TERMS OF REFERENCE

HAZARDOUS WASTE STORAGE, TRANSPORTATION, TREATMENT/DISPOSAL FACILITIES

Notes for NEPA for Generic Terms of Reference

This generic Terms of Reference (TOR) is applicable to **Hazardous Waste Storage, Transportation, Treatment or Disposal Facilities**. The TOR outlines the aspects of an Environmental Impact Assessment (EIA) which when thoroughly addressed, will provide a comprehensive evaluation of the proposed site, in terms of predicted environmental impacts, needed mitigation strategies, potentially viable alternatives to the proposed project and all related legislation.

A hazardous waste may be defined as any discarded material, liquid or solid known to contain substances that are fatal, toxic, carcinogenic, mutagenic or teratogenic to humans and other life forms. This waste is usually recycled, stored, converted to a non-hazardous form or disposed of onsite.

In reality, significant environmental issues may be site specific and it is expected that these be incorporated accordingly. Sites of special consideration are:

Coastal Areas: Issues such as Coastline stability, coral reef, mangrove and wetland, seagrass impacts, unique coastal environments, nutrient loading in coastal waters and impact on coastal commercial fishing should be examined.

Upland Areas: Issues such as slope stability, modification of vegetation, preparation of access roads to the site, the availability of basic amenities such as potable water and electricity, impact of drainage from the site on pre existing drainage patterns etc. should be examined.

Rivers/ Riverine Areas: Issues such as erosion and siltation, nutrient loading of the river system, macro-invertebrate habitat destruction, disrupting of regular flow of the river and the possible impact of upstream activities on the mangrove, sea grass coral reef system.

Distinct Terrestrial Forest Types: Issues relating to the specific growth form of the vegetation, the carrying capacity, the successional stage of the forest and the projected level of disturbance which the forest can undergo without a net change in the forest which would not be part of the natural succession.

Sites located within and adjacent to areas listed as protected or having protected species: The main issue(s) of concern are determined by the statutes of the convention in question and what the convention speaks to. The impact of the development on the specific sensitivities of the protected area should be highlighted. Mitigation of impacts should assess if the post mitigation status would be acceptable in the protected area context. Alternative sites should be rigorously evaluated.

The socio–economic aspects of such a development should be highlighted as the type and location of hazardous waste facilities frequently have an impact on property values and on communities' perceptions of a healthy environment. By virtue of the nature and effects of hazardous waste, special considerations must be made as it regards its storage and treatment/disposal. Special consideration should be given to the type of hazardous waste generated and its volatility. There should be a review of the potential to have secondary pollutants or hazardous substances produced during the storage, disposal and/or treatment of hazardous waste.

Landfilling: Issues of special consideration are scarcity of land especially for island nations, leachate problems, and the creation of pockets of methane gas.

The proposed location of the landfill within a flood plain, coastal wetland, or watershed and or water body surface or ground that could provide a public water supply should be reviewed

Incineration: Issues of special consideration are the creation of harmful substances such as dioxins, odour and smoke control, incomplete combustion of some wastes, increase in concentrated heavy metal presence, the release of pollutants through the incinerator stack. Attention should be given to possible temperature changes.

Chemical Treatment: Issues of special consideration relate to the types of chemicals to be used in treatment. The volatility, acidity or alkalinity, half lives of the constituent elements of the "treatment chemical" need to be reviewed. Other considerations are the accidental release of potentially toxic by-products. The proposed location of the chemical treatment facility within a flood plain, coastal wetland, or watershed and or water body surface or ground that could provide a public water supply should be reviewed

Terms of Reference

The Environmental Impact Assessment should:

1) Provide a comprehensive description of the existing site proposed for the development of the facility to store, treat or dispose of the hazardous waste. Detail the elements of the project, highlighting areas to be reserved for construction and the areas which are to be preserved in their existing state. Thoroughly review the hazardous waste to be introduced to the site and the chemical processes (direct and incidental) involved.
2) Identify the major environmental issues of concern through the presentation of baseline data which should include social and cultural considerations. Assess public perception of the proposed development.
3) Outline the Legislations and Regulations relevant to the project.
4) Predict the likely impacts of the development on the described environment, including direct, indirect and cumulative impacts, and indicate their relative importance to the design of the development's facilities.
5) Identify mitigation action to be taken to minimise adverse impacts and quantify associated costs.
6) Design a Monitoring Plan which should ensure that the mitigation plan is adhered to.
7) Describe the alternatives to the project that could be considered at that site

To ensure that a thorough Environmental Impact Assessment is carried out, it is expected that the following tasks be undertaken:

Task #1. Description of the Project

Provide a comprehensive description of the project, noting areas proposed for the development of the facility to store, treat or dispose of the hazardous waste. Detail the elements of the project, highlighting areas to be reserved for

construction, areas to be preserved in their existing state as well as activities and features which will introduce risks or generate impact (negative and positive) on the environment. This should involve the use of maps, site plans, aerial photographs and other graphic aids and images, as appropriate, and include information on location, general layout and size, as well as pre-construction, construction, and post construction plans. For projects to be done on a phased basis it is expected that all phases be clearly defined, the relevant time schedules provided and phased maps, diagrams and appropriate visual aids be included.

