

**International Finance Corporation
Environmental, Health and Safety Guidelines**



Hazardous Materials Management Guidelines

Applicability

These Guidelines apply to facilities and activities involving the transportation, production, handling, storage, and disposal of hazardous materials (defined below).

IFC-financed projects that involve hazardous materials are required to develop and implement a Hazardous Materials Management Program and, in some cases, more detailed plans, as described in these Guidelines. Project companies are responsible for complying with the provisions in these Guidelines whether they manage hazardous materials themselves or through contractors.

Definition

Hazardous materials (Hazmats): are those materials that represent an excessive risk to property, the environment or human health because of their physical and/or chemical characteristics. Materials (including mixtures and solutions) subject to these guidelines can be classified according to the hazard they present, as follows:

- Explosives
- Toxic or flammable gases
- Flammable liquids
- Flammable solids
- Oxidizing substances
- Toxic and infectious substances
- Radioactive material
- Corrosive substances
- Miscellaneous dangerous materials.

These Guidelines apply when any quantity of Hazmats are present in an IFC-financed project.

Key Requirements

The key requirements of these Guidelines are summarized as follows:

1. Screening. Determine the characteristics and threshold quantities of each Hazmat.

2. Hazardous Materials Management Program. Manage the risks associated with all Hazmat facilities and activities through:

- ♦ Management Actions: training, worker health and safety, record keeping, and reporting.
- ♦ Preventive Plans: for transportation, processes and operations, and hazardous wastes.
- ♦ Emergency Preparedness and Response Plans: response activities, medical assistance, communications, and incident reporting.

3. Community Involvement and Awareness. Inform the potentially affected community and provide for public feedback.

Requirements

IFC-financed projects involving Hazmats must fulfill the following three requirements as described in these Guidelines and as relevant, the attached Guidance Notes A, B and C:

- (1) *Screen* the type and quantity of Hazmats involved. Results from this screening will determine the level of detail for Requirement #2.
- (2) Prepare a *Hazardous Materials Management Program* including if applicable, one or more of the plans described in the attached Guidance Notes.
- (3) Undertake *Community Involvement and Awareness* activities (which can be incorporated into the Hazardous Materials Management Program).

For further guidance in meeting these requirements, project companies (sponsors) should refer to documents listed in the Appendix I, and websites in Appendix II at the end of this document.

Requirement #1: Screening

The preparation of a Hazardous Materials Management Program requires an initial screening to determine the type and quantity of Hazmats involved at various stages of a project, and to identify the necessary procedures to manage them properly. Results from the initial Hazmat screening are used to identify which Hazmat management procedures are applicable (see Management Actions under Requirement #2 below). Screening is conducted for each Hazmat using procedures acceptable to IFC, which are published by specialized international organizations or by national governments. Some of these procedures are available on the Internet. Selected websites are provided as a reference in Appendix II.

Project companies must first determine the threshold quantities of each Hazmat used in their project. These thresholds are used to define appropriate measures for managing each Hazmat. The applicable measure for determining thresholds depends on the relevant activity. For example, for industrial sites, the quantity of material screened is usually the quantity of Hazmats present in the facility at any one time; for transportation, the quantity of materials screened is the quantity of Hazmats contained in

individual packages (e.g., flasks, cylinders, containers, etc.).

Thresholds may be determined using internationally accepted procedures, such as the following (references are directly linked to their website)¹:

- Processes and Operations: US Environmental Protection Agency. *Protection of Environment* (Title 40 CFR Parts 300-399 and 700 to 789).
- Transportation: United Nations. *Transport of Dangerous Goods - Model Regulations*. 12th Revised Edition. Geneva 2001.
- Hazardous Wastes: US Environmental Protection Agency. *Protection of Environment* (Title 40 CFR Parts 260).

Screening procedures typically include looking up hazmat tables that list the substance code, name and description, class or division and/or threshold quantity of Hazmats. Using these, the sponsor must produce a summary table identifying every Hazmat used, produced or transported along with the following information:

- quantity used per month
- characteristic(s) that make(s) it hazardous (e.g. flammability, toxicity)
- hazard level (low to high)
- threshold quantity and a cross reference to its management procedures (see below).

