IL&FS | Environment

DEVELOPMENTAL ACTIVITY-SPECIFIC TERMS OF REFERENCE FOR EIA STUDIES

Submitted to

The Ministry of Environment and Forests
Government of India





By

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Hyderabad

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1. CEMENT PLANTS

For the limestone mine captive to cement plants, separate ToRs specified for cement and as well as mining are required to be considered. In this manual, only the ToR for cement plants is detailed. ToR for EIA studies may include, but not limited to the following:

1. Executive summary of the project – giving a prima facie idea of the objectives of the proposal, use of resources, justification, *etc.* In addition, it should provide a compilation of EIA report, EMP and the post-project plan in brief.

Project description

2. Justification for selecting the proposed unit size
3. Confirmation regarding total land involvement for the cement plant
4. Complete process flow diagram describing each unit, its processes and operations, along with material and energy inputs and outputs (material and energy balance).
5. Details on locating the residential colonies on upwind direction.
6. Details of the proposed methods of water conservation and recharging.
7. Whether hazardous waste is proposed to be charged in kilns, if so, provide details on type of waste, their characteristics and monitoring of emissions of gases, heavy metals, VOCs, dioxins and furans.
8. Scheme of proper storage of fly ash, gypsum, clinker.
9. Analysis report of Sulphur content in fuels and Sulphur balance data.
10. Details of heat and noise emission sources from the proposed project and proposed measures.
11. Details of CO_2 emissions including its quantum per tonne of cement.
12. In case of Expansion projects, compliance to the issued EIA clearance conditions and consent for operation conditions for existing plants may be described.
13. Any legal cases pending against the existing plant related to the environmental pollution and impacts in the last two years, if so, details thereof.

Description of the environment

14. Baseline data of the project area and the area within a 10 km radius w.r.t. different components of environment viz. air, noise, water, land, and biology and socio-economic as per the guidance given in the manual.

15. Site-specific micro-meteorological data including inversion height and mixing height. Data on existing air, water and noise, *etc*., conditions should be included.
16. Chemical characterization of RSPM data.
17. Surface water quality of nearby water sources and other surface drains from at least eight locations shall be ascertained.
18. Groundwater monitoring data from at least eight locations shall be included. Geological features and geo-hydrological status of the plant as well as the mine area are essential. Ecological status (Terrestrial and Aquatic) is vital. Impact of the mining on the groundwater.
19. Hydrological regime plan shall be prepared and incorporated. Interception of mining with the groundwater, if any.
20. Baseline data on silicosis in buffer and core zone shall be included.
21. Toposheet with all the coordinates of the plant site demarcated (1:50000 scale).
22. Topography of the area clearly indicating the presence of pits deeper than one meter, if any. If these pits require to be filled in, details of filling material to be used, quantity required, its source, mode of transport, *etc*.,.
23. Proposed land use for area should be prepared based on satellite imagery. Location of national parks / wildlife sanctuary within a 10 kilometer (km) radius should specifically be mentioned.
24. A map indicating the location of mine, cement plant, township and nearest villages and distance from the cement plant.
25. Names and other details of all the villages (population, list of existing industries, *etc*.) situated within a radius of 25 km from the project area.
26. If any incompatible land use attributes fall within a 10 km radius of the project boundary, proponent shall describe the sensitivity (distance, area and significance) and propose the additional points based on significance for review and acceptance by the EAC/SEAC. Incompatible land use attributes include:
    - Public water supply areas from rivers/surface water bodies, from ground water
    - Scenic areas/tourism areas/hill resorts
    - Religious places, pilgrim centers that attract over 10 lakh pilgrims a year
    - Protected tribal settlements (notified tribal areas where industrial activity is not permitted)
    - Monuments of national significance, World Heritage Sites
    - Cyclone, Tsunami prone areas (based on last 25 years);
    - Airport areas
    - Any other feature as specified by the State or local government and other features as locally applicable, including prime agricultural lands, pastures, migratory corridors, etc.
27. If ecologically sensitive attributes fall with in a 10 km radius of the project boundary, proponent shall describe the sensitivity (distance, area and significance) and propose the additional points based on significance for review and acceptance by the EAC/ SEAC. Ecological sensitive attributes include:

- National parks
- Wild life sanctuaries Game reserve
- Tiger reserve/elephant reserve/turtle nesting ground
- Breeding grounds
- Core zone of biosphere reserve
- Habitat for migratory birds
- Mangrove area
- Areas with threatened (rare, vulnerable, endangered) flora/fauna
- Protected corals
- Wetlands
- Zoological gardens
- Gene Banks
- Reserved forests
- Protected forests
- Any other closed/protected area under the Wild Life (Protection) Act, 1972, any other area locally applicable

28. If the location falls in Valley, specific issues connected to the natural resources management shall be studied and presented.

29. If the location falls in CRZ area: A CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the project and associate facilities w.r.t. CRZ, coastal features such as mangroves, if any. The route of the pipeline, conveyor system *etc.*, passing through CRZ, if any, should also be demarcated. The recommendations of the State Coastal Management Authority for the activities to be taken up in the CRZ.

    - Provide the CRZ map in 1:10000 scale in general cases and in 1:5000 scale for specific observations.
    - Impact of the activities to be taken up in the CRZ area including jetty and desalination plant, etc., should be integrated into the EIA report; however, action should be taken to obtain separate clearance from the competent authority as may be applicable to such activities.
    - Capital quantity of dredging material, disposal and its impact on aquatic life.
    - Fisheries study should be done w.r.t. Benthos and Marine organic material and coastal fisheries.

Anticipated environmental impacts and mitigation measures

30. Anticipated environmental impacts that require specific studies for significance are given in impact matrix (Manual may be referred). Tools as given in the Manual may be used for the assessment of environmental impacts.

31. Air quality modeling for the cement plant should be incorporated. Air pollution control system to be installed should be elaborated upon to control emissions within 50 mg/Nm^3.

32. Assessment report of the impact of transport of raw material and finished product on the transport system.

33. Measures that could be considered for the mitigation of impacts as given in the manual.
34. Proposed measures for occupational safety and health of the workers.
35. A scheme for rainwater harvesting at the cement plant site have to be put in place.
36. Measures to be taken to prevent impact of particulate emissions / fugitive emissions, if any from the proposed plant on the surrounding reserve forests should be included. Further, Conservation Plan for the conservation of wild fauna in consultation with the State Forest Department should also be prepared and included.

Analysis of alternative resources and technologies

37. Comparison of alternate sites considered and the reasons for selecting the proposed site. Conformity of the site with the prescribed guidelines in terms of CRZ, river, highways, railways, *etc.*
38. Details of improved technologies.

Environmental monitoring program

39. Specific programme to monitor Nickel and Vanadium emissions be included, incase of use of pet-coke.
40. An action plan to control and monitor secondary fugitive emissions as per the CPCB guidelines.
41. Appropriate monitoring network has to be designed and proposed for regulatory compliance and to assess the residual impacts, if any.

Additional studies

42. Clearances/approvals from the IBM and State government for the linked mining component.
43. R&R plan in consultation with the State Government should also include details of the tribal population.
44. Risk assessment and damage control needs to be addressed.
45. Socio-economic development activities need to be elaborated upon.

Environmental management plan

46. Proposed post-project monitoring programme to ensure compliance to the approved management plan including administrative and technical organizational structure.
47. EMP devised to mitigate the adverse impacts of the project should be provided along with item-wise cost of its implementation (Capital and recurring costs).
48. Provision for proposed green cover in and around the plant including green belt.

49. Action plan for solid/hazardous waste generation, storage, utilization and disposal should be included.

50. Plan for the implementation of the recommendations made for the cement plants as given in the CREP guidelines.

Note:

Above points shall be adequately addressed in the EIA report at corresponding chapters, in addition to the contents given in the reporting structure as per Appendix III of the EIA Notification, 2006.

2. CHEMICAL FERTILIZERS

ToR for EIA studies in respect of chemical fertilizer industry may include, but not limited to the following:

1. Executive summary of the project – giving a prima facie idea of the objectives of the proposal, use of resources, justification, *etc.* In addition, it should provide a compilation of EIA report, EMP and the post-project monitoring plan in brief.

Project description

2. Justification for selecting the proposed unit size.
3. Land requirement for the project including its optimization, break up of land requirement and its availability.
4. Complete process flow diagram describing each unit, its processes and operations, along with material and energy inputs and outputs (material and energy balance).
5. Details of fluorine recovery system in case of phosphoric acid plants to recover fluorine as hydrofluorosilicic acid (H_2SiF_6) and its uses.
6. Source of water, total requirement and authorization from the concerned department.
7. Details on water balance cycle data including quantity of effluent generated, recycled and reused and discharged and efforts to maintain quality of receiving water body and to minimize effluent discharge.
8. In case the water source for the plant is groundwater then management of high TDS reject from DM plant.
9. Details of effluent treatment plant. Also, mode of disposal and corresponding baseline of the receiving environment (Water body/land) and required modeling studies conducted to determine compatibility with receiving environment.
10. Details of proposed source-specific air pollution control devices to meet gaseous emissions and AAQ standards.
11. Sources of secondary emissions, its control and monitoring as per the CPCB guidelines.
12. Mode of disposal of solid wastes including by products viz., chalk, spent catalyst, hydrofluorosilicic acid and phosphogypsum, sulphur muck, *etc.*
13. Adoption of measures taken to achieve zero discharge during dry season in case of complex fertilizer plant (DAP/NPK excluding acid plants) and also SSP. Adoption of cleaner and energy-efficient technologies. (Higher emphasis on energy efficiency in case of nitrogenous plants and resource conservation in case of complex fertilizer plants).

14. In case of existing plants going for expansion, details of the programmes undertaken for the protection of occupational health of the workers.
15. In case of expansion of existing industries, remediation measures adopted to restore the environmental quality if the groundwater, soil, crop, air, *etc.*, are affected and a detailed compliance to the environmental clearance/consent conditions.
16. Any litigation pending against the project and /or any direction /order passed by any Court of Law against the project, if so, details thereof.

Description of the environment

17. Toposheet with all the coordinates of the plant site demarcated (1:50000 scale).
18. The study area shall be up to a distance of 10 km from the boundary of the proposed project site.
19. Land use of study area should include data about the residential/ institutional/nearest village/ township/ locality/ housing society, *etc.*, based on the satellite imagery.
20. Topography of the area clearly indicating the presence of pits deeper than one meter, if any. If these pits require to be filled in, details of filling material to be used, quantity required, its source, mode of transport, *etc.*
21. List of all the industries located within 10 km radius.
22. The baseline data to be collected from the study area w.r.t. different components of environment viz. air, noise, water, land, and biology and socio-economic as per the guidance given in the manual.
23. Surface water quality of source (dam/river) and other nearby water bodies.
24. Site-specific micro-meteorological data including inversion height and mixing height.
25. Existing ambient air quality and expected, stack and fugitive emissions for Urea dust*, NH_3*, SPM*, SO_2*, NOX*, HF*, F*, *etc.*, and evaluation of the adequacy of the proposed pollution control devices to meet gaseous emissions and AAQ standards should be incorporated. (* - As applicable)
26. One season data with average, range and 90 percentile value for each parameter of concern for gaseous emissions for existing plants other than monsoon season.
27. AQM studies for the proposed fertilizer plant.
28. Details of flora and fauna. In case of any scheduled fauna, conservation plan.
29. If any incompatible land use attributes fall within 10 km from the project boundary, proponent shall describe the sensitivity (distance, area and significance) and propose the additional points based on significance for review and acceptance by the EAC. Incompatible land use attributes include:
    - Public water supply areas from rivers/surface water bodies, from groundwater
    - Scenic areas/tourism areas/hill resorts
    - Religious places, pilgrim centers that attract over 10 lakh pilgrims a year

- Protected tribal settlements (notified tribal areas where industrial activity is not permitted)
- CRZ
- Monuments of national significance, World Heritage Sites
- Cyclone, Tsunami prone areas (based on last 25 years)
- Airport areas
- Any other feature as specified by the State or local government and other features as locally applicable, including prime agricultural lands, pastures, migratory corridors, etc.

30. If ecologically sensitive attributes fall within 10 km from the project boundary, proponent shall describe the sensitivity (distance, area and significance) and propose the additional points based on significance for review and acceptance by the EAC. Ecological sensitive attributes include:

- National parks
- Wild life sanctuaries Game reserve
- Tiger reserve/elephant reserve/turtle nesting ground
- Breeding grounds
- Core zone of biosphere reserve
- Habitat for migratory birds
- Mangrove area
- Areas with threatened (rare, vulnerable, endangered) flora/fauna
- Protected corals
- Wetlands
- Zoological gardens
- Gene Banks
- Reserved forests
- Protected forests
- Any other closed/protected area under the Wild Life (Protection) Act, 1972, any other area locally applicable

31. If the location falls in valley, specific issues connected to the management of natural resources.

Anticipated environmental impacts and mitigation measures

32. Anticipated generic environmental impacts that require specific studies for significance are given in impact matrix (Manual may be referred). Tools as given in the manual may be used for the assessment of environmental impacts.

33. Impact of the transport of the raw materials and end products on the surrounding environment including agricultural land.

34. Impact of air emissions on orchards, prime agricultural land, *etc.*

35. Efforts made to minimize use of groundwater and impact on the groundwater, if any due the proposed project.
36. Impact of noise and measures taken for its control.
37. Hazard identification taking resources to hazardous indices, inventory analysis, natural hazardous probability, *etc*., Consequent analysis of failure and accidents resulting in release of hazardous substances.
38. Impact of stormwater and mitigating measures.
39. Surface as well as roof top rainwater harvesting and groundwater recharge should be included.
40. Action plan for the greenbelt development.
41. Details regarding infrastructure facilities such as sanitation, fuel, restroom, *etc*., to be provided to the workers during construction as well as to the casual workers including truck drivers during operation phase.
42. Any off-site emergency plan for the area and on-site emergency plan for existing plants.

Analysis of alternative resources and technologies

43. Comparison of alternate sites considered and the reasons for selecting the proposed site. Conformity of the site with the prescribed guidelines in terms of CRZ, river, highways, railways, *etc*.
44. Details on improved technologies.

Environmental monitoring program

45. The name of the laboratory recognized by the MoEF / CPCB / NBA *etc*., through which the monitoring / analysis is carried out.
46. Appropriate monitoring network has to be designed and proposed for regulatory compliance and to assess the residual impacts, if any.

