

ACTIVITY 1(a)- AN OPENCAST COAL MINES

STANDARD TERMS OF REFERENCE FOR CONDUCTING ENVIRONMENT IMPACT ASSESSMENT STUDY FOR AN OPENCAST COAL MINES AND INFORMATION TO BE INCLUDED IN EIA/EMP REPORT

A. Statutory Compliance

- (i) An EIA-EMP Report shall be prepared for..... MTPA peak capacity in an ML/project area of.....ha based on the generic structure specified in Appendix III of the EIA Notification, 2006.
- (ii) An EIA-EMP Report would be prepared for..... MTPA peak capacity to cover the impacts and environment management plan for the project specific activities on the environment of the region, and the environmental quality encompassing air, water, land, biotic community, etc. through collection of data and information, generation of data on impacts including prediction modeling for MTPA of coal production based on approved project/Mining Plan for.....MTPA. Baseline data collection can be for any season (three months) except monsoon.
- (iii) If the washery is located within the mine lease or near to the mine lease its location should be cited separately also, providing pillar coordinates and site layout plan. In such cases cumulative impact of mine operation with washery to be assessed and EMP measure to be drawn to the worst scenario. Map showing the core zone along with 3-5 km of the buffer zone) delineating the agricultural land (irrigated and unirrigated, uncultivable land (as defined in the revenue records), forest areas (as per records) and grazing land and wasteland and water bodies.
- (iv) Plan of mechanized transportation of coal to coal washery also for rejects and washed coal to be drawn
- (v) Details on Public Hearing should cover the information relating to notices issued in the newspaper, proceedings/minutes of Public Hearing, the points raised by the general public and commitments made by the proponent and the time bound action proposed with budgets in suitable time frame. These details should be presented in a tabular form. If the Public Hearing is in the regional language, an authenticated English Translation of the same should be provided.
- (vi) Status of any litigations/ court cases filed/pending on the project should be provided.
- (vii) Copy of clearances/approvals such as Forestry clearances, Mining Plan Approval, mine closer plan approval. NOC from Flood and Irrigation Dept. (if req.), etc. wherever applicable must be provided.
- (viii) A copy of application submitted for 5 star rating system to Ministry of coal for expansion cases may be provided. Certificate /rating given to project shall be provided with EIA-EMP report

B Mapping

- (ix) Proper KML file with pin drop and coordinate of mine at 500-1000 m interval be provided
- (x) A toposheet specifying locations of the State, District and Project site should be provided.

- (xi) A Study area map of the core zone (project area) and 10 km area of the buffer zone (1: 50,000 scale) clearly delineating the major topographical features such as the land use, surface drainage pattern including rivers/streams/nullahs/canals, locations of human habitations, major constructions including railways, roads, pipelines, major industries, mines, washery and other polluting sources. In case of ecologically sensitive areas such as Biosphere Reserves/National Parks/WL Sanctuaries/ Elephant Reserves, forests (Reserved/Protected), migratory corridors of fauna, and areas where endangered fauna and plants of medicinal and economic importance found in the 15 km study area should be given. The above details to be furnished in tabular form also.
- (xii) A Study area map of the core zone (project area) and 10 km area of the buffer zone (1: 50,000 scale) clearly delineating the major topographical features such as the land use, surface drainage pattern including rivers/streams/nullahs/canals, locations of human habitations, major constructions including railways, roads, pipelines, major industries, mines, washery and other polluting sources. In case of ecologically sensitive areas such as Biosphere Reserves/National Parks/WL Sanctuaries/ Elephant Reserves, forests (Reserved/Protected), migratory corridors of fauna, and areas where endangered fauna and plants of medicinal and economic importance found in the 15 km study area should be given. The above details to be furnished in tabular form also.
- (xiii) Map showing the core zone delineating the agricultural land (irrigated and un-irrigated, uncultivable land as defined in the revenue records, forest areas (as per records), along with other physical features such as water bodies, etc should be furnished.
- (xiv) A contour map showing the area drainage of the core zone and 25 km of the study area (where the water courses of the core zone ultimately join the major rivers/streams outside the lease/project area) should also be clearly indicated in the separate map.
- (xv) A detailed Site plan of the mine showing the proposed break-up of the land for mining operations such as the quarry area, OB dumps, green belt, safety zone, buildings, infrastructure, CHP, ETP, Stockyard, township/colony (within and adjacent to the ML), undisturbed area -if any, and landscape features such as existing roads, drains/natural water bodies to be left undisturbed along with any natural drainage adjoining the lease /project areas, and modification of thereof in terms of construction of embankments/bunds, proposed diversion/re-channelling of the water courses, etc., approach roads, major haul roads, etc should be indicated.

