

Esso Highlands Limited



Papua New Guinea LNG Project

**Environmental and Social Management Plan
Appendix 7: Hazardous Materials
Management Plan**

PGGP-EH-SPENV-000018-009

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1.0 OBJECTIVES

Esso Highlands Limited (Company) has developed this Hazardous Materials Management Plan as part of its Environmental and Social Management Plan (ESMP).

The objectives of the Hazardous Materials Management Plan are to:

1. Avoid the use of chemicals and hazardous materials subject to international bans or phase-outs
2. Prevent uncontrolled release of any hazardous materials during transportation, handling, storage and use.

The Hazardous Materials Management Plan should be read in conjunction with other Company plans:

- Waste Management Plan
- Water Management Plan
- Project Emergency Response Plan
- Spill Prevention and Response Plan

The provisions established in this Hazardous Materials Management Plan are supplemented by requirements established in the Spill Prevention and Response Plan.

2.0 LEGAL AND OTHER REQUIREMENTS

Legal and other requirements applicable to this plan are identified in Attachment 1.

3.0 SURVEYS

Refer to the risk assessment described in Section 3 of Spill Prevention and Response Plan. Such risk assessments should also address risks related to the handling of hazardous materials.

4.0 MANAGEMENT AND MONITORING

Table 1 presents a summary of the potential impacts due to hazardous materials, together with mitigation and management measures to avoid or reduce these impacts.

Contractor shall develop a Hazardous Materials Management Plan, which will as a minimum incorporate the measures described in Table 1 but shall not be limited to these measures.

Due to differing scopes of work and work locations, not all management and mitigation measures in the Hazardous Materials Management Plan are applicable to all Contractors. Company's Environmental and Social Mitigation Register defines which management and mitigation measures are applicable to each Contract scope of work.

In Table 1, any mitigation and management commitments that were contained in the PNG LNG Project Environmental Impact Statement (EIS) are identified by a code commencing with an 'M' in the 'Mitigation Item Reference Number' column. Some mitigation measures have been reworded to provide further clarity or more detailed information regarding required measures. In these instances, the code is displayed in italics, and these reworded measures supersede what is in the EIS. The original wording of each commitment is included in Appendix 1.

Other mitigation and management commitments required by Company are identified with a code commencing with an 'A'.

Table 1 also presents a summary of the monitoring required as part of the Hazardous Materials Management Plan.

Sampling of the water collected in bunds or secondary containment shall be undertaken prior to release, in order to verify compliance with prescribed water quality discharge criteria and any specific conditions of relevant environmental permits. Refer to the Water Management Plan for details.

Refer to the Spill Prevention and Response Plan for details of actions to be taken subsequent to larger releases, where site contamination has occurred, in order to remediate the site and prevent (further) impacts to human health or the environment.

Table 1: Management and Monitoring

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Source of Impact	Potential Impact and Relevant Management Plan Objective[†]	Mitigation and Management (Design Feature/Specific Measure)	Mitigation Item Reference Number	Monitoring	Monitoring Frequency	Responsibility
Hazardous materials transport, storage handling and use.	Loss of oil/fuel/other hazardous material to air, surface water, groundwater, soil and/or sediment with consequent adverse impacts on associated quality and beneficial values. (Objectives 1, 2)	Avoid or minimize use of hazardous materials.	A39	Verification	Ongoing	Contractor
		Avoiding the transportation of hazardous materials through villages and towns by using alternative routes, where possible.	A40	Verification	Ongoing	Contractor
		Avoid the use of chemicals and hazardous materials subject to international bans or phase-outs due to their high toxicity to living organisms, environmental persistence, potential for bioaccumulation, or potential for depletion of the ozone layer, consistent with the objectives of the following: <ul style="list-style-type: none"> • Stockholm Convention on Persistent Organic Pollutants (Specific substances listed in Annex A). • Montreal Protocol on Substances that Deplete the Ozone Layer. • Rotterdam Convention of Prior Informed Consent for Certain Hazardous Chemicals and Pesticides in International Trade. In all such cases, consider the use of less hazardous chemicals which are preferable from an environmental perspective. In addition, avoid use of the following: <ul style="list-style-type: none"> • Lead-based coatings, primers, and paints • Lead naphthenate (lubricant) • Leaded thread compound • Fluorescent lights containing mercury 	A41	Verification	Ongoing	Contractor