Additional studies

47. Impact of the project on local infrastructure of the area such as road network and whether any additional infrastructure would need to be constructed and the agency responsible for the same with timeframe.
48. Details on compensation package for the people affected by the project, considering the socio-economic status of the area, homestead oustees, land oustees, and landless labourers.
49. Points identified in the public hearing (if applicable) and commitment of the project proponent to the same. Detailed action plan addressing the issues raised, and the details of necessary allocation of funds.
50. Proposed plan to handle the socio-economic influence on the local community. The plan should include quantitative dimension as far as possible.

51. The project proponent should undertake risk assessment. Details of the proposed safeguard measures.

Environmental management plan

52. EMP devised to mitigate the adverse impacts of the project should be provided along with item-wise cost of its implementation.

53. Proposed post-project monitoring programme to ensure compliance to the approved Management Plan including administrative and technical organizational structure.

Note:

Above points shall be adequately addressed in the EIA report at corresponding chapters, in addition to the contents given in the reporting structure as per Appendix III of the EIA Notification, 2006.

3. COMMON EFFLUENT TREATMENT PLANTS

ToR for EIA studies in respect of the proposed CETP may include, but not limited to the following:

1. Executive summary of the project – giving a prima facie idea of the objectives of the proposal, use of resources, justification, *etc.* In addition, it should provide a compilation of EIA report, EMP and the post project monitoring plan in brief.

Project description

2. Details of the industries for which CETP facility is proposed including raw materials used and products manufactured.
3. Expected quantity of wastewater from each industry and justification for selecting the proposed capacity of the treatment plant/modules.
4. Characteristics of effluent and proposed segregation of streams, if any, from individual member industries.
5. Details of mode of effluent collection system either by tankers and/or pipeline, *etc.*, and proposed trouble-shooting mechanism.
6. Monitoring protocol in case of collection of effluent through pipeline and/or tankers.
7. Details on physical, chemical and biological characteristics of the combined effluent and its concentrations and the basis for the same.
8. Details of equalization tank at least for 24 hrs; and guard ponds for holding treated wastewater or continuous monitoring facilities, if any.
9. Details of the proposed treatment schemes supported by the treatability studies including source separation of streams for specific mode of collection and treatment either at individual industry or at CETP (based on economic and operational ease considerations).
10. Built-in flexibility provisions to deal with quantitative and qualitative fluctuations.
11. Organizational setup for collection of pretreated effluents, treatment and disposal of the treated effluents, *etc.* and deployment of qualified/skilled man power.
12. Details of O&M for maximum utilization of the designed capacity of the plant.
13. Proposed monitoring protocol for stage-wise quality control w.r.t. various characteristics and maintenance schedules followed for all rotating equipment including lubricating/oil fill, operational chemicals and laboratory chemicals.
14. For any sensitive environmental parameters such as heavy metals, fluorides, *etc.*, details on improved material of construction of tanks and other equipments such as corrosion resistance, allowance, *etc.*

15. Details of power consumption and stand-by arrangements like the diesel generator (DG) sets, dual fuel (gas and oil) for uninterrupted operation of treatment plant.
16. Protocol and mechanism to accept the effluent by tankers only during day time, including the adequacy of the receiving/holding tanks, *etc*.
17. Impact of the project on local infrastructure of the study area such as road network, *etc*. If the study area requires any additional infrastructure, details of the agency responsible for the same should be included along with the time frame. Details of the permission from the competent Authority for conveyor belt crossing the village road.
18. If the ultimate disposal is through a marine outfall then preliminary design of the outfall with estimated initial dilution.
19. Details of laboratory, workshop, database, library, waste exchange centers, *etc*. in CETP.
20. Details on equity by the member industries/non refundable membership fee to ensure continuity of membership and financial model, *etc*.
21. Any litigation pending against the project and /or any direction /order passed by any Court of Law against the project, if so, details thereof.

Description of the environment

22. The study area shall be up to a distance of 5 km from the boundary of the proposed site and all along the collection network/route map of tanker movement, treated wastewater carrying pipe-line and the receiving environment at the point of disposal.
23. All the coordinates of the project site may be demarcated on the toposheet (1:50000 scale).
24. Land use of study area should include data about the residential/ institutional/nearest village/ township/ locality/ housing society, *etc*., based on the satellite imagery.
25. Baseline data of the study area w.r.t. different components of environment viz. air, noise, water, land, and biology and socio-economic collected as per the guidance given in the manual.
26. Site-specific meteorological data of one season.
27. Ambient Air Quality (AAQ) data (except monsoon) to be given along with the dates of monitoring. The parameters to be covered shall include suspended particulate matter (SPM), respirable suspended particulate matter (RSPM), SO2, NOx, and VOCs. The location of the monitoring stations should be decided in such way that the factors like pre-dominant downwind direction, population zone and sensitive receptors including reserved forests, if any are considered. There should be at least one monitoring station in the upwind direction and one in downwind direction at about 500 m.
28. Assessment of receiving water bodies/land and groundwater for all the relevant environmental parameters

29. Noise monitoring on all the four sides of the project site
30. Monitoring of odour emissions from the project site
31. Details of flora and fauna. In case of any scheduled fauna, conservation plan should be provided.
32. If any incompatible land-use attributes fall within a 5 km radius of the project boundary, proponent shall describe the sensitivity (distance, area and significance) and propose the additional points based on significance for review and acceptance by the EAC/SEAC. Incompatible land use attributes include:
    - Public water supply areas from rivers/surface water bodies, from groundwater
    - Scenic areas/tourism areas/hill resorts
    - Religious places, pilgrim centers that attract over 10 lakh pilgrims a year
    - Protected tribal settlements (notified tribal areas where industrial activity is not permitted); CRZ
    - Monuments of national significance, World Heritage Sites
    - Cyclone, Tsunami prone areas (based on last 25 years);
    - Airport areas
    - Any other feature as specified by the State or local government and other features as locally applicable, including prime agricultural lands, pastures, migratory corridors, etc.
33. If ecologically sensitive attributes fall with in a 5 km radius of the project boundary, proponent shall describe the sensitivity (distance, area and significance) and propose the additional points based on significance for review and acceptance by the EAC/SEAC. Ecological sensitive attributes include:
    - National parks
    - Wild life sanctuaries Game reserve
    - Tiger reserve/elephant reserve/turtle nesting ground
    - Breeding grounds
    - Core zone of biosphere reserve
    - Habitat for migratory birds
    - Mangrove area
    - Areas with threatened (rare, vulnerable, endangered) flora/fauna
    - Protected corals
    - Wetlands
    - Zoological gardens
    - Gene Banks
    - Reserved forests
    - Protected forests
    - Any other closed/protected area under the Wild Life (Protection) Act, 1972, any other area locally applicable

34. If the location falls in a valley, studies on specific issues connected to the natural resources management.

35. Identification of CRZ area: A CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the project and associate facilities w.r.t. CRZ, coastal features such as mangroves, if any. The route of the pipeline, *etc*., passing through CRZ, if any, should also be demarcated. The recommendations of the State Coastal Management Authority for the activities to be taken up in the CRZ.

36. Provide the CRZ map in 1:10000 scale in general cases and in 1:5000 scale for specific observations.

37. Environmental parameters – Temperature, sea level pressure, wind speed, mean relative humidity, visibility, salinity, density, rainfall, fog, frequency and intensity of cyclones, sediment transport, seismic characteristics, fresh water influx.

38. Details on marine biological parameters – microbiological population, pathogenic bacteria, plankton distribution, fish spawning grounds in the adjoining waters, commercial fisheries potential, vegetation including inter tidal, flora and fauna in the marine, benthal quality assessment for biological species and heavy metals and estuarine environment.

Anticipated environmental impacts and mitigation measures

39. Details in case, if the effluent conveyance system uses pipe lines, details regarding minimum (one day) storage tank with mixing facility to keep it in aerobic conditions at source industry and mechanism to ensure compliance with prescribed standards at this storage tank.

40. Anticipated environmental impacts that require specific studies for significance as given in impact matrix (Manual may be referred). Tools as given in the manual may be used for the assessment of environmental impacts.

41. Details regarding soil and groundwater impacts and regular monitoring protocols suggested for ensuring no significant impacts, besides preventive measures.

42. Impact on the disposal mode-specific receiving environment.

43. Impacts due to laying of pipe lines for effluent collection and for the disposal of the treated wastewaters.

44. Bathymetric studies need to be conducted and models shall be applied to predict the dispersion patterns to determine the length of the outfall, if disposal is through a marine outfall.

45. Capital quantity of dredging material, disposal and its impact on aquatic life.

46. Details on fisheries study which are conducted w.r.t. benthos and marine organic material and coastal fisheries.

47. Availability of the land for proposed treatment for ultimate capacity and to accommodate required greenbelt development.

48. Details of stormwater collection network and utilization plan, *etc*.

49. Detailed plan of treated waste water disposal/ reuse/ utilization / management.

50. Proposed measures for occupational safety and health of the workers.
51. Generic measures that could be considered for the mitigation of impacts as given in this manual may be referred.
52. Details of green cover giving details of species, width of plantation, planning schedule, *etc*.
53. Details regarding infrastructure facilities such as sanitation, fuel, restroom, *etc*., to be provided to the labour force during construction as well as to the casual workers including truck drivers during the operational phase.

Analysis of alternative resources and technologies

54. Comparison of alternate sites considered and the reasons for selecting the proposed site. Conformity of the site with the prescribed guidelines in terms of CRZ, river, highways, railways, *etc*.
55. Drainage area and alterations, if any due to the project.
56. Details on improved technologies.

Environmental monitoring program

57. The name of the laboratory recognized by the MoEF/ CPCB / NBA, *etc*. through which the monitoring / analysis shall be carried out.
58. Appropriate monitoring network has to be designed and proposed for regulatory compliance and to assess the residual impacts, if any.

Additional studies

59. The project proponent should undertake risk assessment, covering plant operations and collection network and disposal network and tankers movement. Details of the proposed safeguard measures including measures for fire hazards.
60. Points identified in public hearing (if applicable) and commitment of the project proponent to the same. Detailed action plan addressing the issues raised, and the details of necessary allocation of funds shall be provided.

Environmental management plan

61. EMP devised to mitigate the adverse impacts of the project should be provided along with item-wise cost of its implementation.
62. Proposed post-project monitoring programme to ensure compliance to the approved management plan including administrative and technical organizational structure.

Note:

Above points shall be adequately addressed in the EIA report at corresponding chapters, in addition to the contents given in the reporting structure as per Appendix III of the EIA Notification, 2006.

4. COMMON MUNICIPAL SOLID WASTE MANAGEMENT FACILITY

ToR for EIA studies for common MSW management facility may include, but not limited to the following:

1. Executive summary of the project – giving a *prima facie* idea of the objectives of the proposal, use of resources, justification, *etc.* In addition, it should provide a compilation of EIA report, EMP and the post-project monitoring plan in brief.

Project description

2. Justification for selecting the proposed municipal solid waste handling capacity.
3. Land requirement for the facility including its optimization, break up for various purposes and its availability.
4. Details on each unit in the facility describing its operations.
5. Details on the waste collection system – compliance to the statutory requirements and description of proposed operations
6. Details on proposed protocol for waste acceptance (system for sampling, parameters, analysis methods, time lags, number of people, qualifications, manifest system, *etc.*)
7. Details of the present solid waste management system, which should include the following information:
   - Population covered
   - Area of the city / ULB
   - Climate and rainfall data
   - Expected quantity of municipal solid waste generated (based on population or actual survey of waste quantity)
   - Quantity of MSW actually collected (average figure)
   - Details on seasonal variation of figures for actual collection
   - Characteristics of the MSW – physical and chemical (preferably at least for one year with seasonal variation)
   - Methodology for collection of MSW – whether doorstep collection is done, whether segregation at source is practiced, whether community bins are placed or masonry bins ('dhalao') have been constructed, collection from commercial and office premises *etc.*
   - Methodology for street sweeping and drain cleaning – details on dirt from street sweeping and drain silt get mixed with MSW
   - Transportation of MSW – type of vehicles (fast or slow moving), frequency of transportation, distance of transportation

- Details of bio-medical waste and hazardous industrial waste generated within municipal limits.
- Details of existing processing unit for MSW, if any. If yes, provide process outline, capacity of the facility and history of actual performance of this facility till date.
- Ultimate disposal of the waste – details of the methodology of disposal including life span and design of the existing/proposed site.
- In case of existing processing facility, details on expansion/upgradation of the facility.
- Details of chosen waste treatment process / technology and whether it is in compliance with the applicable law (at present "Municipal Solid Waste - Management and Handling - Rules, 2000")
- Details of the identified site and its suitability for the process chosen (with respect to any habitats or other sensitive areas nearby as per respective norms); status of compliance with the guidelines for site selection provided under MSW Rules, 2000
- Process flow and design details (step by step procedure)
- List of plant and equipment to be set up and vehicles to be used with clear description of their environmental implication (emission, noise level, dust level, leachate generation, etc.)
- Details of infrastructure facilities including drainage
- Source of water and electrical power
- Precaution for avoiding unwanted material such as bio-medical waste
- Details of safety measures for health and environment
- If composting is adopted, quality of compost to be produced and arrangements for marketing of compost

8. Details of the laboratory facilities and statement on adequacy including proposals for accreditation, *etc.*
9. Details of the municipal solid waste storage facilities – Capacities, operating practices, compliance with the statutory requirements and description of proposed operating practices
10. Internal transportation mechanism for the municipal solid waste
11. Specific details on leachate collection system, generation rates, treatment and disposal
12. Details of the landfill operation – filling, layers, equipment, compaction levels, cross-checking mechanism, stability considerations, trouble shooting mechanism, *etc.*
13. Details of proposed monitoring wells, locations, frequency of monitoring, parameters *etc.*
14. Proposed financial model, creation of fund for future liabilities till 30 years of post closure including monitoring, *etc.*
15. Fire fighting, safety and health protection measure in the project design and operations

16. In case of expansion projects, compliance with the issued EIA clearance conditions and 'consent to operate' conditions of existing facility may be described besides legal cases against the existing project, if any.

17. Any legal cases pending against the existing plant related to environmental pollution and impacts in the last three years, if any, details thereof.

Description of the environment

18. The study area shall be up to a distance of 5 km from the boundary of the proposed project site.

19. Baseline data of the study area w.r.t. different components of environment viz. air, noise, water, land, and biology and socio-economic as per the guidance given in the manual.