C Water Environment

- (xvi) In case of any proposed diversion of nallah/canal/river, the proposed route of diversion/modification of drainage and their realignment, construction of embankment etc. should also be shown on the map as per the approval of Irrigation and flood control Department of the concerned state.
- (xvii) Catchment area with its drainage map of 25 km area within and outside the mine shall be provided with names, details of rivers/ riverlet system and its respective order. The map should clearly indicate drainage pattern of the catchment area with basin of major rivers. Diversion of drains/ river need elaboration in form of length, quantity and quality of water to be diverted
- (xviii) Prior in principle approval from the respective state govt shall be required in cases where PP proposes diversion of river/ stream/ nallah/ drains. However, state approval shall not be finally considered before the appraisal by EAC. PP shall have submitted detailed project report in case where diversion is required with emphasis on hydrological study

- (xix) Detailed water balance should be provided. The break-up of water requirement for the various mine operations should be given separately.
- (xx) Flow chart of water balance should be provided. Treatment of effluents from workshop, township, domestic wastewater, mine water discharge, etc. should be provided. Details of STP in colony and ETP in mine should be given. Recycling of water to the max. possible extent should be done.
- (xxi) Source of water for use in mine, sanction of the Competent Authority in the State Govt. and impacts vis-à-vis the competing users in the upstream and downstream of the project site. should be given.

D] Land Environment

- (xxii) Break up of lease/project area as per different land uses and their stage of acquisition should be provided. LANDUSE DETAILS FOR OPENCAST PROJECT should be given as per the following table:

Sl.No.	Landuse	Within ML area/ project area(ha)	Outside ML area/ project area(ha)	Total
1	Agricultural land			
2	Forest land			
3	Wasteland			
4	Grazing land			
5	Surface water bodies			
6	Settlements			
7	Others (specify)			
	TOTAL			

- (xxiii) Break-up of lease/project area as per mining plan should be provided.
- (xxiv) Impact of changes in the land use due to the project if the land is predominantly agricultural land/forestland/grazing land, should be provided.

E Air Environment

- (xxv) PP shall submit design details of all Air Pollution control equipment (APCEs) to be implemented as part of Environment Management Plan vis-à-vis reduction in concentration of emission for each APCEs
- (xxvi) PP shall propose and explore to use LNG/CNG based mining machineries and LNG/CNG/others (electric) trucks for mining operation and transportation of coal. The measures adopted to conserve energy or use of renewable sources shall be submitted.
- (xxvii) PP to evaluate the green house emission gases from the mine operation/ washery plant and corresponding carbon absorption plan.

F Monitoring

- (xxviii) One-season (other than monsoon) primary baseline data on environmental quality - air (PM10, PM2.5, SOx, NOx and heavy metals such as Hg, Pb, Cr, As, etc), noise, water

(surface and groundwater), soil - along with one-season met data coinciding with the same season for AAQ collection period should be provided. The detail of NABL/ MoEF&CC certification of the respective laboratory and NABET accreditation of the consultant to be provided in EIA/EMP Report.