Hazmat Management Procedures

i) If the quantity of an individual Hazmat used, produced or transported is below the relevant threshold limit, the sponsor must develop a Hazardous Materials Management Program according to Requirement #2 below.

ii) If the quantity of an individual Hazmat used or produced is equal to or above the relevant threshold limit, the sponsor must develop a Hazardous Materials Management Program according to Requirement #2 below and must also integrate into that Program one or more of the following relevant management plans outlined in the attached Guidance Notes²:

¹ On a case-by-case basis IFC may accept national standards deemed to be equivalent to internationally accepted standards.

² In addition to the Guidance Notes, IFC will publish Good Practice Manuals to facilitate the preparation of individual hazardous materials management plans.

- Guidance Note A: Outline of a Hazardous Materials Risk Management Plan.
- Guidance Note B: Outline of a Hazardous Materials Transportation Plan.
- Guidance Note C: Outline of a Hazardous Waste Management Plan.

Requirement #2: Hazardous Materials Management Program

The Hazardous Materials Management Program must include all the component activities described in this section and cover all Hazmats both above and below their respective threshold limits used, produced or transported. In addition, for Hazmats in quantities at or above their respective threshold limits, the Program must also include and integrate the appropriate management plans described in the attached Guidance Notes.

The three principal components of a Hazardous Materials Management Program are: management actions, prevention measures and an emergency preparedness and response plan. Activities associated with each component are described in the following sections A), B), and C).

The Hazardous Materials Management Program must integrate the three principal components (and any required additional management plans) into a coherent management system that: (i) sets out written policies and procedures to implement the Program components; (ii) assigns responsibility at the relevant level of the sponsor for implementing the management system as a whole as well as for carrying out each necessary activity; (iii) provides for training of all relevant personnel; (iv) provides for monitoring and recording of the performance of the system; and (v) provides for a system of periodic evaluation of the functioning of the system (such as by compliance audits) to determine whether the system is meeting the objective of managing hazardous materials in a responsible manner.

A) Management Actions

Whenever a Hazmat is used in a process or operation (including transportation), regardless of the quantities handled, the following actions must be implemented:

- *Worker health and safety.* All employees working with Hazmats should be provided with suitable personal protection equipment (footwear, masks, protective clothing and goggles in appropriate areas), emergency eyewash and shower stations, ventilation systems, sanitary facilities, pre-employment and scheduled periodic medical examinations (refer to appropriate occupational health and safety provisions such as the NIOSH³ Threshold Limit Values). Periodic monitoring of workplace air contaminants relative to worker tasks and plant operations is required. Workplace air quality monitoring equipment should be well maintained.
- *Training.* The company's capabilities in Hazmat management should be assessed to determine the level of further training required. All employees working with Hazmats should be trained in hazard identification, safe operating procedures, appropriate materials handling procedures, safe work practices, basic emergency procedures, and (if applicable) special hazards unique to their jobs. Training should incorporate information from Material Safety Data Sheets⁴ (MSDSs) for Hazmats being handled. MSDSs should be readily accessible to employees in their local language. Periodic reviews of Hazmat management procedures should also be reported and filed.
- *Record keeping and reporting.* Measuring and monitoring records must be made available to employees handling Hazmats and their representatives as appropriate; records should be kept for IFC review and reports on Hazmat management should be submitted regularly to IFC – at least once a year as part of the sponsor's Annual Monitoring Report (AMR). Governments may have their own reporting requirements with which the company must also comply.

³ NIOSH stands for National Institute for Occupational Health and Safety, a US Federal Agency (see weblink in Appendix I)

⁴ MSDSs are produced by Hazmat manufacturers and therefore are not available for Hazmats produced *in situ* or for hazardous wastes.

Monitoring data should include: (i) marking of the hazardous chemicals; (ii) location, nature, dimensions of workplace monitored; (iii) type and duration of employees' exposure; (iv) sources of airborne emissions; (v) relevant background information on emissions (engineering controls, ventilation, weather conditions, etc.); (vi) sampling methods used; and (vii) names of persons doing the sampling, date, and exact time of sampling. Accident and incident investigation reports should be maintained and kept on file for a period of at least five years.

B) Preventive Measures

The aim of preventive measures is to develop and implement procedures that will prevent accidents involving Hazmats and integrate these procedures in the day-to-day business activities. For each Hazmat used or produced in quantities below its respective threshold limit, the following requirements must be implemented at a minimum.