Table 1: Management and Monitoring						
Source of Impact	Potential Impact and Relevant Management Plan Objective [†]	Mitigation and Management (Design Feature/Specific Measure)	Mitigation Item Reference Number	Monitoring	Monitoring Frequency	Responsibility
		<ul style="list-style-type: none"> Asbestos Chlorinated solvents (e.g., carbon tetrachloride, 1,1,1-trichloroethane, trichloroethylene) Chromate corrosion inhibitors Heavy metals. 				
		Contractor shall identify radioactive materials to be utilized during construction and shall agree upon a procedure with Company for the use, management and disposal of such materials.	M102	Notification to Company	Prior to selection of material	Contractor
		Undertake hazardous materials handling risk assessment (see Spill Prevention and Response Plan for detailed requirements), and integrate the results, including additional mitigation and management measures as applicable and agreed with Company, into the Hazardous Materials Management Plan.	A42	Verification	Ongoing	Contractor
		Establish site-specific hazardous material management and spill response plans that are commensurate with the potential risks (see Spill Prevention and Response Plan for detailed requirements). Continually assess the level of risk based on: <ul style="list-style-type: none"> Types and amounts of hazardous materials; Analysis of potential release scenarios; and Analysis of potential consequences. 	A43	Verification	Ongoing	Contractor
		Use engineering controls (e.g., containment, automatic alarms and shut-off systems) commensurate with the nature of the hazard.	A44	Verification	Ongoing	Contractor
		Implement management controls (e.g., procedures, inspections, and communications) where engineering	A45	Verification	Ongoing	Contractor

Table 1: Management and Monitoring						
Source of Impact	Potential Impact and Relevant Management Plan Objective[†]	Mitigation and Management (Design Feature/Specific Measure)	Mitigation Item Reference Number	Monitoring	Monitoring Frequency	Responsibility
		controls are deemed inadequate for the risk. See also Spill Prevention and Response Plan.				
		Do not use underground storage tanks for storage of hazardous liquids.	A46	Verification	Ongoing	Contractor
		Fuel and chemical storage systems shall be purpose-built, located in designated above ground areas away from watercourses, and provided with secondary containment (e.g. double-walled tanks/lined containment bunds), as appropriate secondary containment will be designed to enable containment of 110% of the storage capacity of the largest container present. This includes temporary fuel stores along the RoW and access ways.	M26, M130, M146	Verification	Ongoing	Contractor
		Train personnel in the handling, transportation and storage of hazardous materials. Train an appropriate number of staff in the handling of emergency response and release scenarios.	M151	Verification	Ongoing	Contractor
		Maintain an inventory of all hazardous materials.	A47	Verification	Ongoing	Contractor
		Prohibit wash-down or fuel handling near or in streams.	M99	Verification	Ongoing	Contractor
		Material Safety Data Sheets (MSDS) for all stored substances will be located within each storage area or at the site office (see Hazardous Materials Management Plan).	A??	Verification	Ongoing	Contractor
		Use dedicated fittings, pipes and hoses specific to materials in tanks and develop and maintain procedures to prevent addition of hazardous materials to incorrect tanks.	A48	Verification	Ongoing	Contractor
		Use transfer equipment that is compatible and suitable for the characteristics of the materials	A49	Verification	Ongoing	Contractor

Table 1: Management and Monitoring						
Source of Impact	Potential Impact and Relevant Management Plan Objective[†]	Mitigation and Management (Design Feature/Specific Measure)	Mitigation Item Reference Number	Monitoring	Monitoring Frequency	Responsibility
		requiring transfer.				
		Regularly inspect, maintain and repair fittings, pipes and hoses.	A50	Verification	Ongoing	Contractor
		Provide secondary containment, drip trays or other overflow or containment measures for hazardous material containers at connection points or other possible overflow points.	A51	Verification	Ongoing	Contractor
		Incorporate overfill protection measures in permanent tank designs and install level gauges on tanks to measure volumes.	A52	Verification	Ongoing	Contractor
		Prepare written procedures for transfer operations that includes a list of measures to follow during filling/discharging operations.	A53	Verification	Ongoing	Contractor
		Store incompatible materials in separate areas.	A54	Verification	Ongoing	Contractor
		Use construction materials that are compatible with products stored.	A55	Verification	Ongoing	Contractor
		Test permanent storage vessels and enclosures intended for hazardous materials storage for leaks prior to installation and operation.	A56	Verification	Ongoing	Contractor
		Clearly label vessels with name or description of hazardous material.	A57	Verification	Ongoing	Contractor
		Routinely inspect and document vessels, tanks and secondary containment for leaks. If a leak is identified activate appropriate actions as per the Spill Prevention and Response Plan. Record in inspection logs.	A58	Verification	Ongoing	Contractor
		Provide appropriate labeling of vehicles and packaging.	A59	Verification	Ongoing	Contractor

