



International Finance Corporation

Environmental, Health and
Safety Guidelines for

Waste Management Facilities

These guidelines are for the design, construction and operation of facilities for the management of hazardous and non-hazardous wastes, including landfills, incinerators, solvent recovery systems, and other waste management systems. The guidelines incorporate the general provisions of the World Bank policies for cultural properties, indigenous peoples, involuntary resettlement, biodiversity, water resources management and wildlands. Environmental issues that are identified by the project sponsor or other interested parties, but not addressed by World Bank policies or guidelines, must be brought to the immediate attention of IFC for consideration and guidance.

Project Siting

The principal elements of World Bank policy regarding siting, land acquisition and development of waste management facilities and associated project features are summarized below. Sites should be chosen through a systematic, documented process that includes consideration of alternatives and their environmental impacts. The sponsors must provide information regarding project siting, addressing the following guidelines:

- a) The site and access routes must be selected taking environmental factors into consideration in a manner which will minimize, to the extent possible, impacts to natural resources, land use patterns, sensitive ecosystems and cultural resources.
- b) A surface and subsurface investigation of geology, soils, groundwater and surface water resources should be conducted to determine

leachate migration potential and the need for additional design requirements.

- c) Special consideration should be given to site proximity to developed areas and potential impacts resulting from air emissions, odor, contamination of water resources (i.e., groundwater and/or surface water), vector attraction, noise and truck traffic.
- d) The project site should include enough land area to provide a buffer zone to minimize aesthetic impacts.
- e) Land acquisition must be carried out in accordance with World Bank resettlement policy which requires quantification of impacts on land-based livelihood, and fair compensation to landowners and people relying on the land for their residence and/or livelihood.
- f) Selection of the site should be made after consultation with government agencies, affected communities and concerned nongovernmental organizations.

Project sponsors must provide IFC with a complete record of the process by which the site was selected, including the analysis of alternative sites, and the consultation with government agencies, affected communities and nongovernmental organizations.

Erosion and Sediment

Project sponsors should develop an erosion and sediment control plan to minimize erosion in construction areas and along access roads, reduce the risk of sediment discharge to nearby streams, and provide for long-term maintenance and operation practices that will control erosion and

sedimentation. The control plan should include, but should not be limited to, the following measures.

- a) The area cleared of vegetation to accommodate construction should be minimized and slopes should be stabilized to prevent erosion.
- b) Cleared areas should be promptly revegetated with native grasses, shrubs and trees.
- c) Overland drainage should be controlled to prevent channeling and sediment transport by diverting flows from areas where soils are exposed, and/or by providing filter barriers or settling basins to remove sediment before the runoff is discharged to surface waters.
- d) Revegetated areas and areas subject to erosion should be monitored and maintained during project operation.

Waste Collection, Handling and Transport

Project sponsors must conduct a survey to assess the waste management requirements of its service area and develop a compatible program for the collection, handling and transportation of wastes. The program should include the following measures to mitigate potential adverse impacts to the environment, as well as public and employee health and safety.

- a) Ensure scheduled collection services and public awareness of such services.
- b) Provide waste generators with appropriate refuse containers to segregate hazardous and non-hazardous wastes.
- c) Provide enclosed refuse collection vehicles or cloth tarps to cover open vehicles.
- d) Minimize waste handling and maximize waste containment during all operations.
- e) Control odors and the loss of wastes during transportation and at loading and unloading areas.

- f) Include materials recovery facilities in the project to receive, separate, process and market or reclaim materials where possible.
- g) Ensure proper maintenance of collection vehicles to ensure safe collection and transport of wastes.

General Environmental Requirements

- a) Project facilities must be designed to minimize impacts to air and water resources, and may include, where appropriate: venting and gas collection systems; adequate depth between the bottom of waste piles/landfills and the top of the aquifer; adequate horizontal distance between waste treatment facilities and the nearest surface water; stormwater runoff control systems; and leachate collection and treatment systems.
- b) Prior to construction, project sponsors must devise a program to: survey, identify and assess cultural resource sites within the project area; train construction personnel in the identification of cultural resources; and mitigate adverse impacts resulting from project development.
- c) The potential impacts to vegetation and wildlife habitat as a result of the project should be assessed and a plan established to mitigate the impacts.
- d) Landfill design must include gas control systems to protect deep-rooted vegetation in the project area and minimize the potential for explosions or toxic conditions from the accumulation of landfill gas in buildings.