Task #2. Description of the Environment

This task involves the generation of baseline data which is used to describe the study area as follows:

i) physical environment
ii) biological environment
iii) socio-economic and cultural constraints.

It is expected that methodologies employed to obtain baseline and other data be clearly detailed.

Baseline data should include:

(A) Physical

i) a detailed description of the existing **geology** and **hydrology.** Special emphasis should be placed on storm water run-off, drainage patterns, effect on groundwater and availability of potable water. Any slope stability issues that could arise should be thoroughly explored.

ii) **Water quality** of any existing wells, rivers, ponds, streams or coastal waters in the vicinity of the development. Quality Indicators should include but not necessarily be limited to nitrates, phosphates, faecal coliform, and suspended solids.

iii) Climatic conditions and air quality in the area of influence, including particulate emissions from stationary or mobile sources, NO_x, SO_x, wind speed and direction, precipitation, relative humidity and ambient temperatures,

iv) Noise levels of undeveloped site and the ambient noise in the area of influence.

v) Obvious sources of pollution existing and extent of contamination.

vi) Availability of solid waste management facilities.

(B) Biological

Present a detailed description of the flora and fauna (terrestrial and aquatic) of the area, with special emphasis on rare, endemic, protected or endangered species. Migratory species should also be considered. There may be the need to incorporate micro-organisms and the existence of micro-habitats to obtain an accurate baseline assessment. Species dependence, niche specificity, community structure, population dynamics, carrying capacity, species richness and eveness (a measure of diversity) ought to be evaluated.

(C) Socio-economic & cultural

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 should be explored. The historical importance of the area should also be examined. While this analysis is being conducted, it is expected that an assessment of public perception of the proposed development be conducted. This assessment may vary with community structure and may take multiple forms such as public meetings or questionnaires.

Task #3 - Legislative and Regulatory Considerations

Outline the pertinent regulations, policies and standards governing environmental quality, safety and health, protection of sensitive areas, protection of endangered species, siting and land use control at the national and local levels. The examination of the legislation should include at minimum, legislation such as the NRCA Act, the Wildlife Protection Act, legislation from the Solid Waste Management Authority (SWMA), and the appropriate international convention/protocol/treaty where applicable.

Task #4 - Identification of Potential Impacts

Identify the major environmental and public health issues of concern and indicate their relative importance to the design of the project and the intended activities. Identify potential impacts as they relate to, (but are not restricted by) the following:

- change in drainage pattern
- flooding potential
- landscape impacts of excavation and construction
- loss of natural features, habitats, niches and species by construction and activities
- pollution of surface and ground water
- solid waste disposal
- Air pollution
- socio-economic and cultural impacts.
- risk assessment
- noise
- change in soil pH
- waste disposal via incineration, landfilling and recycling
- possible improper or accidental disposal via discharge into sewers and water bodies, creation of mud lakes

- capacity and design parameters of proposed solid waste treatment facility.
- impact of leachate.

Distinguish between significant positive and negative impacts, direct and indirect, long term and immediate impacts. Identify avoidable as well as irreversible impacts. Characterize the extent and quality of the available data, explaining significant information deficiencies and any uncertainties associated with the predictions of impacts. A major environmental issue is determined after examining the impact (positive and negative) on the environment and having the negative impact significantly outweigh the positive. It is also determined by the number and magnitude of mitigation strategies which need to be employed to reduce the risk(s) introduced to the environment. Project activities and impacts should be represented in matrix form with separate matrices for pre and post mitigation scenarios.

Task #5 Mitigation

Prepare guidelines for avoiding, as far as possible, any adverse impacts due to proposed usage of the site and utilising of existing environmental attributes for optimum development. Quantify and assign financial and economic values to mitigating methods.

Task #6 - Monitoring

Design a plan to monitor implementation of mitigatory or compensatory measures and project impacts during construction and operation. An Environmental Management Plan for the long term operations of the site should also be prepared.

An outline monitoring programme should be included in the EIA, and a detailed version submitted to NEPA for approval after the granting of the permit and prior

to the commencement of the development. At the minimum the monitoring programme and report should include:

- Introduction outlining the need for a monitoring programme and the relevant specific provisions of the permit license(s) granted.
- The activity being monitored and the parameters chosen to effectively carry out the exercise.
- The methodology to be employed and the frequency of monitoring.
- The sites being monitored. These may in instances, be pre-determined by the local authority and should incorporate a control site where no impact from the development is expected.
- Frequency of reporting to NEPA

The Monitoring report should also include, at minimum:

- Raw data collected. Tables and graphs are to be used where appropriate
- Discussion of results with respect to the development in progress, highlighting any parameter(s) which exceeds the expected standard(s).
- Recommendations
- Appendices of data and photographs if necessary.

Task #7 - Project Alternatives

Examine alternatives to the project including the no-action alternative. This examination of project alternatives should incorporate the use history of the overall area in which the site is located and previous uses of the site itself. Refer to NEPA guidelines for EIA preparation.

All Findings must be presented in the **EIA report** and must reflect the headings in the body of the TORs, as well as references. Eight hard copies and an electronic copy of the report should be submitted. The report should include an appendix with items such as maps, site plans, the study team, photographs, and other relevant information.