Table 1: Management and Monitoring						
Source of Impact	Potential Impact and Relevant Management Plan Objective[†]	Mitigation and Management (Design Feature/Specific Measure)	Mitigation Item Reference Number	Monitoring	Monitoring Frequency	Responsibility
On ship storage facilities	Discharge (accidental or intentional) to the marine environment with consequent adverse impacts on associated quality and beneficial values. (Objectives 1, 2)	Check that the storage, use and handling of all hazardous chemicals, materials and wastes on project vessels is in accordance with IMO MARPOL (1973/1978) requirements and applicable international port policies and procedures.	<i>M188, M210</i>	Verification	Ongoing	Contractor
Spill	Release of hazardous material resulting in adverse environmental and health effects	Assess and establish the need to provide potentially affected communities with information on the results of the risk assessment (see above), specifically in relation to the nature and extent of large quantities of hazardous material use and transfer, and the prevention and control measures being established, and information relating to community responses in the event of a spill (Refer to Spill Response Plan)	A60	N/A	N/A	Company and Contractor

[†] See Section 1.

5.0 ROLES AND RESPONSIBILITIES

Contractor shall ensure sufficient resources are allocated on an ongoing basis to achieve effective implementation of the Hazardous Materials Management Plan.

Contractor's Hazardous Materials Management Plan shall describe the resources allocated to and responsible for the execution of each task and requirement contained therein, and shall describe how roles and responsibilities are communicated to relevant personnel.

Company shall ensure sufficient resources are allocated on an ongoing basis to achieve effective implementation of Company's responsibilities in the Hazardous Materials Management Plan.

6.0 TRAINING, AWARENESS AND COMPETENCY

Contractor shall ensure that all personnel responsible for the execution of the tasks and requirements contained within the Hazardous Materials Management Plan are competent on the basis of education, training and experience.

Contractor's Hazardous Materials Management Plan shall describe the training and awareness requirements necessary for its effective implementation.

Contractor's training activity associated with the Hazardous Materials Management Plan shall be appropriately documented by means of a training needs assessment, training matrix/plan and records of training undertaken.

Company shall ensure that all Company personnel responsible for the execution of Company's tasks and requirements in the Hazardous Materials Management Plan are competent on the basis of education, training and experience.

Company's training activity associated with the Hazardous Materials Management Plan shall be appropriately documented by means of a training needs assessment, training matrix/plan and records of training undertaken.

7.0 PERFORMANCE INDICATORS

Table 2 outlines the indicators for measuring and verifying performance in relation to hazardous materials management.

Table 2: Performance Indicators

ID #	Performance Indicator	Measurement	Internal Assessment Frequency	Relevant Management Plan Objective [†]
1	Number of times chemicals subject to international bans or phase-outs are brought on site	Verification	Quarterly	1
2	Number of contained and uncontained releases	Number of releases	Quarterly	2
Performance Indicators to be further developed and agreed between Contractor and Company				

[†] See Section 1.

8.0 REPORTING AND NOTIFICATION

Contractor shall report to Company the results of the risk assessment required pursuant to the Spill Prevention and Response Plan, and integrate the results, including additional mitigation and management measures as applicable and agreed with Company, into the Hazardous Materials Management Plan.

Contractor shall immediately notify Company of all contained and uncontained spills detailing material released, volume, location, cause and proposed corrective measures, where appropriate.

For all uncontained releases, Contractor shall provide the following additional information:

- Response time
- Clean up requirements
- Outcome and initial assessment of environmental and social impact.

Contractor's monthly report to Company shall include:

- Number and results of verification inspections prescribed in Table 1
- Summary of all contained and uncontained spills/releases and follow up actions/outcomes
- Results of sampling undertaken to demonstrate successful remediation of receiving environment in the event of an uncontrolled release
- Results of other sampling as defined in the Water Management Plan and Waste Management Plan
- Performance Indicators as applicable in the reporting period.

Refer to the Environmental and Social Management Plan (main document) for details of additional reporting and notification requirements relating to spills.

Attachment 1: Legal and Other Requirements

LEGAL AND OTHER REQUIREMENTS

Contractor shall comply with applicable Papua New Guinea Laws and Regulations, applicable International Finance Institution (IFI) requirements and International Treaties and Conventions (where applicable).

Papua New Guinea Laws and Regulations

PNG has no specific legislation regulating the use of hazardous materials. The Environment Act 2000 does, however, contain numerous provisions that promote environmental protection, regulate environmental impacts associated with development activities, and safeguard the life supporting capacity of air, water land and ecosystems. It also contains Duty of Care provisions.