- *Life and Fire Safety.* Project companies must design, construct and operate all buildings and plants financed by IFC in full compliance with local building codes, local fire department regulations, local legal/insurance requirements, and in accordance with internationally accepted life and fire safety standards⁵.
- *Processes and Operations.* The elimination or substitution of Hazmats should be explored whenever possible, through design modifications, engineering controls, and enhanced technical procedures. A prevention plan should be prepared to cover the following: (i) written process safety parameters (i.e., hazards of the chemical substances, safety equipment specifications, safe operation ranges for temperature, pressure and other applicable parameters, evaluation of the consequences of deviations, etc.); (ii) written operating procedures; and (iii) compliance audit procedures.

For Hazmats used or produced in quantities above the threshold limit, a more comprehensive plan is required as per the attached Guidance Note A.

- *Transportation of Hazmats.* Transportation procedures should be prepared that are consistent with internationally accepted standards, such as the UN Model Regulations⁶. Transportation of Hazmats must, at a minimum, cover the following: (i) ensuring that the nature, integrity and protection provided by packaging and containers used for transport are appropriate for the kind and quantity of hazardous material involved; (ii) ensuring adequate transport vehicle specifications; (iii) routes used; (iv) loading and unloading procedures; (v) informing employees involved in the transportation and training them as appropriate to handle normal operations and emergencies; (vi) using labeling and placarding (external signs in transport vehicles) as required; and (vii) providing the necessary means for emergency response; and (viii) compliance audit procedures.

For Hazmats transported in quantities above the threshold limit, a more comprehensive plan is required as per the attached Guidance Note B.

IFC recognizes that permitted hazardous waste haulers may not always exist or be accessible to the sponsor. Where appropriate transportation options are not available, the environmental assessment process for the project must address appropriate alternatives for transporting or otherwise storing or handling the hazardous materials and propose a reasonable solution. The proposal will be subject to review and approval by IFC.

- *Hazardous Wastes Handling and Disposal.* Hazardous wastes are generated by a wide array of industries and commercial activities. Adequate measures should be taken for the safe accumulation, labeling, handling, storage, transport, treatment and disposal of hazardous wastes to avoid contamination of the physical and living environment, and to avoid exposure to human populations to pathogenic, carcinogenic or other agents. Hazardous wastes may, under certain circumstances, be recycled or reused in the same or other facility subject to adequate controls.

⁵ IFC *Life and Fire Safety Guidelines* October 2001.

⁶ United Nations. *Transport of Dangerous Goods - Model Regulations*. 12th Revised Edition. Geneva 2001.

Internationally accepted procedures should be used to manage hazardous wastes, which adequately consider the following aspects: (i) waste collection procedures; (ii) storage methods and location including location alternatives considered, if any; (iii) options considered for final disposal or destruction; (iv) environmental impacts from the option selected including by-products (i.e. incineration ashes); (v) detailed information about the mitigation measures to be implemented; (vi) monitoring plan to assess impacts of the option chosen, as needed; and (vii) compliance audit procedures.

For Hazmats used or produced in quantities above the threshold limit, a more comprehensive plan is required as per the attached Guidance Note C.

IFC recognizes that permitted hazardous waste disposal facilities may not always exist or be accessible to the sponsor. Where appropriate disposal options are not available, the environmental assessment process for the project must address appropriate alternatives for handling and disposing of hazardous waste and propose a reasonable solution for handling and disposing of hazardous waste. The proposal will be subject to review and approval by IFC.

C) Emergency Preparedness and Response Plan

Proper transportation, handling, storage, processing, treatment and disposal of Hazmats should be undertaken by implementing measures to minimize their impact on the environment and human health and by developing emergency response actions in case of an accident.

An Emergency Preparedness and Response Plan should be prepared to cover the following: (i) preparedness and response principles; (ii) communications with local authorities and emergency response bodies; (iii) medical aspects of emergency preparedness and response including first aid; (iv) emergency response; (v) incident reporting and investigation, including record keeping; and (vi) emergency response training.

For Hazmats used or produced in quantities above the threshold limit, a more comprehensive plan is required as per the relevant attached Guidance Notes.