20. One complete season AAQ data (except monsoon) to be given along with the dates of monitoring. The parameters to be covered shall include SPM, RSPM, SO_2, NOx, CO and Ozone (ground level). The location of the monitoring stations should be so decided as to take into consideration the pre-dominant downwind direction, population zone and sensitive receptors including reserved forests. There should be at least one monitoring station in the upwind direction and one in down wind direction where maximum GLC is likely to fall.

21. One season site-specific meteorological data.

22. Surface water quality of nearby water sources and other surface drains from at least 15 locations shall be ascertained.

23. Groundwater monitoring data from at least 15 locations shall be included. Geological features and geo-hydrological status of the facility are essential.

24. Details on ecological status (Terrestrial and Aquatic).

25. All the coordinates of the project site as well as landfill be demarcated on the toposheet (1: 50000 scale).

26. Topography details of the area.

27. Proposed land use for area should be prepared based on satellite imagery. Location of national parks / wildlife sanctuary within a 10 km radius should specifically be mentioned.

28. A map indicating the location of MSW facility, township and nearest villages and distance from the facility shall be included.

29. Names and other details of all the villages (population, list of existing industries, *etc.*) situated within a radius of 10 km from the project area.

30. If any incompatible land use attributes fall within a 5 km radius of the project boundary, proponent shall describe the sensitivity (distance, area and significance) and propose additional points based on significance for review and acceptance by the EAC/SEAC. Incompatible land use attributes include:

    - Public water supply areas from rivers/surface water bodies, from ground water
    - Scenic areas/tourism areas/hill resorts
    - Religious places, pilgrim centers that attract over 10 lakh pilgrims a year

- Protected tribal settlements (notified tribal areas where industrial activity is not permitted)
- Monuments of national significance, World Heritage Sites
- Cyclone, Tsunami prone areas (based on last 25 years);
- Airport areas
- Any other feature as specified by the State or local government and other features as locally applicable, including prime agricultural lands, pastures, migratory corridors, etc.

31. If ecologically sensitive attributes fall with in a 5 km radius of the project boundary, proponent shall describe the sensitivity (distance, area and significance) and propose the additional points based on significance for review and acceptance by the EAC/ SEAC. Ecological sensitive attributes include:

- National parks
- Wild life sanctuaries Game reserve
- Tiger reserve/elephant reserve/turtle nesting ground
- Breeding grounds
- Core zone of biosphere reserve
- Habitat for migratory birds
- Mangrove area
- Areas with threatened (rare, vulnerable, endangered) flora/fauna
- Protected corals
- Wetlands
- Zoological gardens
- Gene Banks
- Reserved forests
- Protected forests
- Any other closed/protected area under the Wild Life (Protection) Act, 1972, any other area locally applicable

32. If the location falls in Valley, specific issues connected to the natural resources

33. If the location falls in CRZ area: A CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the project and associate facilities w.r.t. CRZ, coastal features such as mangroves, if any. The route of the pipeline, conveyor system *etc.*, passing through CRZ, if any, should also be demarcated. The recommendations of the State Coastal Management Authority for the activities to be taken up in the CRZ should also be provided.

- Provide the CRZ map in 1:10000 scale in general cases and in 1:5000 scale for specific observations.
- Fisheries study should be done w.r.t. Benthos and Marine organic material and coastal fisheries.

Anticipated environmental impacts and mitigation measures

34. Anticipated environmental impacts that require specific studies for significance are indicated in the impact matrix (Manual may be referred). Tools as given in the Manual may be used for the assessment of environmental impacts.
35. Assessment report of the impact of transportation of waste on the transport system.
36. Details on impact on drainage of the area and the surroundings.
37. Impact on AAQ due to MSW facility. Details of the model used and the input parameters for modeling. Also, wind rose diagrams to be demarcated on the map.
38. Generic measures that could be considered for the mitigation of impacts as given in the manual.
39. Proposed measures for occupational safety and health of the workers.
40. Scheme for stormwater management within and around the proposed facility.
41. Details on impacts of landfill gases and its preventive measures.
42. Incase of likely impacts from the proposed facility on the surrounding reserve forests, if any. Conservation Plan for the conservation of wild fauna in consultation with the State Forest Department.
43. Action plan for green belt development including the details of species, width of plantation, planning schedule, *etc.*

Analysis of alternative resources and technologies

44. Comparison of alternate sites considered and the reasons for selecting the proposed site. Conformity of the site with the prescribed guidelines in terms of CRZ, river, highways, railways, *etc.*
45. Details of improved technologies and better operating practices.

Environmental monitoring program

46. The name of the laboratory recognized by the MoEF / CPCB / NBA *etc.*, through which the monitoring/analysis is carried out.
47. Specific programme to monitor safety and health protection of workers.
48. Appropriate monitoring network has to be designed and proposed for regulatory compliance and to assess the possible residual impacts.
49. Yearly monitoring of the ground water quality in and around the MSW facility at about 25 monitoring stations to record fluctuations and to report.
50. Provide details of in-house monitoring capabilities and the recognized agencies proposed for conducting the monitoring.

Additional studies

51. Details on risk assessment.

52. Details on socio-economic development activities.

53. Points identified in the public hearing (if applicable) and commitment of the project proponent to the same. Detailed action plan addressing the issues raised, and the details of necessary allocation of funds.

Environmental management plan

54. Proposed post-project monitoring programme to ensure compliance with the approved management plan including administrative and technical organizational structure.

55. EMP devised to mitigate the adverse impacts of the project should be provided along with item-wise cost of its implementation (Capital and recurring costs).

Note:

Above points shall be adequately addressed in the EIA report at corresponding chapters, in addition to the contents given in the reporting structure as per Appendix III of the EIA Notification, 2006.

5. DISTILLERIES

ToR for EIA studies in respect of the proposed industry may include, but not limited to the following:

1. Executive summary of the project – giving a prima facie idea of the objectives of the proposal, use of resources, justification, *etc.* In addition, it should provide a compilation of EIA report, EMP and the post-project plan in brief.

Project description

2. Justification for selecting the proposed unit size.
3. Land requirement for the project including its optimized, break up of land requirement and its availability.
4. Complete process flow diagram describing each unit, its processes and operations, along with material and energy inputs and outputs (material and energy balance).
5. Number of working days in the distillery unit.
6. Source of water and its availability. Proof regarding the availability of requisite quantity of water from the competent authority.
7. Details of water balance (water intake, use, wastewater generation) taking into account reuse and re-circulation of effluents. Additional water conservation measures, if any, proposed for the project.
8. Proposed effluent treatment scheme covering all the possible sources of wastewater including condensate and cooling tower/spray pond blow, *etc.*
9. Detailed plan of spent wash utilization / management.
10. Detailed plan of molasses storage as per the CPCB latest guidelines.
11. Details of solid waste generation and management including boiler ash utilization and disposal.
12. Details on source of energy and use of any renewable resources.
13. Details of greenbelt including plant species, width of plantation, planning schedule, percent coverage in the project site, *etc.*
14. In case of expansion of existing industries, remediation measures adopted to restore the environmental quality if the groundwater, soil, crop, air, *etc* are affected and a detailed compliance to the environmental clearance/consent conditions.
15. Any litigation pending against the project and /or any direction /order passed by any Court of Law against the project, if so, details thereof.

Description of the environment

16. Toposheet with all the coordinates of the plant site demarcated (1:50000 scale).
17. The study area shall be up to a distance of 10 km from the boundary of the proposed project site.
18. Land use of study area should include data about the residential/ institutional/nearest village/ township/ locality/ housing society, *etc*., based on the satellite imagery.
19. Topography of the area clearly indicating the presence of pits deeper than one metre, if any. If these pits require to be filled in, details of filling material to be used, quantity required, its source, mode of transport, *etc*., shall be provided.
20. Baseline data including different components of environment viz. air, noise, water, land, and biology and socio-economic from the study area as per the guidance given in the manual.
21. Surface hydrology and water regime information, along with the details of the impacts of the project on the same, if any.
22. Groundwater quality around the plant and compost yard.
23. Site-specific meteorological data of one season.
24. AAQ data (except monsoon) of one complete season along with the monitoring dates. The parameters to be covered shall include SPM, RSPM, SO2, NOx (ground level). The location of the monitoring stations should be decided in such a way that the pre-dominant downwind direction, population zone and sensitive receptors including reserved forests, if any are considered. There should be at least one monitoring station in the upwind direction and one in down-wind direction where maximum GLC is likely to fall.
25. Details of flora and fauna. In case of any scheduled fauna, conservation plan should be provided.
26. If any incompatible land use attributes fall with in 10 km from the project boundary, proponent shall describe the sensitivity (distance, area and significance) and propose the additional points based on significance for review and acceptance by the EAC/SEAC. Incompatible land use attributes include:
    - Public water supply areas from rivers/surface water bodies, from groundwater
    - Scenic areas/tourism areas/hill resorts
    - Religious places, pilgrim centers that attract over 10 lakh pilgrims a year
    - Protected tribal settlements (notified tribal areas where industrial activity is not permitted); CRZ
    - Monuments of national significance, World Heritage Sites
    - Cyclone, Tsunami prone areas (based on last 25 years);
    - Airport areas
    - Any other feature as specified by the State or local government and other features as locally applicable, including prime agricultural lands, pastures, migratory corridors, etc.

27. If ecologically sensitive attributes fall with in a 5 km radius of the project boundary, proponent shall describe the sensitivity (distance, area and significance) and propose the additional points based on significance for review and acceptance by the EAC/SEAC. Ecological sensitive attributes include:

    - National parks
    - Wild life sanctuaries Game reserve
    - Tiger reserve/elephant reserve/turtle nesting ground
    - Breeding grounds
    - Core zone of biosphere reserve
    - Habitat for migratory birds
    - Mangrove area
    - Areas with threatened (rare, vulnerable, endangered) flora/fauna
    - Protected corals
    - Wetlands
    - Zoological gardens
    - Gene Banks
    - Reserved forests
    - Protected forests
    - Any other closed/protected area under the Wild Life (Protection) Act, 1972, any other area locally applicable

28. If the location falls in a valley, specific issues connected to the management of natural resources shall be studied and presented.

Anticipated environmental impacts & mitigation measures

29. Anticipated environmental impacts that require specific studies for significance are given in impact matrix (Manual may be referred). Tools as given in the Manual shall be used for the assessment of environmental impacts.
30. Impact on drainage of the area and the surroundings.
31. Impact of the project on the AAQ of the area. Details of the model used and the input data used for modeling should also be provided. The air quality contours may be plotted on a location map showing the location of project site, habitation nearby, sensitive receptors, if any. The wind roses should also be shown on this map.
32. Impact of the project on local infrastructure of the study area such as road network, *etc*. In case if the study area requires any additional infrastructure, details of the agency responsible for the same should be included along with the time frame.
33. Details of rainwater harvesting and its proposed usage in the plant.
34. Proposed measures for occupational safety and health of the workers.
35. Proposed measures for odor control.

36. Details regarding infrastructure facilities such as sanitation, fuel, restroom, *etc*. to be provided to the labour force during construction as well as to the casual workers including truck drivers during the operational phase.

37. Typical measures that could be considered for the mitigation of impacts as given in this manual may be referred.

Analysis of alternative resources and technologies

38. Comparison of alternate sites considered and the reasons for selecting the proposed site. Conformity of the site with the prescribed guidelines in terms of CRZ, river, highways, railways *etc*.

39. Details on improved technologies.

Environmental monitoring program

40. The name of the laboratory recognized by the MoEF/ CPCB / NBA, *etc*. through which the monitoring / analysis shall be carried out.

41. Appropriate monitoring network has to be designed and proposed for regulatory compliance and to assess the residual impacts, if any.

Additional studies

42. Detailed R&R plan/compensation package for the people affected by the project shall be prepared, considering the socio-economic status of the area, homestead oustees, land oustees, and landless labourers.

43. Points identified in public hearing (if applicable) and commitment of the project proponent to the same. Detailed action plan addressing the issues raised, and the details of necessary allocation of funds shall be provided.

44. Proposed plan to handle the socio-economic influence on the local community. The plan should include quantitative dimension as far as possible.

45. The project proponent should undertake Risk Assessment. Details of the proposed safeguard measures including measures for fire hazards.

Environmental management plan

46. EMP devised to mitigate the adverse impacts of the project should be provided along with item-wise cost of its implementation.

47. Proposed post-project monitoring programme to ensure compliance to the approved Management Plan including administrative and technical organizational structure.

Note:

Above points shall be adequately addressed in the EIA report at corresponding chapters, in addition to the contents given in the reporting structure as per Appendix III of the EIA Notification, 2006.

6. INDUSTRIAL ESTATES

For any common facilities such as CETPs, municipal solid waste management, common incinerators, TSDFs, coming-up as a part of the IEs, then respective developmental activity-specific guidance points may be considered. Besides, the ToR for EIA studies for IEs may include but may not be limited to the following:

1. Executive summary of the project – giving a prima facie idea of the objectives of the proposal, use of resources, justification, *etc.* In addition, it should provide a compilation of EIA report, EMP and the post-project monitoring plan in brief.

Project Description

2. Details of the industries, for which the estate is being planned and their proposed capacities of installation, if available. In the absence of complete details, indicate the type of industries and capacity being considered.
3. Land requirement for the project including the peripheral greenbelt inside the boundary.
4. Justification for selecting the proposed size of the IEs.
5. Details on strategy being followed for development of IE.
6. Layout map of estate indicating processing zones, admin area, roads, plots, green belt, common utilities area, *etc.*, shall be shown along with contour map. Landscape plan including open spaces may be described.
7. All the coordinates of the IE site to be demarcated on the topographical sheet.
8. Classify the proposed industries based on their pollution potential to the extent possible i.e., A1 to A4 categories for air pollution and W1 to W4 categories for water pollution - CPCB Guidance may be referred for classification
9. Backward and forward linkages of the IEs (availability of input resources and markets for the products / by-products and anticipated benefits for the regional development).
10. Details of Infrastructure Development within the IE and in the region.
11. Details on known industrial activity-specific proposed processes, resource consumption and rejects assessment.
12. Details on estimated quantity of fuel required, fuel type, nature, source and transportation.
13. Details on estimated water balance taking into account conservation measures, reuse and recycling of treated effluents.
14. Individual and/or common facilities for waste collection, treatment, recycling and disposal (all effluent, emission and refuse including MSW, and hazardous wastes)

15. Commitment from the concerned authorities regarding availability of power, water and sewerage network.
16. Details of Solid Waste management including arrangements for hazardous waste management and e-waste.
17. Details on provisions made for safety in storage of materials, products and wastes.
18. Details on use of local building materials. The provisions of fly ash notification should be kept in view.
19. Detailed plan of treated water disposal, reuse and utilization/management.
20. In case of site leveling involving quarrying, details thereof.
21. Any litigation pending against the project and /or any direction /order passed by any Court of Law against the project/site, if so, details thereof.