International Financial Institution Requirements

The following International Finance Corporation (IFC) Performance Standards are applicable to the use of hazardous materials:

- IFC Performance Standard 1: *Social and Environmental Assessment and Management System*, which establishes requirements for assessment, management, organizational capability, training, community engagement, monitoring, and reporting
- IFC Performance Standard 4 and Guidance Note 4 which deal with Community Health, Safety and Security, and include the following provisions which are relevant to community safety and transportation, including the transportation of hazardous materials:

“Where the project poses risks to or adverse impacts on the health and safety of affected communities, the client will disclose the Action Plan and any other relevant project-related information to enable the affected communities and relevant government agencies to understand these risks and impacts, and will engage the affected communities and agencies on an ongoing basis consistent with the requirements of Performance Standard 1.”

“The client should design its community engagement process so that it reflects communities’ capacities to understand and act on health and safety information. Communication will be effective when it starts early and is frequently maintained throughout the project life-cycle. Community health and safety management is more than a technical issue. It also requires a sound understanding of the social and cultural processes through which communities experience, perceive and respond to risks and impacts. Community perceptions are often conditioned less by technical or quantitative assessments, and more by the ways in which community members experience change in their environments. They are, for example, likely to have greater perception of risk where it is involuntary, complex, beyond their personal control, or where the distribution of risks and benefits is considered inequitable.”

“The client will design, construct, operate and decommission the structural elements or components of the project in accordance with good international industry practice”

“The client will exercise commercially reasonable efforts to control the safety of deliveries of raw materials and of transportation and disposal of wastes.”

“Even in situations where the client can not exert direct control over the actions of its Contractor and subcontractors, clients should use commercially reasonable means to investigate their capacity to address safety issues, communicate its expectations of

safety performance, and otherwise influence the safety behaviour of Contractor, especially those involved in the transportation of hazardous materials to and from the project site.”

“Where the consequences of emergency events are likely to extend beyond the project property boundary or originate outside of the project property boundary (e.g. hazardous material release during transportation in public roadways), the client is required to design emergency response plans based on the risks to community health and safety identified during the process of Social and Environmental Assessment. When projects need to develop such plans, the proposed actions and measures should be included in the client’s Action Plan. Emergency plans should be developed in close collaboration and consultation with potentially affected communities and should include detailed preparation to safeguard the health and safety of workers and the communities in the event of an emergency.”

“The client should provide relevant local authorities, emergency services, and the affected community with information on the nature and extent of environmental and human health effects that may result from routine operations or unplanned emergencies at the project facility. Information campaigns should describe appropriate behaviour and safety measures in the event of an accident involving project facilities, as well as actively seek community views concerning risk management and associated community preparedness. In addition, clients should consider including the community in regular training exercises (e.g. simulations, drills, and debriefs of exercises and actual events) to familiarize them with proper procedures in the event of an emergency. Emergency plans should address the following aspects of emergency response and preparedness:

- Specific emergency response procedures
- Trained emergency response teams
- Emergency contacts and communication systems / protocols
- Procedures for interaction with local and regional emergency & health authorities
- Permanently stationed emergency equipment & facilities (e.g. first aid stations, fire extinguishers/hoses, sprinkler systems)
- Protocols for fire truck, ambulance and other emergency vehicle services
- Evacuation routes and meeting points
- Drills (annual or more frequently as necessary)

The following IFC Guidelines are applicable to the use of hazardous materials. Contractor shall meet the intent of these guidelines:

- IFC *EHS General Guidelines* (April 2007), Section 4.1 which, in brief, advocate the following:
 - Providing adequate secondary containment for fuel storage tanks and for the temporary storage of other fluids such as lubricating oils and hydraulic fluids
 - Using impervious surfaces for refueling areas and other fluid transfer areas
 - Training workers on the correct transfer and handling of fuels and chemicals and the response to releases
 - Providing portable release containment and cleanup equipment on site and training in the equipment deployment

- Assessing the contents of hazardous materials and petroleum-based products in building systems (e.g. PCB containing electrical equipment, asbestos-containing building materials) and process equipment and removing them prior to initiation of decommissioning activities, and managing their treatment and disposal according to Sections 1.5 and 1.6 on Hazardous Materials and Hazardous Waste Management, respectively
- IFC *EHS General Guidelines* (April 2007), Section 3.5, which presents the procedures to be followed for general hazardous materials transport, and guidance for major transportation hazards (including hazard assessment, management actions, preventive measures, and emergency preparedness and response).