Requirement #3: Community Involvement and Awareness

When Hazmats are in use, the potentially affected community (e.g. people around the facility, people on the transport route) should be informed and provided with a means for public feedback. Community involvement activities should include:

- Providing general information (e.g. in writing or through meetings) on the nature and extent of potential off-site effects on human health or the environment, including property.
- Providing specific and timely information, both as a routine practice and in the event of an accident, on the appropriate response and safety measures to be adopted.
- Providing access to other available information needed to understand the nature of the possible effect of an accident and to enable community members to contribute effectively, as appropriate, to decisions concerning hazardous installations and the development of community emergency preparedness plans.
- Record keeping of complaints or inquiries and responses.
- Applying mitigation measures for validated repeated complaints.

Preface to the Guidance Notes

The following Guidance Notes have each been drafted as free-standing documents so that each Note can be referred to separately. As a result, there is some repetition and similarity between the Notes. The differences between the three Notes are primarily in the sections on “Hazard Assessment” and “Preventive Action.” Therefore, in designing a Hazardous Materials Management Program that incorporates more than one Guidance Note, project companies can apply the same basic principles set out in “Management Action” in each of the Guidance Notes.

Guidance Note A: Outline of a Hazardous Materials Risk Management Plan.

IFC-financed projects involving the production, handling, and storage of Hazmats at or above threshold quantities (see **Requirement #1: Screening** in the Guidelines) must prepare a Hazardous Materials Risk Management Plan as outlined in this Guidance Note, and integrate it into the Hazardous Materials Management Program. This risk-based approach is not required for the Hazardous Materials Management Program if Hazmat quantities are below the threshold limit.

Hazard Assessment

Hazmats in quantities at or above the threshold limits determined from the initial screening require more rigorous handling procedures. Potential hazards involving Hazmats are assessed by reviewing: (i) the project and/or industry accident history, if applicable; (ii) potential worst case impacts as a result of an accident; and (iii) more realistic impacts as a result of an accident.

Management Actions

The following actions are required in addition to those already outlined in Requirement #2A of the Guidelines.

- **Management of Change.** Procedures for managing change should address: (i) the technical basis for changes in processes and operations; (ii) the impact of changes on health and safety; (iii) modification to operating procedures; (iv) authorization requirements; (v) employees affected; and (vi) training needs.
- **Compliance Audit.** A compliance audit covering each element of the preventive measures (see below) should be conducted at least once every three years. The sponsor must develop compliance audit protocols that include: (i) review of applicable preventive measures; (ii) assessment of compliance with these measures and reporting of findings; (iii) identification of the appropriate response to each finding; and (iv) documentation of the actions taken to correct any deficiencies.

- **Incident Investigation.** Incidents can provide valuable information about site hazards and the steps needed to prevent and manage them. The sponsor must prepare incident investigation procedures to: (i) initiate the investigation promptly; (ii) summarize the investigation in a report; (iii) address the report findings and recommendations; and (iv) review of the report with staff and contractors.
- **Employee Participation.** The sponsor must ensure the active participation of employees on risk management plans.
- **Contractors.** The sponsor must ensure that contractors: (i) are provided with procedures and information on Hazmat management; (ii) observe safety practices; (iii) act responsibly; (iv) assess trends of repeated similar incidents; and (v) develop and implement procedures to manage repeated similar incidents. The sponsor must also require contractors to: (i) develop and implement a risk management training program for their employees; (ii) confirm that their employees know appropriate risk management and emergency response actions; (iii) prepare and submit training records.
- **Training.** The sponsor must develop training programs for company employees on safe Hazmat management. The program should include: (i) a list of employees to be trained; (ii) the specific training objectives; (iii) the mechanisms to achieve the objectives (i.e., hands on, workshops, videos, etc.); (iv) the means to determine whether the training program is working; and (v) training procedures for new hires and refreshers for existing employees. The date of the most recent review or revision to the training program should be reported.

Preventive Measures

The following measures are required in addition to those already outlined in Requirement #2B of the Guidelines. The purpose of these measures is to ensure that the safety-related aspects of the process and equipment are considered, that limits placed on the operations are well known, and that accepted standards and codes are adopted where they apply.

- *Process Safety Information.* Procedures should be prepared for each Hazmat that include: (i) compilation of Material Safety Data Sheets (MSDS); (ii) identification of maximum intended inventories and safe upper/lower parameters; and (iii) documentation of equipment specifications and of codes and standards used to design, build and operate the process.
- *Process Hazard Analysis.* The hazard review is the key to understanding how to operate safely on a continuous basis. A hazard analysis should identify the hazards associated with the project processes and Hazmats and should: (i) use well-accepted guidelines to conduct the review (e.g., checklists, HAZOP⁷, FMEA⁸, fault-tree analysis); (ii) document results and resolve identified problems, and (iii) be updated of the review as required.
- *Operating Procedures.* Procedures should be prepared for the use of Hazmats during each operation phase including initial startup, normal operations, temporary operations, emergency shutdown, emergency operations, normal shutdown, and start up following a normal or emergency shutdown or major change.

