

Proposed Terms of Reference for EIA studies

Collection of Base line data in any season other than Monsoon season in study area of 10 kms radius from Lease Area. Based on the Meteorological data from IMD, the AAQ monitoring details are as given below.

1.1 Baseline Environmental Monitoring

Field studies will be conducted to determine existing conditions of various environmental attributes like ambient air quality, water quality, soil characteristics, noise levels, land use pattern, demographic pattern etc. within the 10-km radial distance from the lease area. The details of the monitoring are given in **Table - 1**.

Table - 1: Environmental Attributes & Frequency of Monitoring to be Adopted

Sl.	Attribute	Parameters	Frequency of Monitoring
1	Ambient Air Quality	PM ₁₀ , PM _{2.5} SO ₂ , NO _x	The monitoring will be carried out at 5 villages (Sensitive Area, Commercial Area, Residential Area & Forest Boundary – Buffer Zone) and 3 locations within the Lease Area (Core Zone) at a frequency of 24 hourly samples twice a week (as per CPCB Guidelines).
2	Micro Meteorology	Wind Speed and Direction, Temperature, Relative Humidity and Rainfall.	a] Continuous with hourly recording through setting up of on-site automatic meteorological station; b] Data collected from secondary sources like nearest IMD station.
3	Water Quality	Physical, Chemical and Bacteriological Parameters.	(5 ground + 5 surface) water samples will be collected during the study period.
4	Ecology & Bio-diversity	Existing terrestrial and aquatic flora and fauna.	Through field visits and secondary data.
5	Noise Levels	Noise levels in dB (A).	Once during study period at 8 locations such as sensitive, commercial and residential areas

Sl.	Attribute	Parameters	Frequency of Monitoring
6	Soil Characteristics	Soil profile, characteristics, soil type and texture, heavy metal, NPK value etc.	Once during study period at 5 locations.
7	Land use	Land use for different categories.	Land use as per the district census handbook as well as with the help of satellite imagery
8	Socio-Economic aspects	Socio-economic characteristics, labor force characteristics, etc	Based on data from latest published district census handbooks and through primary data collection.
9	Geology	Geological history	Based on data collected from secondary sources and primary data.
10	Hydrology	Drainage pattern, nature of streams.	Detailed study (primary) of drainage pattern of both core and buffer zone.
11	Traffic Study	Traffic density	Traffic density survey will be collected and interpreted.

2.0 Environmental Impact Assessment

The proposed production capacity may have some impacts on the environment. The parameters likely to be affected are air quality, water quality, soil quality, noise levels, etc. on account of gaseous emissions, liquid effluent discharges, resultant particulates etc.

The baseline data generated from the above studies will be analyzed and compared with applicable standards prescribed by the CPCB and SPCB. By this means, the impact whether positive or negative would be assessed and the environmental attributes requiring special attention for mitigating the negative impact, if any will be identified. Also the areas, which fulfill the prescribed environmental norms and not requiring further improvements, would also be specified. Impact of air pollution on surrounding ecology & environment will be carried out by using suitable Air Dispersion Modeling.

2.1 Impact on Land Use

2.1.1 *Impact Assessment*

The land use impacts due to production capacity will be identified in terms of local land use planning efforts. The change in land use pattern of Lease Area will also be identified. This will include visual impact, impact on forest, impact due to creation of urban and industrial growth centers and other growth due to socio-economic factors.

2.1.2 Mitigation Measures

The mitigation measures will be addressed towards restoration of land disturbed by the mining activities to the extent possible. Planning for the changed socio-economic will also be identified, assessed and interpreted for its positive and or negative impacts.

2.1.3 Impact on Water Environment

2.1.3.1 Impact Assessment

The impact of the water environment due to water usage and wastewater discharges will be addressed from the mining activity. The method of impact analysis will depend on the level of details available from various sources. The analysis will also include study of the water balance of the project to determine the feasibility of the source and its adequacy.

2.1.3.2 Mitigation Measures

The mitigation measures will be addressed to ensuring that the present and anticipated future water requirements for various purposes are not adversely affected by the project requirements. The measures will also address the need to maintain or improve the water quality.

2.1.4 Impact on Demography and Socio-Economics

2.1.4.1 Impact Assessment

Socio-economic impacts by comparing the before and after mining activities for demography, facilities and services, agricultural sector, civic infrastructure and basic amenities, industrial growth, economic status and health status etc will also be carried out.

2.1.4.2 Mitigation Measures

The role of different bodies in mitigation measures will be identified. The need for developing schools, housing, medical facilities and other civic amenities will be assessed in suggesting such measures.

2.1.5 Impact on Soil

2.1.5.1 Impact Assessment

Impact on soil characteristics may include destruction of soil profile changes in soil productivity, increased erosion will be assessed. The impact assessment will include an

analysis of susceptibility of the area to loss of agricultural production, change in crop pattern etc. Details on solid wastes from the mining activity will be collected. Impact assessment of disposal of solid waste will be addressed to the effect on human settlement, vegetation, ground water contamination etc.

2.1.5.2 Mitigation Measures

Based on analysis of soil data, mitigation measures will be proposed that will avoid, minimize or compensate for significant adverse impact on soil characteristics.