Description of Environment

22. The project study area for EIA studies include 10 km radius from the boundary of the proposed IE.
23. Land use of study area should include data about the residential/ institutional/nearest village/ township/ locality/ housing society, *etc*., based on the satellite imagery.
24. Topography of the area clearly indicating the presence of pits deeper than one meter, if any. If these pits require to be filled in, details of filling material to be used, quantity required, its source, mode of transport, *etc*., shall be provided.
25. Anticipated pollution loads from each of the known composition of industrial units. Cumulative wastewater quantity and pollution load, point source–specific details for air pollutants and their loads, total solid/hazardous waste generation *etc*.
26. Details of rainwater harvesting and how it will be used in the IE & outfall.
27. Baseline data of the project area and the area within a 10 km radius with respect to different components of environment viz. air, noise, water, land, and biology and socio-economic may be collected as per the guidance provided in the Manual.
28. Identification of existing potential sources of pollution in the study area.
29. Present and projected population; present and proposed land use; planned development activities, issues relating to squatting and relocation, community structure, employment, distribution of income, goods and services; recreation; public health and safety; cultural peculiarities, aspirations and attitudes shall be explored in study.
30. Details regarding availability of social infrastructure and future projections, details of facilities such as sanitation, fuel, restroom *etc*. to be provided to the labour force during construction as well as to the casual workers including truck drivers during operation phase.
31. Detailed Study of the hydrological and geo-hydrological conditions of the project area including a contour plan indicating slopes and showing drainage pattern and outfall.

32. Information regarding surface hydrology and water regime and impact of the same, if any due to the project.
33. Site-specific meteorological data of one season and secondary data for future predictions.
34. Examine soil characteristics, topography, rainfall pattern and soil erosion.
35. Water quality of nearby River, if any, Source of water supply and nearby water ponds shall be analyzed.
36. Climatic conditions of the study area shall be monitored for hourly wind speed, wind direction, relative humidity, ambient dry and wet bulb temperatures and precipitation.
37. Ambient Air Quality (AAQ) data (except monsoon) of one complete season along with the monitoring dates. The parameters to be covered shall include SPM, RSPM, SO_2, NOx (ground level). The location of the monitoring stations should be decided in such a way that the pre-dominant downwind direction, population zone and sensitive receptors including reserved forests are considered. There should be at least one monitoring station in the upwind direction and one in down-wind direction where maximum GLC falls.
38. Fuel analysis to be provided (sulphur, ash content and mercury). Details of auxiliary fuel, if any including its quantity, quality, storage, *etc*., should also be given.
39. Noise level monitoring data from at least 15 locations within the study area.
40. Details of groundwater quality in and around the IE.
41. Examine entry/exit of the project including the crossings from the highway and provision of service roads on the basis of traffic density studies and analysis.
42. Examine water quality with reference to Persistent Organic Pollutants, if relevant.
43. If ecologically sensitive attributes fall within 10 km from the project boundary, proponent shall describe the sensitivity (distance, area and significance) and propose the additional points based on significance for review and acceptance by the EAC / SEAC. Ecological sensitive attributes include:
    - National parks
    - Wild life sanctuaries Game reserve
    - Tiger reserve/elephant reserve/turtle nesting ground
    - Breeding grounds
    - Core zone of biosphere reserve
    - Habitat for migratory birds
    - Mangrove area
    - Areas with threatened (rare, vulnerable, endangered) flora/fauna
    - Protected corals
    - Wetlands
    - Zoological gardens
    - Gene Banks

- Reserved forests
- Protected forests
- Any other closed/protected area under the Wild Life (Protection) Act, 1972, any other area locally applicable

44. If any incompatible land use attributes fall with in 10 km from the project boundary, proponent shall describe the sensitivity (distance, area and significance) and propose the additional points based on significance for review and acceptance by the EAC/SEAC. Incompatible land use attributes include:

- Public water supply areas from rivers/surface water bodies, from groundwater
- Scenic areas/tourism areas/hill resorts
- Religious places, pilgrim centers that attract over 10 lakh pilgrims a year
- Protected tribal settlements (notified tribal areas where industrial activity is not permitted); CRZ
- Monuments of national significance, World Heritage Sites
- Cyclone, Tsunami prone areas (based on last 25 years);
- Airport areas
- Any other feature as specified by the State or local government and other features as locally applicable, including prime agricultural lands, pastures, migratory corridors, etc.

45. If the location falls in Valley, specific issues connected to the natural resources management shall be studied and presented.

46. If the location falls in CRZ area: A CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the project and associate facilities w.r.t. CRZ, coastal features such as mangroves, if any. The route of the pipeline, conveyor system, *etc*. passing through CRZ, if any, should also be demarcated. The recommendations of the State Coastal Management Authority for the activities to be taken up in the CRZ shall also be provided.

- CRZ map in 1:10000 scale in general cases and in 1:5000 scale for specific observations shall be provided.
- Impact of the activities to be taken up in the CRZ area including jetty and desalination plant, etc. should be integrated into the EIA report; however, action should be taken to obtain separate clearance from the competent authority as may be applicable to such activities.
- Make provision for guard pond of adequate capacity before conveying effluent to marine outfall and similar provisions for safety against failure in the operation of wastewater treatment facilities. Identify acceptable outfall for treated effluent.
- Explore the possibility of expansion of Port facilities instead of Copy of the MOU for Port facilities shall be provided.
- Capital quantity of dredging material, disposal and its impact on aquatic life.
- Common marine outfall design, features, impacts on marine biology, etc.
- Fisheries study should be done with respect to Benthos and Marine organic material and coastal fisheries, bathymetric studies.

Anticipated Environmental Impacts and Mitigation Measures

47. Anticipated environmental impacts that require specific studies for significance are given in impact matrix (Manual may be referred). Tools as given in the Manual may be used for the assessment of environmental impacts.
48. Examine in detail the proposed site with reference to possible impact of infrastructure covering water supply, pipelines, roads, storm water drainage, sewerage, power, temporary waste storage facilities, treated wastewater disposal (land/sewer/surface water bodies), common facilities, *etc.*
49. Environmental condition scenarios shall be developed based on industrial activities and pollution potentials.
50. In case of any scheduled fauna, conservation plan should be provided.
51. Details of traffic density vis-à-vis impact on the ambient air.
52. Impact of the developmental activity on drainage of the area and the surroundings.
53. Impact of the project on the AAQ of the area. Details of the model used and the input data used for modeling should also be provided. The air quality contours may be plotted on a location map showing the location of project site, habitation nearby, sensitive receptors, if any. The wind roses should also be shown on this map.
54. Mathematical modeling for calculating the dispersion of air pollutants and ground level concentration along with emissions from boilers
55. Cumulative impact on regional supportive capacity shall be studied in terms of population density, water supply, sewerage, storm water drainage, power supply, educational facilities, medical facilities, public transport, traffic, housing for EWS, and community facilities, *etc.*
56. Details on positive and negative impacts, direct and indirect impacts, induced impacts.
57. Project activities and impacts shall be represented in matrix form with separate matrices for pre and post mitigation scenarios.
58. Traffic management plan including parking and loading/unloading areas may be described. Traffic survey should be carried out on week days and weekends and also analyze the anticipated traffic increase.
59. Odour mitigation plan may be described. Also make provision of green cover as a measure for mitigation of dust and noise and buffer between habitation and industry.
60. Rain water harvesting proposals should be made with due safeguards for groundwater quality. Maximize recycling of water and utilization of rain water.
61. Temporary plans for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile Sewage Treatment Plant (STP), safe drinking water, medical health care, crèche, *etc.*
62. Proposed measures for occupational safety and health of the workers.

63. Impact of the project on local infrastructure of the area such as road network and whether any additional infrastructure would need to be constructed and the agency responsible for the same with time frame.

64. Details of greenbelt including details of species, width of plantation, planning schedule, *etc*. within the boundary around the IE.

Analysis of alternative resources and technologies

65. Comparison of alternate sites considered and the reasons for selecting the proposed site. Conformity of the site with the prescribed guidelines in terms of CRZ, river, highways, railways, *etc*.

66. Evaluate alternative disposal modes of effluent and solid wastes, from the point of view of disposal points and associated impacts.

67. All kind of resources both renewable and non-renewable shall be taken into account.

68. Details on improved technologies.

Environmental Monitoring Program

69. Proposed post-project monitoring programme to ensure compliance to the approved Management Plan including administrative and technical organizational structure.

70. Appropriate monitoring network has to be designed and proposed for regulatory compliance and to assess the residual impacts, if any.

Additional Studies

71. The historical importance of the area shall also be examined in the study. While this analysis is being conducted, it is expected that an assessment of public perception of the proposed development be conducted.

72. Describe the application of industrial ecology concept for planning of IEs. Explore possibility of utilizing waste of one unit as raw material for the other units.

73. Public hearing should be conducted as per the prescribed procedure.

74. Points identified in the Public hearing (if applicable) and commitment of the project proponent to the same. Detailed action plan addressing the issues raised, and the details of necessary allocation of funds shall be provided.

75. Details on social impact assessment.

76. Risk assessment and corresponding on-site and off-site emergency management plans.

77. Specific chemical emergency response and proposed rescue system.

78. Details on corporate social responsibility proposal.

Environmental Management Plan

79. EMP devised to mitigate the adverse impacts of the project should be provided along with item-wise cost of its implementation.

Note:

Above points shall be adequately addressed in the EIA report at corresponding chapters, in addition to the contents given in the reporting structure as per Appendix III of the EIA Notification, 2006.

7. LEATHER/SKIN/HIDE PROCESSING INDUSTRY

ToR for EIA studies w.r.t the tanneries (leather / skin / hide processing industry) may include but not limited to the following:

1. Executive summary of the project – giving a prima facie idea of the objectives of the proposal, use of resources, justification, *etc.* In addition, it should provide a compilation of EIA report, EMP and the post-project monitoring plan in brief.

Project description

2. Justification for engaging a particular type of process (raw hide/skin into semi finishing or finished leather, semi finished leather to finished leather, dry finishing operations, chrome/vegetable tanning, *etc.*).
3. Justification for selecting the proposed unit size.
4. Details regarding complete leather/ skin/ hide processing including the usage of sulfides, nitrogen compounds, chromium or other tanning agents, post-tanning chemicals, biocides, *etc.*, along with the material balance shall be provided.
5. Incase of chrome tanning, details of the chrome recovery plant, management of shavings/solid waste including safe disposal.
6. Details on proposed waste minimization measures.
7. Details on management of fleshing and solid waste.
8. Details on water balance and measures to optimize water consumption; wastewater characteristics and proposed effluent treatment plant (Pre-treatment, in case connected to CETP).
9. Details on reuse of soak liquor / saline stream from membrane system, if applicable, to the extent possible in pickling activity after required treatment. Also, mention the salt recovery measures.
10. Details on proposed measures to ensure compliance to the environmental regulatory requirements, specifically the total dissolved solids (TDS) in treated wastewaters, wherever applicable.
11. Details on the proposed disposal of recovered salts, if any.
12. Details on odorous compounds and their management.
13. Proposed measures to address the possible fugitive air emissions and odour from the process operations.
14. Details regarding infrastructure facilities such as sanitation, fuel, restroom, *etc.*, to be provided to the labour force during construction as well as to the casual workers including truck drivers during the operational phase.

15. Any litigation pending against the project and /or any direction /order passed by any Court of Law against the project, if so, details thereof.

Description of the environment

16. The study area shall be up to a distance of 5 km from the boundary of the proposed project site.
17. Land use of study area should include data about the residential/ institutional/nearest village/ township/ locality/ housing society, *etc*., based on the satellite imagery.
18. Topography of the area clearly indicating the presence of pits deeper than one meter, if any. If these pits require to be filled in, details of filling material to be used, quantity required, its source, mode of transportation, *etc*.,.
19. Baseline data of the study area with respect to different components of environment viz. air, noise, water, land, and biology and socio-economic as per the guidance given in the manual.
20. Quality of the groundwater in and around the project area considering all the relevant parameters.
21. Information regarding surface hydrology and water regime and impact due to the project, if any, on the same.
22. Site-specific meteorological data of one season.
23. Details of flora and fauna. In case of any scheduled fauna, conservation plan should be provided.
24. If any incompatible land use attributes fall within a 5 km radius of the project boundary, proponent shall describe the sensitivity (distance, area and significance) and propose the additional points based on significance for review and acceptance by the EAC/SEAC. Incompatible land use attributes include:
    - Public water supply areas from rivers/surface water bodies, from groundwater
    - Scenic areas/tourism areas/hill resorts
    - Religious places, pilgrim centers that attract over 10 lakh pilgrims a year
    - Protected tribal settlements (notified tribal areas where industrial activity is not permitted); CRZ
    - Monuments of national significance, World Heritage Sites
    - Cyclone, Tsunami prone areas (based on last 25 years);
    - Airport areas
    - Any other feature as specified by the State or local government and other features as locally applicable, including prime agricultural lands, pastures, migratory corridors, etc.
25. If ecologically sensitive attributes fall with in a 5 km radius of the project boundary, proponent shall describe the sensitivity (distance, area and significance) and propose the additional points based on significance for review and acceptance by the EAC / SEAC. Ecological sensitive attributes include:

- National parks
- Wild life sanctuaries Game reserve
- Tiger reserve/elephant reserve/turtle nesting ground
- Breeding grounds
- Core zone of biosphere reserve
- Habitat for migratory birds
- Mangrove area
- Areas with threatened (rare, vulnerable, endangered) flora/fauna
- Protected corals
- Wetlands
- Zoological gardens
- Gene Banks
- Reserved forests
- Protected forests
- Any other closed/protected area under the Wild Life (Protection) Act, 1972, any other area locally applicable

26. If the location falls in a valley, specific issues connected to the management of natural resources.

Anticipated environmental impacts and mitigation measures

27. Anticipated environmental impacts that require specific studies for significance are given impact matrix (Manual may be referred). Tools as given in the manual may be used for the assessment of environmental impacts.
28. Impact of the disposal of treated water on the groundwater quality.
29. Impact on the receiving environment, due to the disposal of treated water.
30. Details of traffic density vis-à-vis impact on the ambient air, wherever applicable.
31. Typical measures that could be considered for the mitigation of impacts as given in this manual may be referred.
32. Proposed protective measures for occupational safety and health of the workers.
33. Proposed measures for odor control.
34. Impact of the project on local infrastructure of the study area such as road network, *etc.* If the study area requires any additional infrastructure, details of the agency responsible for the same should be included along with the time frame.