Other procedures to be developed include impacts of deviations, steps to avoid deviations, prevention of chemical exposure, exposure control measures, and equipment inspections.

- *Mechanical Integrity.* Procedures should be prepared to maintain the mechanical integrity of process equipment. The procedures should be developed for pressure vessels and storage tanks, piping systems, relief and vent systems and devices, emergency shutdown systems, controls, and pumps.

This requirement includes: (i) developing written procedures; (ii) conducting training; (iii) developing inspection and testing procedures; (iv) identifying and correcting equipment deficiencies; and (v) setting up a

quality assurance plan for equipment, maintenance materials, and spare parts.

- *Hot Work Permit.* Procedures should be prepared to cover the issuance of a hot work permit, identifying the object on which the hot work will be conducted and implementing emergency preparedness and response measures.
- *Pre-Start Review.* Procedures should be prepared to carry out pre-start reviews when a modification is significant enough to require a change in safety information under the management of change procedure.

The procedures should: (i) confirm that the new or modified construction and/or equipment meet design specifications; (ii) ensure that procedures for safety, operation, maintenance, and emergency are adequate; (iii) include a process hazard assessment and resolve or implement recommendations for new process; and (iv) ensure that training for all affected employees is being conducted.

Emergency Preparedness and Response Plan

When handling Hazmats in an industrial site, it is necessary to develop procedures and practices that will allow quick and efficient response to accidents that may result in injuries or damage to the environment. The sponsor must produce an Emergency Preparedness and Response Plan, which should cover the following:

- *Planning Coordination.* Procedures should be prepared for (i) informing the public and emergency response agencies; (ii) documenting first aid and emergency medical treatment; (iii) taking emergency response actions; and (iv) reviewing and updating the emergency response plan to reflect changes and ensuring that employees are informed of such changes.
- *Emergency Equipment.* Procedures should be prepared for using, inspecting, testing, and maintaining emergency response equipment.
- *Training.* Employees and relevant parties should be trained on appropriate procedures.

⁷ HAZOP: HAZard and OPerability Analysis

⁸ FMEA: Failure Mode and Effects Analysis

Guidance Note B: Outline of a Hazmat Transportation Plan

IFC-financed projects that contract or offer transportation services for Hazmats at or above threshold quantities (see **Requirement #1. Screening** in the Guidelines) must prepare a Hazmat Transportation Plan as outlined in this Guidance Note and integrate it into the Hazardous Materials Management Program.

Hazard Assessment

Hazmats in quantities at or above the threshold limits determined from the initial screening require more rigorous handling procedures for transportation.

A hazard assessment should be carried out on the transportation of Hazmats by reviewing: (i) the hazard characteristics of the substances identified during the screening stage; (ii) the history of accidents, both by the company and its contractors, involving Hazmat transportation, and (iii) the existing criteria for the safe transportation of Hazmats, including environmental management systems used by the company and its contractors. This review should cover the management actions, preventive measures and emergency response procedures described below. The hazard assessment helps to determine what additional measures may be required to complete the Hazmat Transportation Plan.

Management Actions

- **Management of Change.** Procedures for managing change should address: (i) the technical basis for changes in Hazmat transportation routes and/or procedures; (ii) the potential impact of changes on health and safety; (iii) modification required to operating procedures; (iv) authorization requirements; (v) employees affected; and (vi) training needs.
- **Compliance Audit.** A compliance audit covering each element of the preventive measures (see below) should be conducted at least once every three years. The sponsor must develop compliance audit protocols that include: (i) review of applicable preventive measures; (ii) assessment of compliance with these measures and reporting of findings; (iii)

identification of the appropriate response to each finding; and (iv) documentation of the actions taken to correct any deficiencies.