Project Operations

- a) Facilities should have separate receiving and handling areas for hazardous and non-hazardous wastes.
- b) Wastes should be analyzed prior to disposal for compatibility with treatment and disposal methods.
- c) Air quality control measures must be implemented to minimize fugitive dust from materials loading/unloading, and odors from land disposal sites and composting systems.

- d) Adequate and environmentally sound and contained storage areas must be available for materials that cannot be treated or disposed of immediately upon arrival to the facility.
- e) All containment cells should be covered with soil or other suitable cover material at the end of each working day to minimize odors and infringement by animals.
- f) Waste should be composted whenever possible.
- g) A monitoring program should be implemented to detect any groundwater contamination or gas migration as a result of project operations.
- h) Treated leachate and other liquid effluents from the waste management facility and associated project facilities must meet the requirements for liquid effluents in the General Environmental Guidelines.
- i) Maintenance practices should include routine checks for failure of spill containment facilities, air quality controls and emergency devices.

Incinerator Stack Emissions

Concentrations of contaminants emitted from the stacks of incinerators, or other significant sources of air emissions, including boilers, furnaces, and electrical generating equipment should not exceed the following limits:

<i>Parameter/Pollutant</i>	<i>Maximum Value</i>
Particulate Matter	100 mg/Nm ³
Nitrogen Oxides, as NO ₂	
Coal fired	750 mg/Nm ³
Oil fired	460 mg/Nm ³
Gas fired	320 mg/Nm ³
Sulfur Dioxide	2,000 mg/Nm ³
Dioxin	1 ng/Nm ³
Furan	1 ng/Nm ³

Hazards Protection

- a) Waste management facilities should be located, to the extent possible, to minimize potential risks from earthquakes, tidal waves, floods and fires from surrounding areas.

- b) Buildings and other support structures must be designed to criteria appropriate to the local seismic risk, wind and snow loading, and any other dynamically imposed loads associated with climatic and geological factors inherent at the location; certification of the design criteria used must be provided by the structural engineers or architect.

Employee Health and Safety

Project sponsors must develop an Employee Health and Safety Program that includes the following:

- a) Employees working in hazardous waste facilities must undergo a medical examination when they are hired and, at a minimum, every two years thereafter.
- b) Emergency escape routes should be provided for all employees in the event of fire, toxic gas emissions, explosions, radiation and other hazards exposure.
- c) Firewalls and other fireproof structures should be incorporated into the facility design.
- d) No smoking, eating or drinking rules should be strictly enforced in all work areas.
- e) Unauthorized personnel should be prevented from entering hazardous or restricted areas.
- f) An operations and public emergency response program should be implemented for spills, fires and major accidents, including emergency equipment and trained personnel, and critical components of the program tested on a regular basis.

Training

- a) Personnel involved in the construction and operation of the project must be trained on the hazards, safety procedures and emergency response plan associated with their tasks in accordance with the General Health and Safety Guidelines and the General Environmental Guidelines.
- b) Training should incorporate information from the Material Safety Data Sheets (MSDSs) for potentially harmful materials.

- c) Personnel should be trained in environmental, health and safety matters including accident prevention, safe lifting practices, the use of MSDSs, safe waste handling practices, and proper control and maintenance of equipment and facilities.
- d) Project sponsors must provide training for monitoring and mitigating the effects of the project on environmental and sociocultural resources.

Record Keeping And Reporting

- a) The sponsor must maintain records of significant environmental matters, including monitoring data, spills, occupational accidents and illnesses, and fires and other emergencies.
- b) Records of public complaints and accidents involving the general public must be maintained.
- c) The above information must be reviewed and evaluated to improve the effectiveness of the environmental, health and safety program, and an annual summary provided to IFC.