed Pakhritola Bauxite Ore Mine. M/s CMDC is committed to implement the suggestions for the improvement of the environment and assure that every attempt will be made for the conservation and protection of the natural resources to the maximum extent. It is requested to recommend this proposal for the grant of Environmental Clearance.