Analysis of alternative resources and technologies

35. Comparison of alternate sites considered and the reasons for selecting the proposed site. Conformity of the site with the prescribed guidelines in terms of CRZ, river, highways, railways, *etc.*
36. Details of improved technologies.

Environmental monitoring program

37. Appropriate monitoring network has to be designed and proposed for regulatory compliance and to assess the residual impacts, if any.

Additional studies

38. Detailed R&R plan/compensation package for the people affected by the project shall be prepared, considering the socio-economic status of the area, homestead oustees, land oustees, and landless labourers.
39. Points identified in public hearing (if applicable) and commitment of the project proponent to the same. Detailed action plan addressing the issues raised, and the details of necessary allocation of funds shall be provided.
40. Proposed plan to handle the socio-economic influence on the local community. The plan should include quantitative dimension as far as possible.
41. The proponent should undertake Risk Assessment. Details of the proposed safeguard measures should be provided. Measures to guard against fire hazards should also be provided.

Environmental management plan

42. EMP devised to mitigate the adverse impacts of the project should be provided along with item-wise cost of its implementation.
43. Proposed post-project monitoring programme to ensure compliance to the approved Management Plan including administrative and technical organizational structure.

Note:

Above points shall be adequately addressed in the EIA report at corresponding chapters, in addition to the contents given in the reporting structure as per Appendix III of the EIA Notification, 2006.

8. OFFSHORE AND ONSHORE OIL & GAS EXPLORATION, DEVELOPMENT AND PRODUCTION

ToR for EIA studies in respect of the offshore and onshore oil and gas exploration, development and production industry may include, but not limited to the following:

8.1 OFFSHORE

1. Executive summary of the project – giving a prima facie idea of the objectives of the proposal, use of resources, justification, *etc.* In addition, it should provide a compilation of EIA report, EMP and the post-project monitoring plan in brief.

Project description

2. Justification for selecting proposed capacity.
3. Geographic information of the site – Latitude/Longitude, total area envisaged for setting up of project, seismic zone classification, *etc.*
4. Maps at appropriate scales with proper labels and legends to illustrate the general settings of project-related development sites as well as surrounding areas likely to be environmentally affected.
5. Details on the implementation of the project in phases i.e., Seismic phase, exploratory drilling phase and development/exploitation.
6. Details on seismic equipments and vessel operations for seismic operations.
7. Details on support infrastructure, vessel and air traffic in the study area.
8. Details on geological, geophysical and seismic surveys.
9. Details on bathymetry such as nature and depth of seabed, *etc.*
10. Complete process flow diagram describing each unit, its processes and operations, along with material and energy inputs and outputs (material, water and energy balance).
11. Details on storage of chemicals at the site and measures to prevent hazards.
12. Details on solid waste management for drill cuttings, drilling mud and oil sludge, produced sand, radioactive materials, other hazardous materials, *etc.* including its disposal options during all project phases.
13. Details on wastewater generation, treatment and utilization/discharge for produced water, cooling waters, other wastewaters, *etc.* during all project phases.
14. Details on estimation and computation of air emissions (such as nitrogen oxides, sulphur oxides, carbon monoxide, hydrocarbons, VOCs, *etc.*) resulting from flaring, DG sets, combustion, *etc.* during all project phases.

15. Details on oil spills.
16. Identify the Petroleum and Natural Gas Ministries regarding the fulfillment of license requirements.
17. Details on the stratigraphic structure, fracture patterns and seismic history (if any) of the area.
18. Details on projected energy requirement for each phase of the development.
19. Details on change in shoreline due to installation of pipelines and related facilities at the shore.
20. Details on ports and harbors/possibility of expansion of Port facilities due to project activities. (Relevant ToR points from TGM for Ports and Harbors may be referred.)
21. Details on trans-boundary issues, if any.

Description of the environment

22. Baseline data including different components of environment viz. air, noise, water and biology from the study area as per the guidance given in the manual.
23. Details on climate, meteorology including wind patterns, temperature, rainfall, waves, tides, currents, cyclone, earthquakes, *etc.* in the study area.
24. Details on establishment of baseline on the air quality of the areas immediately affected by the exploratory drilling and also particularly with reference to hydrogen sulphide and sulphur dioxide and background levels of hydrocarbons and VOCs.
25. Details on establishment of baseline on the water resources of the area affected or potentially impacted by the activities in the various phases of the project. This baseline should include water quality assessment of available waters sources of the project site and zone of influence. The baseline should potentially include parameters such as: Total Nitrate, Salinity, DO, COD, BOD, pH, Sulphates, Hardness, Phosphates, Conductivity, Heavy metals (Total metals, mercury, lead, copper *etc.*), TDS, Hydrocarbons and Arsenic.
26. Quantify noise and vibration levels to be expected from seismic activities and potential exploratory drilling.
27. Details on bathymetry including sea depth, seawater quality, seafloor relief, navigational information, digital terrain model, *etc.*
28. Details of the basic physical environment of the study area.
29. Studies on flora and fauna including the main habitat types with list of species of flora and fauna and their conservation value, giving particular attention to any species protected under law.
30. Fisheries study w.r.t. benthos and marine organic material and coastal fisheries.
31. Details on the nature and volumes of liquid waste (including sewage if applicable), and wastewater and other sources of runoff to be generated by the project activities.

32. Details on the nature and volumes of solid wastes, including seismic programme by-products, drilling mud, drill cuttings *etc*., to be generated by the project activities.

33. Identification of CRZ area: A CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the project and associate facilities w.r.t. CRZ, coastal features such as mangroves, if any. The route of the pipeline, *etc*., passing through CRZ, if any, should also be demarcated. The recommendations of the State Coastal Management Authority for the activities to be taken up in the CRZ. The CRZ map in 1:10000 scale in general cases and in 1:5000 scale for specific observations.

34. If ecologically sensitive attributes fall with in 10 km from the project boundary, proponent shall describe the sensitivity (distance, area and significance) and propose the additional points based on significance for review and acceptance by the EAC. Ecological sensitive attributes include:

    - Breeding grounds
    - Core zone of biosphere reserve
    - Mangrove area
    - Areas with threatened (rare, vulnerable, endangered) flora/fauna
    - Protected corals

35. Details on hazardous or toxic material or substance to be used during either seismic testing or potential exploratory drilling.

36. Capital quantity of dredging material, disposal and its impact on aquatic life.

Anticipated Environmental Impacts & Mitigation Measures

37. Anticipated environmental impacts that require specific studies for significance are indicated in the impact matrix (Manual may be referred). Tools as given in the Manual may be used for the assessment of environmental impacts.

38. Details on potential impacts of seismic and exploratory drilling activities on water quality within the study area.

39. Details on potential impacts of project activities on the air emissions resulting from drilling operations.

40. Details on potential impacts on the water quality due to the activities in the various phases of the project.

41. Details on noise and vibration levels quantification that is expected from seismic activities and potential exploratory drilling and specify any potential impacts of these on the surrounding environment including human habitation.

42. Details on odor sources (such as hydrogen sulphide, mercaptants, *etc*.) and mitigation measures taken to control the odour.

43. Details on potential impacts of project activities on the aquatic fauna and flora for each phase of the project.

44. Details on impact of spills and discharge of crude oil in the surrounding areas.

45. Details on impacts of drilling waste such as drilling mud, additives (polymers, oxygen scavengers, biocides, surfactants), lubricants, diesel oil, emulsifying agents, flocculating agents, *etc*. and its treatment and disposal options to control the impacts.

46. Details on environmental impacts of the decommissioning of oil and gas installations, drill cuttings, *etc*.

47. Describe mitigation measures including an EMP to be implemented to reduce or offset the adverse impacts of seismic testing, potential exploratory drilling and exportation. Also, include measures to be taken during decommissioning phase.

48. Prepare outline designs for any proposals and give costs for implementing the mitigation measures.

49. Identify the preferred option(s) for waste management/disposal method based on environmental grounds, including necessary infrastructure. Specify any residual impacts of waste management, their significance, and any mitigation measures to be undertaken.

50. Identify mitigation measures to reduce or limit the potential impact on the surrounding environment and zone of influence (humans and wildlife).

51. Details on occupational health and safety of employees and workers.

52. Details on oceanographic changes (such as induced currents, waves, tidal currents, water quality, *etc*.) due to infrastructure development for project activities.

53. Recommend precise mitigation measures based on the specific option selected, for the proper management of all types of traffic close to and within the project area. These mitigation measures must include recommendations for protection features against erosion, and other potential pollution to the environment as well as social and human impacts.

54. Describe the potential social, economic and cultural impacts of conducting the proposed activity. Characterize the impacts in terms of type (beneficial or adverse), magnitude (high, medium or low), direct/indirect, duration (short, medium and long term, sporadic), avoidance and reversibility.

55. Typical measures that could be considered for the mitigation of impacts as given in this manual may be referred.

56. Impact of the activities to be taken up in the CRZ area including jetty and desalination plant *etc*., should be integrated into the EIA report; however, action should be taken to obtain separate clearance from the competent authority as may be applicable to such activities.

Analysis of Alternative resources and technologies

57. Evaluate options for the provision of suitable access for each of the components of the exploration phase.

58. Select preferred option for the provision for these components. This may need to examine construction materials (types, sources, volumes, transportation) and methods in relation to their environmental impacts.

59. Evaluate alternative options for meeting project needs. For these options, it may be necessary to investigate:
    - fuel storage (where relevant)
    - transportation (where relevant)
    - health and safety
    - significance of any pollution that may result from energy generation; and
    - mitigation measures
60. Select the preferred option for energy generation. Again, this should be based on environmental grounds, and should specify the residual impacts of generation of the preferred option, their significance and the mitigation measures, which will be undertaken.
61. Evaluate alternative options for the collection, treatment, recycling (if appropriate), and disposal of these wastes. Identify any chemicals planned for use in the treatment or management of these wastes.
62. Details on improved technologies such as remote sensing and GIS, *etc*. in oil and gas exploration.

Environmental Monitoring Program

63. Details on environmental monitoring program during surveying, drilling and exploration.
64. Details on use of advanced monitoring technologies such as remote sensing, *etc*., if any.
65. Identify and develop a water quality monitoring program able to detect any change in groundwater or surface water quality that could impact:
    - Public health
    - Forest, wetland and adjacent aquatic habitats; and
    - Flora and Fauna (including endangered or threatened species) in project area and zone of influence.
66. Develop and Implement an air quality monitoring programme to monitor the release of toxic emission in particular SO_2, CO and NO_2 and their potential impacts on Public Health, wildlife health and environment.
67. Appropriate monitoring network has to be designed and proposed for regulatory compliance and to assess the residual impacts, if any.

Additional Studies

68. Details on existing socio-economic conditions with a brief overview of the socio-economic background to the study area, including population, employment and travel patterns.
69. Identify patterns of land use within the corridor of the proposed route, and record these on a map with annotation.

70. Consult with relevant local stakeholders (village councils, local community, and local NGOs) within the direct project area, to identify their economical, environmental and social concerns about the proposal.

71. Archaeology - Consult with the Archeology Department to conduct a general assessment of the area to determine any features of archaeological or cultural importance and provide recommendations for the protection of any features.

72. Public Interest - Report on the views and concerns of directly affected communities, local NGOs and relevant government departments/agencies regarding the development of the project.

73. Details on risk assessment including identification of hazards, proposed measures, disaster management plan, contingency plan, emergency response plan, *etc.*

Environmental Management Plan

74. Outline of the overall management structure anticipated for the proposed activities.

75. Details on compliance verification of the emissions of the environmental components (such as emissions limits, discharge limits, noise limits, odor, *etc.*) with the national/ international standards.

76. Description of the pertinent regulations, standards and policies, at the local and national levels governing environmental quality, health, safety and protection of sensitive areas. These could include cultural resources, protection of endangered or threatened species, infrastructure development and land use control that may have an impact on the proposed development.

77. Specify options for refueling of vehicles and identify best practice methods for eliminating spills and maximizing health and safety.

78. Identify emergency preparation and applicable management measures for the proposed activities dealing with the following eventualities:

    - Oil spills
    - Hurricanes
    - Floods
    - Fires
    - Blow out plan
    - Hydrogen sulfide safety (including other types of gases)
    - Employee training

79. Details on post-project closure and monitoring programme.

8.2 ONSHORE

1. Executive summary of the project – giving a *prima facie* idea of the objectives of the proposal, use of resources, justification, *etc.* In addition, it should provide a compilation of EIA report, EMP and the post-project plan in brief.

Project Description

2. Justification for selecting the proposed capacity.
3. Geographic information of the site – Latitude/Longitude, total area envisaged for setting up of project, seismic zone classification, topography, *etc.*
4. Land requirement for the project including its optimization, break up of land requirement and its availability.
5. Maps at appropriate scales with proper labels and legends to illustrate the general settings of project-related development sites as well as surrounding areas likely to be environmentally affected.
6. Details on the implementation of the project in phases i.e., Seismic phase, exploratory drilling phase and development/exploitation.
7. Complete process flow diagram describing each unit, its processes and operations, along with material and energy inputs and outputs (material, water and energy balance).
8. Details on support infrastructure in the study area.
9. Details on geological, geophysical and seismic surveys.
10. Details on outline of the overall management structure anticipated for the proposed activities.
11. Details on the implementation of the project in phases i.e., Seismic phase, exploratory drilling phase and development/exploitation
12. Details on solid waste management for drill cuttings, drilling mud and oil sludge, produced sand, radioactive materials, other hazardous materials, *etc.* including its disposal options during all project phases.
13. Details on wastewater generation, treatment and utilization/discharge for produced water, cooling waters, other wastewaters, *etc.* during all project phases.
14. Details on estimation and computation of air emissions (such as nitrogen oxides, sulphur oxides, carbon monoxide, hydrocarbons, VOCs, *etc.*) resulting from flaring, DG sets, combustion, *etc.* during all project phases.
15. Identify the Petroleum and Natural Gas Ministries regarding the fulfillment of license requirements.
16. Details on the stratigraphic structure, fracture patterns and seismic history (if any) of the area.
17. Details on projected energy requirement for each phase of the development.