- **Incident Investigation.** Incidents can provide valuable information about Hazmat transportation risks and the steps needed to prevent and manage them. The sponsor must prepare incident investigation procedures to: (i) initiate the investigation promptly; (ii) summarize the investigation in a report; (iii) address the report findings and recommendations; and (iv) review of the report with staff and contractors.
- **Employee Participation.** The sponsor must ensure the active participation of employees on Hazmat transportation plans.
- **Contractors.** The sponsor must ensure that contractors: (i) are provided with procedures and information on Hazmat transportation management; (ii) observe safety practices; (iii) act responsibly; (iv) assess trends of repeated similar incidents; and (v) develop and implement procedures to manage repeated similar incidents. The sponsor must also require contractors to: (i) develop and implement a training program on Hazmat transportation for their employees; (ii) confirm that their employees know appropriate risk management and emergency response actions; (iii) prepare and submit training records.
- **Training.** The sponsor must develop training programs for company employees on safe Hazmat transportation. The program should include: (i) a list of employees to be trained; (ii) the specific training objectives; (iii) the mechanisms to achieve the objectives (i.e., hands on, workshops, videos, etc.); (iv) the means to determine whether the training program is working; and (v) training procedures for new hires and refreshers for existing employees. The date of the most recent review or revision to the training program should be reported.

Preventive Measures

The sponsor must prepare procedures for the implementation of preventive measures, according to internationally acceptable rules agreeable to IFC, for each Hazmat being transported. These procedures should include:

- *Classification and Segregation.* Hazmats of the same class may be stowed together if the materials are not capable of reacting dangerously with each other and causing combustion or dangerous evolution of heat, evolution of flammable, poisonous or asphyxiant gases or formation of corrosive or unstable materials. Otherwise, Hazmats must be segregated according to procedures acceptable to IFC.
- *Packaging.* Packaging is probably the single most important of the operational procedures for hazardous materials transportation. Hazardous materials must be packaged in a manner that keeps them from interacting with each other or with the environment or from being tampered with, purposefully or otherwise.
- *Marking and Labeling.* Packaging labels must comply with standards acceptable to IFC. Unless otherwise specified by national regulations, it should contain the corresponding UN Number preceded by the letters "UN" on each package. In the case of unpackaged articles the marking shall be displayed on the article, on its cradle or on its handling, storage or launching device.
- *Handling and Securing Packages in Transport Units.* Packages containing dangerous goods shall be secured by suitable means in the transport unit in a manner that will prevent any movement during the journey that could change the orientation of the packages or cause them to be damaged.
- *Marking and Placarding of Transport Units.* Transport units subject to placarding include transport tank and freight vehicles, railway transport tank and freight wagons, multimodal freight containers, and portable tanks. Placards shall be affixed to the exterior surface of transport units to provide a warning that the contents of the unit are Hazmats and present risk. Placards shall correspond to the primary risk of the goods contained in the transport unit.

- *Documentation.* The dangerous goods transport document shall include at least the following information: the name of the material, UN number, class and quantity for each Hazmat and for the entire Hazmat cargo offered for transport by any mode.
- *Special Provisions.* Provisions for packaging, labeling and vessel stowage are provided in hazardous materials tables shown in specialized texts such as the UN Model Regulations for Transportation of Dangerous Goods or in the US Department of Transport's hazardous materials regulations. Special provisions usually apply to specially hazardous materials such as toxic gases.

Emergency Preparedness and Response Plan

When transporting Hazmats, it is necessary to develop procedures and practices that will allow quick and efficient response to accidents that may result in injuries to people or damage to the environment. The sponsor must produce an Emergency Preparedness and Response Plan, which should cover the following:

- *Planning Coordination.* Procedures should be prepared for (i) informing the public and emergency response agencies; (ii) documenting first aid and emergency medical treatment; (iii) taking emergency response actions; and (iv) reviewing and updating the emergency response plan to reflect changes and ensuring that employees are informed of such changes.
- *Emergency Equipment.* Procedures should be prepared for using, inspecting, testing, and maintaining emergency response equipment.
- *Training.* Employees and other relevant parties should be trained on the appropriate procedures.

Guidance Note C: Outline of a Hazardous Waste Management Plan.

IFC-financed projects that involve handling, treating, disposing or destroying hazardous wastes in quantities above the threshold limits (see **Requirement #1. Screening** in the Guidelines) must prepare a Hazardous Wastes Management Plan as outlined in this Guidance Note and integrate it into the Hazardous Materials Management Program.