- (xxix) Map (1: 50, 000 scale) of the study area (core and buffer zone) showing the location of various sampling stations superimposed with location of habitats, other industries/mines, polluting sources, should be provided. The number and location of the sampling stations in both core and buffer zones should be selected on the basis of size of lease/project area, the proposed impacts in the downwind (air)/downstream (surface water)/groundwater regime (based on flow). One station should be in the upwind/upstream/non-impact/non-polluting area as a control station. The monitoring should be as per CPCB guidelines and parameters for water testing for both ground water and surface water as per ISI standards and CPCB classification wherever applicable. Observed values should be provided along with the specified standards.
- (xxx) Study on the existing flora and fauna in the study area (10km) should be carried out by an institution of relevant discipline. The list of flora and fauna duly authenticated separately for the core and study area and a statement clearly specifying whether the study area forms a part of the migratory corridor of any endangered fauna should be given. If the study area has endangered flora and fauna, or if the area is occasionally visited or used as a habitat by Schedule-I species, or if the project falls within 15 km of an ecologically sensitive area, or used as a migratory corridor then a Comprehensive Conservation Plan along with the appropriate budgetary provision should be prepared and submitted with EIA-EMP Report; and comments/observation from the CWLW of the State Govt. should also be obtained and furnished.
- (xxxi) For proper baseline air quality assessment, Wind rose pattern in the area should be reviewed and accordingly location of AAMSQ shall be planned by the collection of air quality data by adequate monitoring stations in the downwind areas. Monitoring location for collecting baseline data should cover overall the 10 km buffer zone i.e. dispersed in 10 km buffer area. In case of expansion, the displayed data of CAAQMS and its comparison with the monitoring data to be provided
- (xxxii) A detailed traffic study along with presence of habitation in 100 mts distance from both side of road, the impact on the air quality with its proper measures and plan of action with timeline for widening of road. The project will increase the no. of vehicle along the road which will indirectly contribute to carbon emission so what will be the compensatory action plan should be clearly spell out in EIA/ EMP report.
- (xxxiii) The socio-economic study to conducted with actual survey report and a comparative assessment to be provided from the census data should be provided in EIA/ EMP report also occupational status & economic status of the study area and what economically project will contribute should be clearly mention. The study should also include the status of infrastructural facilities and amenities present in the study area and a comparative assessment with census data to be provided and to link it with the initialization and quantification of need based survey for CSR activities to be followed.
- (xxxiv) The Ecology and biodiversity study should also indicate the likely impact of change in forest area for surface infrastructural development or mining activity in relation to the climate change of that area and what will be the compensatory measure to be adopted by PP to minimize the impact of forest diversion.

- (xxxv) Impact of proposed project/activity on hydrological regime of the area shall be assessed and report be submitted. Hydrological studies as per GEC 2015 guidelines to be prepared and submitted
- (xxxvi) Submission of sample test analysis of Characteristics of coal: This should include details on grade of coal and other characteristics such as ash content, S and heavy metals including levels of Hg, As, Pb, Cr etc.

G] Geology, Infrastructure and mine management

- (xxxvii) Details of mineral reserves, geological status of the study area and the seams to be worked, ultimate working depth and progressive stage-wise working scheme until the end of mine life should be provided on the basis of the approved rated capacity and calendar plans of production from the approved Mining Plan. Geological maps and sections should be included. The Progressive mine development and Conceptual Final Mine Closure Plan should also be shown in figures. Details of mine plan and mine closure plan approval of Competent Authority should be furnished for green field and expansion projects.
- (xxxviii) Details of mineral reserves, geological status of the study area and the seams to be worked, ultimate working depth and progressive stage-wise working scheme until the end of mine life should be provided on the basis of the approved rated capacity and calendar plans of production from the approved Mining Plan. Geological maps and sections should be included. The Progressive mine development and Conceptual Final Mine Closure Plan should also be shown in figures. Details of mine plan and mine closure plan approval of Competent Authority should be furnished for green field and expansion projects.
- (xxxix) Details of mining methods, technology, equipment to be used, etc., rationale for selection of specified technology and equipment proposed to be used vis-à-vis the potential impacts should be provided.
- (xl) Impact of mining on hydrology, modification of natural drainage, diversion and channeling of the existing rivers/water courses flowing through the ML and adjoining the lease/project and the impact on the existing users and impacts of mining operations thereon.
- (xli) Forest diversion shall be only proposed for coal bearing areas. No non-essential infrastructure, office, workshop etc shall be proposed or developed in forest area. No forest area shall be used for OB dump, accordingly Mine plan to be prepared
- (xlii) Detail of OB recovery for reutilization of minerals from mining shall be explored
- (xliii) OB dump management from its extraction, transportation to reutilization, disposal / backfilling, to be carry on in a manner to minimize its impact. A detail to be furnished in EIA/EMP report

H] Impact Evaluation and EMP measures

- (xliv) Site specific impact assessment with its respective measure to be provided
- (xlv) Impact of mining and water abstraction from the mine on the hydrogeology and groundwater regime within the core zone and 10 km buffer zone including long-term monitoring measures should be provided. Details of rainwater harvesting and measures for recharge of groundwater should be reflected in case there is a declining trend of groundwater availability and/or if the area falls within dark/grey zone.
- (xlvi) Impact of blasting, noise and vibrations should be given.
- (xlvii) Impacts of mining on the AAQ and predictions based on modeling using the ISCST-3 (Revised) or latest model should be provided.