Description of the Environment

18. Baseline data including different components of environment viz. air, noise, water and biology from the study area as per the guidance given in the manual.
19. Details on demography and socio-economic status in the study area.
20. Details on establishment of baseline on the air quality of the areas immediately affected by the exploratory drilling and also particularly with reference to hydrogen

sulphide and sulphur dioxide and background levels of hydrocarbons (HC) and VOCs.

21. Details on establishment of baseline on the water resources of the area. This baseline should include water quality assessment of available waters sources of the project site and zone of influence. The baseline should potentially include parameters such as: Total Nitrate, Salinity, DO, COD, BOD, pH, Sulphates, Hardness, Phosphates, Conductivity, Heavy metals (Total metals, mercury, lead, copper *etc*.), TDS, Hydrocarbons and Arsenic.
22. Quantify noise and vibration levels to be expected from seismic activities and potential exploratory drilling.
23. Details of the basic physical environment of the study are. This should include:
    - Topography: including degree of slopes, drainage patterns around project site, and flood hazard
    - Map outlining the boundaries of area of influence in relation to protected areas, surrounding villages, roads, etc.
    - Climate, Hydrology and Meteorology: including rainfall average per year, prevailing wind patterns
    - Geology: description of the characteristics of landform, land surface including exposed rocks, types of unconsolidated materials sediments, rivers, tributaries, if they can be determined by field mapping
    - Soils: specific soil types, soil fertility, agricultural value
24. Land use of the proposed study area as well as the project area – notified industrial area, residential/ institutional/nearest village/ township/ locality/ housing society, grazing, mangroves, no development area, national parks, sanctuary, marches, surface water bodies, roads, protected areas, agriculture, tourism, *etc*. based on the satellite imagery.
25. Maps at appropriate scales and with proper labels and legends to illustrate the general settings of project-related development sites as well as surrounding areas likely to be environmentally affected.
26. Air Quality - Details on baseline of air quality of the areas immediately affected by the exploratory drilling.
27. Physical description of surrounding water bodies including creeks and rivers.
28. Studies on flora and fauna including the main habitat types with list of species of flora and fauna and their conservation value, giving particular attention to any species protected under law
29. Details on baseline on the current presence of hydrocarbons and heavy metals in the soils.
30. If any incompatible land use attributes fall with in 10 km from the project boundary, proponent shall describe the sensitivity (distance, area and significance) and propose the additional points based on significance for review and acceptance by the EAC. Incompatible land use attributes include:
    - Public water supply areas from rivers/surface water bodies, from groundwater
    - Scenic areas/tourism areas/hill resorts

- Religious places, pilgrim centers that attract over 10 lakh pilgrims a year
- Protected tribal settlements (notified tribal areas where industrial activity is not permitted)
- Monuments of national significance, World Heritage Sites
- Cyclone, Tsunami prone areas (based on last 25 years)
- Airport areas
- Any other feature as specified by the State or local government and other features as locally applicable, including prime agricultural lands, pastures, migratory corridors *etc.*

31. If ecologically sensitive attributes fall with in 10 km from the project boundary, proponent shall describe the sensitivity (distance, area and significance) and propose the additional points based on significance for review and acceptance by the EAC. Ecological sensitive attributes include:

- National parks
- Wild life sanctuaries Game reserve
- Tiger reserve/elephant reserve/turtle nesting ground
- Breeding grounds
- Core zone of biosphere reserve
- Habitat for migratory birds
- Mangrove area
- Areas with threatened (rare, vulnerable, endangered) flora/fauna
- Protected corals
- Wetlands
- Zoological gardens
- Gene Banks
- Reserved forests
- Protected forests
- Any other closed/protected area under the Wild Life (Protection) Act, 1972, any other area locally applicable.

32. If the location falls in a valley, specific issues connected to the management of natural resources shall be studied.

33. Determine the nature and volumes of liquid waste (including sewage if applicable), and wastewater and other sources of runoff to be generated by the entire project.

34. Determine the nature and volumes of solid wastes, including seismic programme by-products, drilling mud, drill cuttings *etc.*, to be generated by the entire project.

35. Quantify whether any of the solid waste are to be considered hazardous or not.

36. Details on hazardous or toxic chemical material or substance to be used during either seismic testing or potential exploratory drilling.

Anticipated environmental impacts & mitigation measures

37. Anticipated environmental impacts that require specific studies for significance are indicated in the impact matrix (Manual may be referred). Tools as given in the Manual may be used for the assessment of environmental impacts.
38. Describe and identify potential impacts on the terrestrial and aquatic fauna and flora of the study area for each phase. This would include, where applicable, forest, river corridors, wetlands, biological corridors, and protected areas.
39. If clearing of vegetation is required, estimate the acreage.
40. Details on potential impacts of seismic and exploratory drilling activities on water quality within the study area.
41. Details on potential impacts of project activities on the air emissions resulting out of drilling operations.
42. Details on potential impacts on the water quality due to the activities in the various phases of the project.
43. Details on noise and vibration levels quantification that is expected from seismic activities and potential exploratory drilling and specify any potential impacts of these on the surrounding environment including human habitation.
44. Details on odour sources (such as hydrogen sulfide, mercaptans *etc*) and mitigation measures taken to control the odour.
45. Details on impact of spills and discharge of crude oil in the surrounding areas.
46. Details on impacts of drilling waste such as drilling mud, additives (polymers, oxygen scavengers, biocides, surfactants), lubricants, diesel oil, emulsifying agents, flocculating agents, *etc*. and its treatment and disposal options to control the impacts.
47. Details on environmental impacts of the decommissioning of oil and gas installations, drill cuttings, *etc*.
48. Describe mitigation measures including an EMP which is to be implemented to reduce or offset the adverse impacts of seismic testing, potential exploratory drilling and exportation. Also, include measures to be taken during decommissioning phase.
49. Details on outline designs for any proposal and costs for implementing the mitigation measures.
50. Identify the preferred option(s) for waste management/disposal method based on environmental grounds, including necessary infrastructure. Specify any residual impacts of waste management, their significance, and any mitigation measures to be undertaken.
51. Identify mitigation measures to reduce or limit the potential impact on the surrounding environment and zone of influence (humans and wildlife).
52. Details on occupational health and safety of employees and workers.
53. Recommend precise mitigation measures based on the specific option selected, for the proper management of all types of traffic close to and within the project

area. These mitigation measures must include recommendations for protection features against erosion, and other potential pollution to the environment as well as social and human impacts.

54. Describe the potential social, economic and cultural impacts of conducting the proposed activity. Characterize the impacts in terms of type (beneficial or adverse), magnitude (high, medium or low), direct/indirect, duration (short, medium and long term, sporadic), avoidance and reversibility.

55. Typical measures that could be considered for the mitigation of impacts as given in this manual may be referred.

Analysis of alternative resources and technologies

56. Evaluate options for the provision of suitable access for each of the components of the exploration phase.

57. Select preferred option for the provision for exploration phase components. This may need to examine construction materials (types, sources, volumes, transportation) and methods in relation to their environmental impacts.

58. Evaluate alternative options for meeting project needs. For these options, it may be necessary to investigate:

    - fuel storage (where relevant)
    - transportation (where relevant)
    - health and safety
    - significance of any pollution that may result from energy generation; and
    - mitigation measures

59. Select the preferred option for energy generation. Again, this should be based on environmental grounds, and should specify the residual impacts of generation of the preferred option, their significance and the mitigation measures, which will be undertaken.

60. Evaluate alternative options for the collection, treatment, recycling (if appropriate), and disposal of these wastes. Identify any chemicals planned for use in the treatment or management of these wastes.

61. Details on improved technologies such as remote sensing and GIS, *etc*. in oil and gas exploration.

Environmental Monitoring Program

62. Details on environmental monitoring program during surveying, drilling and exploration.

63. Details on use of advanced monitoring technologies such as remote sensing, *etc*., if any.

64. Identify and develop a water quality monitoring program able to detect any change in groundwater or surface water quality that could impact:

    - Public health

- Forest, wetland and adjacent aquatic habitats; and
- Flora and Fauna (including endangered or threatened species) in project area and zone of influence.

65. Develop and Implement an air quality monitoring programme to monitor the release of toxic emission in particular SO2, CO and NO2 and their potential impacts on Public Health, wildlife health and environment.

66. Appropriate monitoring network has to be designed and proposed for regulatory compliance and to assess the residual impacts, if any.

Additional Studies

67. Details on existing socio-economic conditions, giving a brief overview of the socio-economic background to the study area, including population, employment and travel patterns.

68. Identify patterns of land use within the corridor of the proposed route, and record these on a map with annotation.

69. Consult with relevant local stakeholders (village councils, local community, and local NGOs) within the direct project area, to identify their economical, environmental and social concerns about the proposal.

70. Archaeology - Consult with the Archeology Department to conduct a general assessment of the area to determine any features of archaeological or cultural importance and provide recommendations for the protection of any features.

71. Public Interest - Report on the views and concerns of directly affected communities, local NGOs and relevant government departments/agencies regarding the development of the project.

72. Details on risk assessment including identification of hazards, proposed measures, disaster management plan, contingency plan, emergency response plan, *etc.*

Environmental Management Plan

73. Outline of the overall management structure anticipated for the proposed activities.

74. Details on compliance verification of the emissions of the environmental components (such as emissions limits, discharge limits, noise limits, odor, *etc.*) with the national/ international standards.

75. Description of the pertinent regulations, standards and policies, at the local and national levels governing environmental quality, health, safety and protection of sensitive areas. These could include cultural resources, protection of endangered or threatened species, infrastructure development and land use control that may have an impact on the proposed development.

76. Specify options for refueling of vehicles and identify best practice methods for eliminating spills and maximizing health and safety.

77. Identify emergency preparation and applicable management measures for the proposed activities dealing with the following eventualities:

- Oil spills
- Hurricanes
- Floods
- Fires
- Blow out plan
- Hydrogen sulfide safety (including other types of gases)
- Employee training

Note:

Above points shall be adequately addressed in the EIA report at corresponding chapters, in addition to the contents given in the reporting structure as per Appendix III of the EIA Notification, 2006.

9. PULP AND PAPER INDUSTRY

ToR for EIA studies in respect of the proposed Pulp and Paper industry may include, but not limited to the following:

1. Executive summary of the project – giving a *prima facie* idea of the objectives of the proposal, use of resources, justification, *etc.* In addition, it should provide a compilation of EIA report, EMP and the post-project monitoring plan in brief.

Project Description

2. Justification for selecting the proposed unit size.
3. Land requirement for the project including its optimization, break up of land requirement and its availability. Norms prescribed by CEA should be kept in view.
4. Complete process flow diagram describing each of the unit processes and operations, along with material and energy inputs and outputs (material and energy balance).
5. Sources of raw material for pulping activity, availability of compatible land and water resources in the region to support the proposed capacity of the plant and future expansions
6. Type of manufacturing process (*i.e.* Chemi mechanical/Mechanical/Chemical; and pulp & paper, only paper, imported pulp based, waste paper based, *etc.*)
7. Comparison of alternate sites considered and the reasons for selecting the proposed site. Conformity of the site with the prescribed guidelines in terms of CRZ, river, highways, railways *etc.*
   - Strategies for sustainable supply of raw material
     - Forest based
     - Agro based
     - Waste paper based

44. Details regarding complete process of pulp and paper making including bleaching method and chemicals used *etc.* (including ink remover, *etc*)
45. Flow sheet showing unit processes and unit operations of the manufacturing process with material balance and sources of pollution including description on following:
   - Pulping
   - Bleaching
     - Bleaching sequences
     - Sources of Bleaching chemicals

- Characteristics of bleaching plant effluent
- Bleach plant filtrate closure
- Details on Black liquor handling

▪ Chemical recovery

- Recovery efficiency make up salt cake
- Closure of lime cycle
- Disposal of lime sludge and solid making
- Fiber recovery in peb mechanized waste paper processing
- Management of de-inking sludge

▪ Stock preparation and paper making

- Source of raw material
- Initiative to obtain sustainable supply of raw material

▪ Water Cycle closure

- Movement towards zero discharge

▪ Initiative for colour reduction from effluent bleach plant & chemical recovery

▪ Chlorine dioxide generation

▪ Oxygenate generation

8. Source of water and its availability. Proof regarding availability of requisite quantity of water from the competent authority.
9. Details of water consumption per Ton of paper.
10. Details of water balance (water intake, use, wastewater generation) taking into account reuse and re-circulation of effluents. Additional water conservation measures, if any, proposed for the project.
11. Details on toxicity in the effluent due to discharge of organo-chloro compounds from bleaching process of grey pulp
12. Details on proposed waste minimization measures.
13. Design details of chemical recovery plant for bleached grade of paper for compliance of standard of BOD, COD & AOx and measures for control of emissions from the recovery plant should be incorporated.
14. Details on solid waste, particularly lime sludge generated from the causticizing section of chemical recovery system should be included
15. Proposed points for odour control (by burning the reduced sulfur emissions in the boiler/lime-kiln)
16. Examine the feasibility of zero discharge. In case of any proposed discharge, its quantity, quality and point of discharge, users downstream, *etc.*
17. Any legal cases pending against the existing plant related to the environmental pollution and impacts in the last three years shall be described.