Hazard Assessment

On the basis of the outcomes of the initial screening, the sponsor must carry out a hazard assessment covering the following aspects: (i) waste collection procedures; (ii) storage methods and location including location alternatives considered, if any; (iii) options considered for final disposal or destruction; (iv) environmental impacts from the option selected including by-products (i.e., incineration ashes), (v) detailed information about the mitigation measures to be implemented and (vi) a monitoring plan program to assess impacts of the option chosen, as needed.

Management Actions

- **Management of Change.** Procedures for managing change should address: (i) the technical basis for changes in hazardous waste management; (ii) the potential impact of changes on health and safety; (iii) modification required to operating procedures; (iv) authorization requirements; (v) employees affected; and (vi) training needs.
- **Compliance Audit.** A compliance audit covering each element of the preventive measures (see below) should be conducted at least once every three years. The sponsor must develop compliance audit protocols that include: (i) review of applicable preventive measures; (ii) assessment of compliance with these measures and reporting of findings; (iii) identification of the appropriate response to each finding; and (iii) documentation of the actions taken to correct any deficiencies.
- **Incident Investigation.** Incidents can provide valuable information about risks and the steps needed to prevent and manage them. The

sponsor must prepare incident investigation procedures to: (i) initiate the investigation promptly; (ii) summarize the investigation in a report; (iii) address the report findings and recommendations; and (iv) review of the report with staff and contractors.

- **Employee Participation.** The sponsor must ensure the active participation of employees on hazardous waste management plans.
- **Contractors.** The sponsor must ensure that contractors: (i) are provided with procedures and information on hazardous waste management; (ii) observe safety practices; (iii) act responsibly; (iv) assess trends of repeated similar incidents; and (v) develop and implement procedures to manage repeated similar incidents. The sponsor must also require contractors to: (i) develop and implement a training program on hazardous waste management for their employees; (ii) confirm that their employees know appropriate risk management and emergency response actions; (iii) prepare and submit training records.
- **Training.** The sponsor must develop training programs for company employees on safe hazardous waste management. The program should include: (i) a list of employees to be trained; (ii) the specific training objectives; (iii) the mechanisms to achieve the objectives (i.e., hands on, workshops, videos, etc.); (iv) the means to determine whether the training program is working; and (v) training procedures for new hires and refreshers for existing employees. The date of the most recent review or revision to the training program should be reported.

Preventive Measures

Preventive measures are specific to the handling and disposal of hazardous wastes. The specific measures will be determined by the characteristics of the wastes and the final disposal to be applied. When process operations are used to treat or destroy these wastes, the following preventive measures apply.

- *Safety Information.* The sponsor must prepare procedures for each hazardous waste that include: (i) compilation of hazardous waste data sheets; (ii) identification of maximum intended waste inventories and safe upper/lower parameters; and (iii) documentation of specifications, codes and standards used to design, build and operate hazardous waste management facilities.
- *Hazard Analysis.* A hazard analysis should identify the risks associated with hazardous waste management: (i) use well-accepted guidelines to conduct the review; (ii) document results and resolve identified problems, and (iii) be updated of the review as required.
- *Operating Procedures.* Procedures should be prepared for managing hazardous wastes facilities including initial startup, normal operations, temporary operations, emergency shutdown, emergency operations, normal shutdown, and start up following a normal or emergency shutdown or major change.

Other procedures to be developed include impacts of deviations, steps to avoid deviations, prevention of chemical exposure, exposure control measures, and facility inspections.

Emergency Preparedness and Response Plan

Treatment, disposal or destruction of hazardous waste require the development of procedures and practices that will allow quick and efficient response to accidents that may result in injuries or damage to the environment. The sponsor must produce an Emergency Preparedness and Response Plan, which should cover the following:

- *Planning Coordination.* The sponsor must prepare procedures for: (i) informing the public and emergency response agencies; (ii) documenting first aid and emergency medical treatment; (iii) taking emergency response actions, and (iv) reviewing and updating the emergency response plan to reflect changes and ensuring that employees are informed of such changes.
- *Emergency Equipment.* The sponsor must prepare procedures for using, inspecting, testing, and maintaining emergency response equipment.
- *Training.* Employees and other relevant parties should be trained on the appropriate procedures.

Appendix I – Hazmat Information

The following are suggested sources of additional information. They are provided for guidance and are not intended to be comprehensive.

United Nations. *Transport of Dangerous Goods - Model Regulations*. 11th Revised Edition. Geneva 1999.