- (xlviii) Impacts of mineral transportation within the mining area and outside the lease/project along with flow-chart indicating the specific areas generating fugitive emissions should be provided. Impacts of transportation, handling, transfer of mineral and waste on air quality, generation of effluents from workshop etc, management plan for maintenance of HEMM and other machinery/equipment should be given. Details of various facilities such as rest areas and canteen for workers and effluents/pollution load emanating from these activities should also be provided.
- (xlix) Effort be made to reduce/eliminate road transport of coal inside and outside mine and for mechanized loading of coal through CHP/ Silo into wagons and trucks/tippers.
- (l) Details of waste OB and topsoil generated as per the approved calendar programme, and their management shown in figures as well explanatory notes tables giving progressive development and mine closure plan, green belt development, backfilling programme and conceptual post mining land use should be given. OB dump heights and terracing based on slope stability studies with a max of 28o angle as the ultimate slope should be given. Sections of final dumps (both longitudinal and cross section) with relation to the adjacent area should be shown.
- (li) Site specific Risk Assessment with quantified risk analysis and Disaster Preparedness and Management Plan should be provided.
- (lii) Integration of the Env. Management Plan with measures for minimizing use of natural resources - water, land, energy, etc. should be carried out.
- (liii) Cost of EMP (capital and recurring) should be included in the project cost and for progressive and final mine closure plan.
- (liv) Efforts be made for maximising progressive internal dumping of O.B., sequential mining, external dump on coal bearing area and later rehandling into the mine void.--to reduce land degradation.
- (lv) Impact of change in land use due to mining operations and plan for restoration of the mined area to its original land use should be provided.
- (lvi) Progressive Green belt and ecological restoration /afforestation plan (both in text, figures and in the Adequate greenbelt nearby areas, coal stock yard and transportaion area of coal shall be provided with details of species selected and survival rate. Adequate greenbelt nearby areas, coal stock yard and transportaion area of coal shall be provided with details of species selected and survival rate Greenbelt development should be undertaken particularly around the transport route and CHP.

Table 1 Progressive Plantation during Mining

Sl. No.	Land use Category	Plantation (Year)			Year of mine closure*)*
		Year	Year	Year	
	Backfilled Area(Reclaimed with plantation)				
	Excavated Area (not reclaimed)/void				
	External OB dump Reclaimed with plantation)				
	Reclaimed Top soil dump				
	Open Built Area				

	disturbed area (brought under plantation)					
	roads (avenue plantation)					
	area around buildings and Infrastructure					
	TAL					

Table 2 : Stage Wise Cumulative Plantation

Year	AR*	Open Belt		Internal Dump		Backfilled Area		Others (undisturbed area / etc)		TOTAL	
		Area (ha)	No. of trees	Area (ha)	No. of trees	Area (ha)	No. of trees	Area (ha)	No. of trees	Area (ha)	No. of trees
1 st year											
2 nd year											
3 rd year											
4 th yr											
5 th yr											
6 th yr											
7 th yr											
8 th yr											
9 th yr											
10 th year (end of mine life)											
37 th Year (Post-mining)											

*As a representative example

- (lvii) Conceptual Final Mine Closure Plan and post mining land use and restoration of land/habitat to the pre- mining status should be provided. A Plan for the ecological restoration of the mined out area and post mining land use should be prepared with detailed cost provisions.

/Project Area (ha)	(ha)		forest land	which FC is yet to be obtained	diversion of estland
		more than one, provide details of each FC			

(lxii) PP shall submit clarification from PCCF that mine does not falls under corridors of any National Park and Wildlife Sanctuary with certified map showing distance of nearest sanctuary.

J] Miscellaneous

(lxiii) If the project involves diversion of any road/railway line passing through the ML/project area, the proposed route of diversion and its realignment should be shown in the map along with the status of the approval of the competent authority.

(lxiv) In case of expansion of the proposal, the status of the work done/activities as per mining plan and mine closure plan and progressive reclamation of OB dump shall be detailed in EIA/EMP report

(lxv) PP shall carry out survey through drone highlighting the ground reality for atleast 10 minutes

(lxvi) Detailed Chronology of the project starting from the first lease deed allotted/Block allotment/ Land acquired to its No. of renewals, CTO /CTE with details of no. renewals, previous EC(s) granted details and its compliance details, NOC details from various Govt bodies like Forest NOC(s), CGWA permissions, Power permissions, etc as per the requisites respectively to be furnished in tabular form.

(lxvii) The first page of the EIA/ EMP report must mention the peak capacity production, area, detail of PP, Consultant (NABET accreditation) and Laboratory (NABL / MoEF & CC certification)

(lxviii) The compliances of ToR must be properly cited with respective chapter section and page no in tabular form and also mention sequence of the respective ToR complied within the EIA-EMP report in all the chapter,s section.