Description of the Environment

18. Toposheet with all the coordinates of the plant site demarcated (1:50000 scale).
19. The study area shall be up to a distance of 10 km from the boundary of project area.
20. Land use of study area should include data about the residential/ institutional/nearest village/ township/ locality/ housing society, *etc*., based on the satellite imagery.
21. Topography of the area clearly indicating the presence of pits deeper than one metre, if any. If these pits require to be filled in, details of filling material to be used, quantity required, its source, mode of transport, *etc*.
22. Baseline data of the study area with respect to different components of environment viz. air, noise, water, land, and biology and socio-economic as per the guidance given in the manual.
23. Quality of the ground water in and around the proposed site for all the relevant parameters
24. Surface and ground water quality monitoring should be included. Permission for the drawl of ground water from SGWB/CGWA and irrigation department should be included.
25. Information regarding surface hydrology and water regime and impact due to the project, if any, on the same.
26. Site-specific meteorological data of one season.
27. AAQ data (except monsoon) of one complete season along with the monitoring dates. The parameters to be covered shall include SPM, RSPM, SO_2, NOx (ground level). The location of the monitoring stations should be decided in such a way that the pre-dominant downwind direction, population zone and sensitive receptors including reserved forests are considered. There should be at least one monitoring station in the upwind direction and one in down-wind direction where maximum GLC falls.
28. Chemical characterization of RSPM and incorporation of RSPM data.
29. Noise level monitoring data collected from locations from all the four sides surrounding the project area and also at sensitive receptors. If any incompatible land-use attributes fall within a 10 km radius of the project boundary, proponent shall describe the sensitivity (distance, area and significance) and propose the additional points based on significance for review and acceptance by the EAC/SEAC. Incompatible land-use attributes include:
    - Public water supply areas from rivers/surface water bodies, from ground water
    - Scenic areas/tourism areas/hill resorts
    - Religious places, pilgrim centers that attract over 10 lakh pilgrims a year
    - Protected tribal settlements (notified tribal areas where industrial activity is not permitted)
    - CRZ
    - Monuments of national significance, World Heritage Sites

- Cyclone, Tsunami prone areas (based on last 25 years);
- Airport areas
- Any other feature as specified by the State or local government and other features as locally applicable, including prime agricultural lands, pastures, migratory corridors, *etc.*

30. If ecologically sensitive attributes fall with in a 10 km radius of the project boundary, proponent shall describe the sensitivity (distance, area and significance) and propose the additional points based on significance for review and acceptance by the EAC/SEAC. A map marking the location of such areas (existing or proposed) duly authenticated by the Chief Wildlife Warden. Ecological sensitive attributes include:

    - National parks
    - Wild life sanctuaries Game reserve
    - Tiger reserve/elephant reserve/turtle nesting ground
    - Breeding grounds
    - Core zone of biosphere reserve
    - Habitat for migratory birds
    - Mangrove area
    - Areas with threatened (rare, vulnerable, endangered) flora/fauna
    - Protected corals
    - Wetlands
    - Zoological gardens
    - Gene Banks
    - Reserved forests
    - Protected forests
    - Any other closed/protected area under the Wild Life (Protection) Act, 1972, any other area locally applicable

31. Details of traffic density vis-à-vis impact on the ambient air, wherever applicable.

32. If the location falls in a valley, studies on specific issues connected to the management of natural resources.

33. If the location is on Seashore:

    - Identification of CRZ area: A CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the project and associate facilities w.r.t. CRZ, coastal features such as mangroves, if any. The route of the pipeline, conveyor system etc. passing through CRZ, if any, should also be demarcated. The recommendations of the State Coastal Management Authority for the activities to be taken up in the CRZ.
    - Provide the CRZ map in 1:10000 scale in general cases and in 1:5000 scale for specific observations.
    - Environmental parameters – Temperature, sea level pressure, wind speed, mean relative humidity, visibility, salinity, density, rainfall, fog, frequency and

intensity of cyclones, sediment transport, seismic characteristics, fresh water influx.

- Details on marine biological parameters – microbiological population, pathogenic bacteria, plankton distribution, fish spawning grounds in the adjoining waters, commercial fisheries potential, vegetation including inter tidal, flora and fauna in the marine, benthal quality assessment for biological species and heavy metals and estuarine environment.

Anticipated Environmental Impacts and Mitigation Measures

34. Anticipated generic environmental impacts that require specific studies for significance are given in impact matrix (Manual may be referred). Tools as given in the manual may be used for the assessment of environmental impacts.
35. Impact on drainage of the area and the surroundings.
36. Impact of the project on the AAQ of the area. Details of the model used and the input data used for modeling. The air quality contours may be plotted on a location map showing the location of project site, habitation nearby, sensitive receptors, if any. The wind roses should also be shown on this map.
37. Impact of the project on local infrastructure of the study area such as road network, *etc.* In case if the study area requires any additional infrastructure, details of the agency responsible for the same should be included along with the time frame.
38. Details of rainwater harvesting and its proposed usage in the plant.
39. Details regarding infrastructure facilities such as sanitation, fuel, restroom, *etc.* to be provided to the workers during construction as well as to the casual workers including truck drivers during the operational phase.
40. Details of greenbelt giving details of species, width of plantation, planning schedule, *etc*.
41. Details of flora and fauna. Conservation plan in case of any scheduled fauna.
42. Proposed measures for occupational safety and health of the workers.

Analysis of alternative resources and technologies

43. Details on proposed measures to ensure Compliance to the environmental regulatory requirements, specifically the lignin handling and colour removal.
44. Details on alternative measures proposed to address the possible fugitive air emissions and odor from the process operations.
45. Comparison of alternate sites considered and the reasons for selecting the proposed site. Conformity of the site with the prescribed guidelines in terms of Coastal Regulatory Zone (CRZ), river, highways, railways *etc*.
46. Details on improved technologies.

Environmental Monitoring Program

47. Appropriate monitoring network has to be designed and proposed for regulatory compliance and to assess the residual impacts, if any.

Additional Studies

48. Detailed compensation package for the people affected by the project shall be prepared, considering the socio-economic status of the area, homestead oustees, land oustees, and landless labourers.
49. Points identified in public hearing and commitment of the project proponent to the same. Detailed action plan addressing the issues raised, and the details of necessary allocation of funds.
50. Proposed plan to handle the socio-economic influence on the local community. The plan should include quantitative dimension as far as possible.
51. Details of risk assessment and proposed safeguard measures.

Environmental Management Plan

52. EMP devised to mitigate the adverse impacts of the project along with item-wise cost of its implementation.
53. Proposed post-project monitoring programme to ensure compliance to the approved Management Plan including administrative and technical organizational structure.

Note:

Above points shall be adequately addressed in the EIA report at corresponding chapters, in addition to the contents given in the reporting structure as per Appendix III of the EIA Notification, 2006.

10. SHIP BREAKING YARDS

Ship breaking yard refers to group of individual ship breaking units. The expert committee suggested to consider only ship breaking yards for the purpose of EIA studies and thus this ToR is for ship breaking yards. ToR for EIA studies w.r.t ship breaking yards may include, but not limited to following:

1. Executive summary of the project - giving a prima facie idea of the objectives of the proposal, use of resources, justification, *etc.* In addition, it should provide a compilation of EIA report, EMP and the post-project monitoring plan in brief.

Project description

2. Backward and forward linkages of the project – sale and purchase of ships for scrapping, demand for scrapping, scrap market, availability of re-rolling mills, *etc.*
3. Proposed ship dismantling plan and facilities management plan.
4. Details of temporary storage facilities for wastes and scrap from vessels in the yard – storage for asbestos, PCBs, radioactive wastes, gas cylinders, administrative office building, workers' rest/changing room, storage facility for bilge and ballast water, storage facility for oil residues.
5. Injuries, accidents and possible hazards during the ship breaking process.
6. List of proposed personal protective equipments to be provided to safeguard health and safety of workers.
7. Details of local amenities and infrastructural developmental activities - electricity, drinking water facilities, sewage facilities, roads, transportation, communication, housing, greenbelt.
8. Details of the transportation system from the yard and the traffic density.
9. Details of the provisions for treatment or disposal of all types of wastes generated by the ship breaking yard (locations and capacities of the provisions for hazardous waste, solid waste, radioactive waste, asbestos, *etc.*)
10. Details regarding infrastructure facilities such as sanitation, fuel storage rooms, restrooms, *etc.* to be provided to the workmen during ship breaking operations.
11. Any litigation pending against the project and /or any direction /order passed by any Court of Law against the project, if so, details thereof.
12. In case of expansion projects, compliance to the issued EIA clearance conditions and consent for operation conditions for existing yard.

Description of the environment

13. The study area shall be up to a distance of 5 km from the boundary of the proposed ship breaking yard.
14. Geographic information of the site – Latitude/Longitude, total area envisaged for setting up of the industry, seismic zone classification.
15. Land use of the proposed project area – notified industrial area, grazing, mangroves, no development area, national parks, sanctuary, marshes, fishing area, *etc*.
16. Land use of study area should also include data about the residential/institutional/ nearest village/township/locality/housing society, *etc*., based on the satellite imagery.
17. Baseline data of the study area w.r.t different components of environment viz. air, noise, water, land, and biology and socio-economic as per the guidance given in the manual.
18. Details of site and information related to environmental setting within a 5 km radius on the landward side – CRZ classification, LTL, HTL, bathymetric survey.
19. CRZ map in 1:10000 scale in general cases and in 1:5000 scale for specific observations.
20. Environmental parameters – temperature, sea level pressure, wind speed, mean relative humidity, visibility, salinity, density, rainfall, fog, frequency and intensity of cyclones, sediment transport, seismic characteristics, fresh water influx.
21. Details on marine biological parameters – microbiological population, pathogenic bacteria, plankton distribution, fish spawning grounds in the adjoining waters, commercial fishery potential, vegetation including intertidal flora and fauna in the marine, benthal quality assessment for biological species and heavy metals and estuarine environment.
22. Site-specific meteorological data of one season.
23. Source of water and its availability. Proof regarding the availability of requisite quantity of water from the competent authority.
24. Details of groundwater quality around the industry – groundwater samples to be collected from 7 to 10 locations.
25. Details of stormwater management.
26. Ambient Air Quality (AAQ) data (except monsoon) of one complete season along with the monitoring dates. The parameters to be covered shall include SPM, RSPM, SO_2, NOx and Asbestos. The location of the monitoring stations should be within the proposed project area and at about 500m towards the land side.
    - Dust fall shall be monitored at each AAQ.
    - AAQ monitoring stations shall be located within the study area.
27. Noise levels monitoring at three sides surrounding the yard and at sensitive/ commercial/residential locations within the study area.

28. Sea water and sediments must be collected up to 500m from the site at multiple points depending on activities at beach.

29. Soil sampling to be done from each AAQ station such that a relationship is developed between dust fall and soil quality.

30. If any incompatible land use attributes fall within a 5 km radius of the project boundary, proponent shall describe the sensitivity (distance, area and significance) and propose the additional points based on significance for review and acceptance by the EAC. Incompatible land use attributes include:

    - Public water supply areas from rivers/surface water bodies, from groundwater
    - Scenic areas/tourism areas/hill resorts
    - Religious places, pilgrim centers that attract over 10 lakh pilgrims a year
    - Protected tribal settlements (notified tribal areas where industrial activity is not permitted); CRZ
    - Monuments of national significance, World Heritage Sites
    - Cyclone, Tsunami prone areas (based on last 25 years);
    - Airport areas
    - Any other feature as specified by the State or local government and other features as locally applicable, including prime agricultural lands, pastures, migratory corridors, *etc*.

31. If ecologically sensitive attributes fall within a 5 km radius of the project boundary, proponent shall describe the sensitivity (distance, area and significance) and propose the additional points based on significance for review and acceptance by the EAC. Ecological sensitive attributes include:

    - National parks
    - Wild life sanctuaries Game reserve
    - Tiger reserve/elephant reserve/turtle nesting ground
    - Breeding grounds
    - Core zone of biosphere reserve
    - Habitat for migratory birds
    - Mangrove area
    - Areas with threatened (rare, vulnerable, endangered) flora/fauna
    - Protected corals
    - Wetlands
    - Zoological gardens
    - Gene banks
    - Reserved forests
    - Protected forests
    - Any other closed/protected area under the Wild Life (Protection) Act, 1972, any other area locally applicable

Anticipated environmental impacts and mitigation measures

32. Anticipated environmental impacts that require specific studies for significance are given impact matrix (Manual may be referred). Tools as given in the manual may be used for the assessment of environmental impacts.
33. Impact on drainage of the area and the surroundings.
34. Impact of the project on local infrastructure within the study area such as road network, *etc*.
35. Measures that could be considered for the mitigation of impacts.
36. Oil spill models may be used to predict the likely impacts, in case of eventuality.
37. Proposed measures for occupational safety and health of the workers.

Analysis of alternative technologies

38. Justification for selecting the proposed ship breaking yard (LDT, individual unit/plot size, infrastructure – type of ships, number of ships that can be accommodated).
39. Comparison of alternate sites and dismantling methods (beaching, docking, berthing) and the reasons for selecting the same. Conformity of the site with the prescribed guidelines in terms of rivers, highways, *etc*.
40. Details on better practices.

Environmental monitoring program

41. Appropriate monitoring network has to be designed and proposed for regulatory compliance and to assess the residual impacts, if any.

Additional studies

42. Detailed socio-economic status of the area (including migrated labor), homestead oustees, fishermen, reduction in fishing yields, project-affected people, *etc*.
43. Points identified in the Public hearing (if applicable) and commitment of the project proponent to the same. Detailed action plan addressing the issues raised, and the details of necessary allocation of funds shall be provided.
44. Proposed plan to handle the socio-economic influence on the local community. The plan should include quantitative dimension as far as possible.
45. Risk assessment and mitigation measures, fire-fighting, emergency management plan and services.

Environmental management plan

46. EMP devised to mitigate the adverse impacts of the project should be provided along with item-wise cost of its implementation.

47. Proposed post-project monitoring programme to ensure compliance to the approved Management Plan including administrative and technical organizational structure.

Note:

Above points shall be adequately addressed in the EIA report at corresponding chapters, in addition to the contents given in the reporting structure as per Appendix III of the EIA Notification, 2006.

11. SUGAR INDUSTRY

ToR for EIA studies in respect of the proposed Sugar industry may include, but not limited to the following:

1. Executive summary of the project – giving a prima facie idea of the objectives of the proposal, use of resources, justification, *etc.* In addition, it should provide a compilation of EIA report, EMP and the post-project monitoring plan in brief.

Project description

2. Justification for selecting the proposed unit size.
3. Land requirement for the project including its optimization, break up of land requirement and its availability
4. Complete process flow diagram describing each unit, its processes and operations in production of sugar, along with material and energy inputs and outputs (material and energy balance).
5. Number of working days of the sugar production unit.
6. Source of water and its availability. Proof regarding the availability of requisite quantity of water from the competent authority.
7. Details of water balance (water intake, use, wastewater generation) taking into account reuse and re-circulation of effluents. Additional water conservation measures, if any, proposed for the project.
8. Details of the use of steam from the boiler.
9. Information on the following is necessary:
   - Sugar cane sourcing, transportation and storage (issues of traffic congestion)
   - Water sourcing and use for sugarcane plantation
   - Land use pattern and cropping, if sugarcane plantations are owned by the mill
   - Bagasse quantity generated, its storage, internal use and external disposal
   - Use of Pith
   - Bagasse drying
   - Use of fossil fuels
   - Fire hazards
10. Proposed effluent treatment system and scheme for achieving zero discharge
11. Any litigation pending against the project and /or any direction /order passed by any Court of Law against the project, if so, details thereof.