Organization for Economic Cooperation and Development (OECD). *Guiding Principles for Chemical Accident Prevention, Preparedness and Response*. 1988-89.

US Department of Transport. *Hazmat Regulations* (Title 49 CFR Parts 100-185). October 1, 1998 and amendments through June 30, 2000.

US Environmental Protection Agency. *Protection of Environment* (Title 40 CFR Parts 300-399 and 700 to 789). July 1, 1996.

World Health Organization (WHO). *Harmonization of Approaches to the Assessment of Risk from the Exposure to Chemicals*. 1997.

International Labor Organization (ILO). *Safety in the use of chemicals at work - Code of practice*. 1997.

US National Institute for Occupational Safety and Health (NIOSH). *Pocket Book to Chemical Hazards*. HTML version. December 2000.

EPA-450/4-88-008. *Workbook of Screening Techniques for Assessing Impacts of Toxic Air Pollutants*. September 1988.

EPA-454/R-93-000. *Guidance for the Application of Refined Dispersion Models for Hazardous/Toxic Air Release*. May 1993.

Center for Chemical Process Safety of the American Institute of Chemical Engineers. *Guidelines for Process Safety Documentation*. 1995

Center for Chemical Process Safety of the American Institute of Chemical Engineers. *Guidelines for Process Safety Fundamentals for General Plant Operations*. 1995.

Center for Chemical Process Safety of the American Institute of Chemical Engineers. *Guidelines for Hazard Evaluation Procedures. 2nd Edition, with Worked examples*. 1992.

American Petroleum Institute. *Risk Based Decision Making* (Publication 16288).

Chemical Manufacturers Association. *Evaluating Process Safety in the Chemical Industry*.
Frank P. Lees. *Loss Prevention in the Process Industries*, Vol. I, II, and III. Butterworths: London 1996.

Center for Chemical Process Safety of the American Institute of Chemical Engineers. *Guidelines for Hazard Evaluation Procedures*.

American Petroleum Institute. *Management of Process Hazards* (R.P. 750).

Center for Chemical Process Safety of the American Institute of Chemical Engineers. *Plant Guidelines for Technical Management of Chemical Process Safety*. 1992.

U.S. Department of Transportation. *North American Emergency Response Guidebook* (NAERG96). 1996.

U.S. EPA *Risk Management Programs Regulation* (Title 40 CFR part 68).

Appendix II – Hazmat Websites

General

NIOSH *Pocket Book to Chemical Hazards*:
<http://www.cdc.gov/niosh/homepage.html>
NIOSH *Chemical Name and Synonym Index*:
<http://www.cdc.gov/niosh/npg/npgd0000.html>

US EPA *Laws and Regulations*:
<http://www.epa.gov/epahome/lawreg.htm>

Environment Australia *Hazmats*:
<http://www.act.gov.au/enviro/hazard.html>

UK OSHA *Hazardous Chemicals*:
<http://uk.osha.eu.int/topics/>

US OSHA *Hazard and Operability Study (HAZOP)*
http://www.osha-slc.gov/OshStd_data/1910_0119.html

Hazardous Materials Identification Guide (HMIG):
<http://chemlabs.uoregon.edu/Safety/HMIG.html>

NFPA Hazard Identification System:
<http://chemlabs.uoregon.edu/Safety/NFPA.html>

Process Safety Management of Highly Hazardous Chemicals: http://www.osha-slc.gov/OshStd_data/1910_0119.html

Transportation

US DOT *Hazmats Regulations*:
<http://hazmat.dot.gov/rules>
US DOT *Hazmats Table*:
http://63.141.231.97/cgi-bin/om_isapi.dll?infobase=netdot&softpage=Doc_Frame_Pg42

Transport Canada *Transport Dangerous Goods – Means of Containment*:
http://www.tc.gc.ca/TDGoods/info/moc/moc_e.htm

UNESC *Transport of Dangerous Goods*:
<http://www.unece.org/unece/trans/danger/danger.htm>

Radioactive Materials

International Atomic Energy Agency:
<http://www.iaea.org/worldatom>

Radiation Protection and Emergency Response:
<http://www.nrc.gov/NRC/radprotect>

Radioactive Waste Disposal
<http://www.epa.gov/radiation/radwaste/>

International Commission on Radiological Protection: <http://www.icrp.org/>