2.1.6 Impact on Hydrology

2.1.6.1 Impact Assessment

The impacts of the hydrology due to water usage and wastewater discharges will be addressed.

2.1.6.2 Mitigation Measures

Some examples of potential mitigation measures applicable to reduce adverse impact on surface water sources at the lease area relate to holding ponds, waste water recycling, containment of emissions etc. Control measures will be identified. Potential alterations of ground water will be identified during impact assessment. These impacts can affect local/regional ground water quality due to leaching or infiltration of surface run-offs originating from lease area. This will then have to be controlled to prevent recharge of contaminants to alluvial and bedrock aquifer system. Potential movement of contaminants associated with the disposal of wastewater too will have to be controlled

2.1.7 Impact on Water Quality

2.1.7.1 Impact Assessment

It is proposed to establish the impact of liquid effluents on natural water bodies receiving the effluents and clearly spell out the significant parameters which are likely to change the water quality critically.

2.1.7.2 Mitigation Measures

Considering the dependence of the people in the area on surface or ground water as sources for drinking purposes, the prevailing quality and extent of contamination due to mining activities, the mitigation measures will include the treatment required for meeting the effluent discharge standards specified under the Environment Protection Rules and SPCB. The disposal arrangement will also be conceptually indicated.

2.1.8 Impact of Meteorology

2.1.8.1 *Impact Assessment*

The climatological factors, which play an important role in the environmental analysis of the process of transportation, dilution and dispersion of pollutants, will be analyzed. Meteorological data will be collected to prepare wind roses, ascertain the atmospheric stability conditions and prevalence of inversion levels around the project. This will enable to define the atmospheric conditions likely to prevail during different months of the year and use it as a basis for air quality modeling studies.

2.1.9 Impact on Ambient Air Quality

2.1.9.1 *Impact Assessment*

Emission Inventory will be carried in an area of 10-km around the lease area. A computer based internationally recognized mathematical air quality model (e.g.ISCST-3) suitable for the region will be identified and run to predict the concentration of SO₂, NO_x & PM due to the mining activities. The model would also take into account other sources of pollution and topographical features of the area. The emission of relevant pollutant (SO₂, NO_x and PM) from nearby sources shall be used in the model for more accurate estimate of air quality. The results will be presented for seasonal and short term (24 hourly) concentrations over a radius of 10-km around the lease area. The dispersion model results will be included in the report using isopleths or other graphical methods, over laying a land use map of the surrounding area.

The predicted air quality will be compared with existing regulations and mitigative measures, if any, will be identified. The long term and short-term impact at all the monitoring locations shall also be estimated.

2.1.9.2 *Mitigation Measures*

Potential mitigation measures during mining activity include protection of habitats adjacent to lease area, erosion control measures, compensation of loss of forage for livestock and wildlife by improving vegetation in adjacent areas, reclamation/restoration of disturbed area etc. In case of aquatic ecological impact, mitigation measures will be addressed to restoration of physical and chemical water quality characteristics through pollution control measures.

2.1.10 Impact on Noise

2.1.10.1 *Impact Assessment*

Sources of noise and its impact on the environment would be clearly brought out. The noise level at varying distances for multi-sources will be predicted using suitable model. A comparison of measured noise (Leq) at monitoring locations to that of predicted noise levels (Leq) would be made and mitigatory measures required, if any, will be recommended to conform to regulatory ambient air noise standards.

It is proposed to estimate increase in noise levels over the baseline conditions in different zones like industrial, residential and sensitive areas like hospitals, wild life habitation etc. The potential noise level exposure will be determined and evaluated for acceptable limits of exposure.

2.1.10.2 *Mitigation Measures*

The potential mitigation measures will be addressed to reduction in noise levels by control at source, provision of greenery to absorb noise during its propagation, isolation of high noise generating sources, use of protective measures especially in high noise areas.

2.1.10.3 *Impact on Ecology*

Impacts on aquatic species especially during dry season will be assessed particularly those which are endangered. The parameters which are of concern are TSS, TDS, heavy metals, oil and grease, pH and temperature. The assessment will also include impacts of chlorinated organic chemicals. The impact of site preparation activities that may involve site clearing, excavation, earth moving will be assessed. This assessment will give priority to impacts on endangered species, if any. Measures to mitigate such adverse impacts as soil erosion and habitat loss will be addressed. In addition, impact of vehicular emissions will be assessed on the surrounding species of economic/genetic/biological importance.

2.2 Environment Management Plan

Environment Management Plan will be prepared based on the potential impacts and review of proposed control measures in the lease area.

2.3 Green Belt Development Plan

A green belt development plan for the Lease Area would be included in the EIA report. Details such as areas to be planted, suitable plant species, plantation technique and necessary infrastructures required for plantation etc. would be clearly mentioned.

2.4 Emergency Preparedness Plan and Occupational Safety

An Emergency Preparedness Plan (EPP) for dealing emergency situation arising due to fire, explosion, leakages of hazardous substances, etc. The plan would also include storage, handling, transportation etc. for the hazardous and toxic materials to be used in the mine.

Occupational risk involved during construction and operation of the project would be assessed and necessary safety protective measures would be spelt out. The EPP would include both onsite and off site plans.