Description of the environment

12. Baseline data including different components of environment viz. air, noise, water, land, and biology and socio-economic from the study area as per the guidance given in the manual.
13. Toposheet with all the coordinates of the plant site demarcated (1:50000 scale).
14. The study area shall be up to a distance of 5 km from the boundary of the proposed project site.
15. Topography of the area clearly indicating the presence of pits deeper than one metre, if any. If these pits require to be filled in, details of filling material to be used, quantity required, its source, mode of transport, *etc*., shall be provided.
16. Details of site and information related to environmental setting within a 5 km radius of the project site.
17. Land use of study area should include data about the residential/ institutional/nearest village/ township/ locality/ housing society, *etc*., based on the satellite imagery.
18. Information regarding eco-sensitive areas such as National parks / Wildlife Sanctuaries / Biosphere reserves within the study area.
19. Information regarding surface hydrology and water regime and impact due to the project, if any, on the same.
20. Site-specific meteorological data of one season.
21. Ambient Air Quality (AAQ) data (except monsoon) of one complete season along with the monitoring dates. The parameters to be covered shall include SPM, RSPM, SO_2, NOx (ground level). The location of the monitoring stations should be decided in such a way that the pre-dominant downwind direction, population zone and sensitive receptors including reserved forests, if any are considered. There should be at least one monitoring station in the upwind direction and one in down-wind direction where maximum GLC is likely to fall.
22. Noise level monitoring data from at least five locations within the study area.
23. Details of groundwater quality around the unit and molasses storage area.
24. Details of traffic density vis-à-vis impact on the ambient air.
25. Details of flora and fauna. In case of any scheduled fauna, conservation plan should be provided.
26. The name of the laboratory recognized by the MoEF / CPCB / NBA, *etc*., through which the monitoring / analysis shall be carried out.
27. If any incompatible land use attributes fall within a 5 km radius of the project boundary, proponent shall describe the sensitivity (distance, area and significance) and propose the additional points based on significance for review and acceptance by the EAC/SEAC. Incompatible land use attributes include:
    - Public water supply areas from rivers/surface water bodies, from groundwater
    - Scenic areas/tourism areas/hill resorts
    - Religious places, pilgrim centers that attract over 10 lakh pilgrims a year

- Protected tribal settlements (notified tribal areas where industrial activity is not permitted); CRZ
- Monuments of national significance, World Heritage Sites
- Cyclone, Tsunami prone areas (based on last 25 years);
- Airport areas
- Any other feature as specified by the State or local government and other features as locally applicable, including prime agricultural lands, pastures, migratory corridors, etc.

28. If ecologically sensitive attributes fall with in a 5 km radius of the project boundary, proponent shall describe the sensitivity (distance, area and significance) and propose the additional points based on significance for review and acceptance by the EAC / SEAC. Ecological sensitive attributes include:

- National parks
- Wild life sanctuaries Game reserve
- Tiger reserve/elephant reserve/turtle nesting ground
- Breeding grounds
- Core zone of biosphere reserve
- Habitat for migratory birds
- Mangrove area; Areas with threatened (rare, vulnerable, endangered) flora/fauna
- Protected corals
- Wetlands
- Zoological gardens
- Gene Banks
- Reserved forests
- Protected forests
- Any other closed/protected area under the Wild Life (Protection) Act, 1972, any other area locally applicable

29. If the location falls in a valley, specific issues connected to the management of natural resources shall be studied and presented.

Anticipated environmental impacts and mitigation measures

30. Anticipated environmental impacts that require specific studies for significance are indicated in the impact matrix (Manual may be referred). Tools as given in the Manual may be used for the assessment of environmental impacts.

31. Impact on drainage of the area and the surroundings.

32. Mathematical modeling for calculating the dispersion of air pollutants and ground level concentration along with emissions.

33. Typical measures that could be considered for the mitigation of impacts as given in this manual may be referred.

34. Details regarding infrastructure facilities such as sanitation, fuel, restroom, *etc*., to the workers during construction as well as to the casual workers including truck drivers during the operational phase.
35. Impact of the project on local infrastructure of the study area such as road network, *etc*. In case if the study area requires any additional infrastructure, details of the agency responsible for the same should be included along with the time frame. Details of the permission from Competent Authority for conveyor belt crossing the village road.
36. Remediation measures adopted to restore the environmental quality if the groundwater, soil, crop, air *etc*., are affected.
37. Proposed measures for occupational safety and health of the workers.
38. Details of solid waste management including management of boiler ash.
39. Details of rainwater harvesting and its proposed usage in the plant.
40. Details of greenbelt giving details of species, width of plantation, planning schedule, *etc*.
41. Anticipated environmental impacts that require specific studies for significance are given in Impact matrix (Manual may be referred). Tools as given in the Manual may be used for the assessment of environmental impacts.

Analysis of alternative resources and technologies

42. Justification for selecting the proposed unit size.
43. Comparison of alternate sites considered and the reasons for selecting the proposed site. Conformity of the site with the prescribed guidelines in terms of Coastal Regulatory Zone (CRZ), river, highways, railways *etc*.
44. Details on improved technologies.

Environmental monitoring program

45. Appropriate monitoring network has to be designed and proposed for regulatory compliance and to assess the residual impacts, if any.

Additional studies

46. Detailed compensation package for the people affected by the project shall be prepared, considering the socio-economic status of the area, homestead oustees, land oustees, and landless labourers.
47. Points identified in public hearing (if applicable) and commitment of the project proponent to the same. Detailed action plan addressing the issues raised, and the details of necessary allocation of funds.
48. Proposed plan to handle the socio-economic influence on the local community. The plan should include quantitative dimension as far as possible.
49. Details on risk assessment and proposed safeguard measures.

Environmental management plan

50. EMP devised to mitigate the adverse impacts of the project should be provided along with item-wise cost of its implementation.

51. Proposed post-project monitoring programme to ensure compliance to the approved Management Plan including administrative and technical organizational structure.

Note:

Above points shall be adequately addressed in the EIA report at corresponding chapters, in addition to the contents given in the reporting structure as per Appendix III of the EIA Notification, 2006.

12. THERMAL POWER PLANTS

ToR for EIA studies in respect of the proposed TPPs include, but not limited to the following:

1. Executive summary of the project – giving a prima facie idea of the objectives of the proposal, use of resources, justification, *etc.* In addition, it should provide a compilation of EIA report, EMP and the post-project monitoring plan in brief.

Project Description

2. Justification for selecting the proposed unit size.
3. Land requirement for the project including its optimization, break up of land requirement and its availability. Norms prescribed by CEA should be kept in view.
4. Complete process flow diagram describing each of the unit processes and operations, along with material and energy inputs and outputs (material and energy balance).
5. Fuel analysis report (sulphur, ash content and mercury) including details of auxiliary fuel, if any. Details like quantity, quality, storage *etc.*
6. Quantity of fuel required its source and transportation, a confirmed fuel linkage/ copy of the MoU.
7. Source of water and its availability. Proof regarding availability of requisite quantity of water from the competent authority.
8. Details of water balance (water intake, use, wastewater generation) taking into account reuse and re-circulation of effluents. Additional water conservation measures, if any, proposed for the project.
9. Location of intake and outfall points (with coordinates) based on modeling studies. Details of modeling and the results obtained. It may be kept in view that the intake and outfall points are away from the mangroves.
10. Examine the feasibility of zero discharge. In case of any proposed discharge, its quantity, quality and point of discharge, users downstream, *etc.*
11. Explore the possibility of cooling towers installation. Details regarding the same.
12. Details regarding fly ash utilization as per new notification
13. Detailed plan of ash utilization / management.
14. Details of evacuation of ash.
15. Details regarding ash pond impermeability and whether it would be lined, if so details of the lining *etc.*
16. Details of desalination plant and disposal of sludge.

17. Explore the possibility of expansion of Port facilities instead of Copy of the MoU for Port facilities.

Description of the Environment

18. Toposheet with all the coordinates of the plant site demarcated (1:50000 scale).
19. The study area shall be up to a distance of 10 km from the boundary of project area for air quality considerations in view of impacts occurring at distant locations once emitted from a tall stack particularly in view of absence of source control for SO2 in tail gases whereas for impacts on other components (such as water, soil quality and noise monitoring, *etc.*) the study area may be up to a distance of 5 Km.
20. Land use of study area should include data about the residential/ institutional/nearest village/ township/ locality/ housing society, *etc.*, based on the satellite imagery.
21. Topography of the area clearly indicating the presence of pits deeper than one metre, if any. If these pits require to be filled in, details of filling material to be used, quantity required, its source, mode of transport, *etc.*
22. Baseline data of the study area with respect to different components of environment viz. air, noise, water, land, and biology and socio-economic as per the guidance given in the manual.
23. Information regarding surface hydrology and water regime and impact due to the project, if any, on the same.
24. Site-specific meteorological data of one season.
25. AAQ data (except monsoon) of one complete season along with the monitoring dates. The parameters to be covered shall include SPM, RSPM, SO_2, NOx (ground level). The location of the monitoring stations should be decided in such a way that the pre-dominant downwind direction, population zone and sensitive receptors including reserved forests are considered. There should be at least one monitoring station in the upwind direction and one in down-wind direction where maximum GLC falls.
26. Noise level monitoring data collected from locations from all the four sides surrounding the project area and also at sensitive receptors. If any incompatible land-use attributes fall within a 10 km radius of the project boundary, proponent shall describe the sensitivity (distance, area and significance) and propose the additional points based on significance for review and acceptance by the EAC/SEAC. Incompatible land-use attributes include:
    - Public water supply areas from rivers/surface water bodies, from groundwater
    - Scenic areas/tourism areas/hill resorts
    - Religious places, pilgrim centers that attract over 10 lakh pilgrims a year
    - Protected tribal settlements (notified tribal areas where industrial activity is not permitted); CRZ
    - Monuments of national significance, World Heritage Sites
    - Cyclone, Tsunami prone areas (based on last 25 years);

- Airport areas
- Any other feature as specified by the State or local government and other features as locally applicable, including prime agricultural lands, pastures, migratory corridors, *etc*.

27. If ecologically sensitive attributes fall with in a 10 km radius of the project boundary, proponent shall describe the sensitivity (distance, area and significance) and propose the additional points based on significance for review and acceptance by the EAC/SEAC. A map marking the location of such areas (existing or proposed) duly authenticated by the Chief Wildlife Warden. Ecological sensitive attributes include:

- National parks
- Wild life sanctuaries Game reserve
- Tiger reserve/elephant reserve/turtle nesting ground
- Breeding grounds
- Core zone of biosphere reserve
- Habitat for migratory birds
- Mangrove area
- Areas with threatened (rare, vulnerable, endangered) flora/fauna
- Protected corals
- Wetlands
- Zoological gardens
- Gene Banks
- Reserved forests
- Protected forests
- Any other closed/protected area under the Wild Life (Protection) Act, 1972, any other area locally applicable

28. If the location falls in a valley, studies on specific issues connected to the management of natural resources.

29. If the location is on Seashore:

- Identification of CRZ area: A CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the project and associate facilities w.r.t. CRZ, coastal features such as mangroves, if any. The route of the pipeline, conveyor system etc. passing through CRZ, if any, should also be demarcated. The recommendations of the State Coastal Management Authority for the activities to be taken up in the CRZ.
- Provide the CRZ map in 1:10000 scale in general cases and in 1:5000 scale for specific observations.
- Environmental parameters – Temperature, sea level pressure, wind speed, mean relative humidity, visibility, salinity, density, rainfall, fog, frequency and intensity of cyclones, sediment transport, seismic characteristics, fresh water influx

- Details on marine biological parameters – microbiological population, pathogenic bacteria, plankton distribution, fish spawning grounds in the adjoining waters, commercial fisheries potential, vegetation including inter tidal, flora and fauna in the marine, benthal quality assessment for biological species and heavy metals and estuarine environment.

Anticipated Environmental Impacts and Mitigation Measures

30. Anticipated generic environmental impacts that require specific studies for significance are given in impact matrix (Manual may be referred). Tools as given in the manual may be used for the assessment of environmental impacts.
31. Impact on drainage of the area and the surroundings.
32. Impact of the project on the AAQ of the area. Details of the model used and the input data used for modeling. The air quality contours may be plotted on a location map showing the location of project site, habitation nearby, sensitive receptors, if any. The wind roses should also be shown on this map.
33. Impact of the project on local infrastructure of the study area such as road network, *etc*. In case if the study area requires any additional infrastructure, details of the agency responsible for the same should be included along with the time frame. Details of the permission from Competent Authority for conveyor belt crossing the village road.
34. Impact of the activities to be taken up in the CRZ area including jetty and desalination plant *etc*. should be integrated into the EIA report; however, action should be taken to obtain separate clearance from the competent authority as may be applicable to such activities.
35. Details of rainwater harvesting and its proposed usage in the plant.
36. Details regarding infrastructure facilities such as sanitation, fuel, restroom, *etc*. to be provided to the workers during construction as well as to the casual workers including truck drivers during the operational phase.
37. Details of greenbelt giving details of species, width of plantation, planning schedule, *etc*.
38. Details of flora and fauna. Conservation plan in case of any scheduled fauna.
39. Proposed measures for occupational safety and health of the workers.
40. Oil spill control planning.
41. Off-shore coastal air dispersion models shall be applied.
42. Capital quantity of dredging material, disposal and its impact on aquatic life.
43. Fisheries study should be done with respect to Benthos and Marine organic material and coastal fisheries.

Analysis of alternative resources and technologies

44. Comparison of alternate sites considered and the reasons for selecting the proposed site. Conformity of the site with the prescribed guidelines in terms of Coastal Regulatory Zone (CRZ), river, highways, railways *etc*.

45. Details of alternative sources of energy such as photovoltaic cells use in the plant for various applications.

46. Details on improved technologies.

Environmental Monitoring Program

47. Appropriate monitoring network has to be designed and proposed for regulatory compliance and to assess the residual impacts, if any.

Additional Studies

48. Detailed compensation package for the people affected by the project shall be prepared, considering the socio-economic status of the area, homestead oustees, land oustees, and landless labourers.

49. Points identified in public hearing and commitment of the project proponent to the same. Detailed action plan addressing the issues raised, and the details of necessary allocation of funds.

50. Proposed plan to handle the socio-economic influence on the local community. The plan should include quantitative dimension as far as possible.

51. Details of risk assessment and proposed safeguard measures.

Environmental Management Plan

52. EMP devised to mitigate the adverse impacts of the project along with item-wise cost of its implementation.

53. Proposed post-project monitoring programme to ensure compliance to the approved Management Plan including administrative and technical organizational structure.

Note:

Above points shall be adequately addressed in the EIA report at corresponding chapters, in addition to the contents given in the reporting structure as per Appendix III of the EIA Notification, 2006.

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