Environmental and Socioeconomic Management Plan

Liza Phase 1 Development Project

Esso Exploration and Production Guyana, Limited

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ERM Partner

The business of sustainability

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Approved by:

EEPGL Country Manager

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AUV.....Automated Underwater Vehicle
BFROC .....base fluid retained on cuttings
BOD .....Biological Oxygen Demand
BOEM.....U.S. Bureau of Ocean Energy Management
CHS .....Cultural Heritage Specialist
CITES.....Convention on International Trade in Endangered Species of Wild Fauna and Flora
CO.....carbon monoxide
COD .....Chemical Oxygen Demand
COLREG .....Convention on the International Regulations for Preventing Collisions at Sea
CSC.....International Convention for Safe Containers
EEPGL.....Esso Exploration and Production Guyana Limited
EIA.....Environmental Impact Assessment
EPA.....Guyanese Environmental Protection Agency
EPI .....Environmental Performance Indicator
ESMP.....Environmental and Socioeconomic Management Plan
FAO .....Food and Agriculture Organization
FPSO.....Floating Production, Storage, and Offloading
GGMC.....Guyana Geology and Mines Commission
GPS .....Global Positioning System
GRA.....Guyana Revenue Authority
JNCC .....Joint Nature Conservation Committee
MARAD.....Maritime Administration
MARPOL 73/78.....International Convention for the Prevention of Pollution by Ships, 1973, as modified by the Protocol of 1978
MPN .....most probable number
NABF.....non-aqueous base fluid
NADF.....non-aqueous drilling fluid
NEAP .....National Environmental Action Plan
OAS .....Organization of American States
OGP.....Oil and Gas Producers
OI .....Operations Integrity
OIMS .....Operations Integrity Management System
PDA.....Project Development Area
ROV.....remotely operated vehicle
SEP.....Stakeholder Engagement Plan
SSLT.....Site Safety Leadership Team
TSS.....total suspended solids
VSP .....Vertical Seismic Profile
WBDF.....Water Based Drilling Fluids

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1.0 INTRODUCTION AND SCOPE

Esso Exploration and Production Guyana, Limited (EEPGL) is the Operator of the Stabroek Petroleum Prospecting Licence Area (referred to hereafter as the Stabroek Block), the largest petroleum prospecting license area offshore Guyana. In 2015, oil was discovered in the Liza field within the eastern half of the Stabroek Block approximately 190 km (~120 mi) offshore from Georgetown in waters approximately 1,500 to 1,900 meters (m) deep. Subsequent surveys and exploratory drilling have identified a reservoir of oil in a sandstone formation approximately 3,600 m below the seabed (approximately 5,400 m below sea level). EEPGL, together with Hess Guyana Exploration Limited and CNOOC Nexen Petroleum Guyana Limited, are parties to a Petroleum Agreement with the Government of Guyana. Under this agreement, and in light of the Liza field discovery, EEPGL has applied for a Petroleum Production Licence and submitted a Project Development Plan to the Minister responsible for Petroleum. This agreement is conditioned on EEPGL obtaining all required permits for EEPGL to develop the Liza field and recover the oil.

The scope of this Environmental and Socioeconomic Management Plan (ESMP) is intended to cover Phase 1 of the Liza development (the Project), which will include drilling approximately 17 subsea development wells and using a Floating Production Storage and Offloading (FPSO) vessel to process, store, and offload the recovered oil. The Project drilling and production operations activities will collectively occur in what is referred to as the Project Development Area (PDA), which is an approximately 50 km^2 (~20 mi^2) area located approximately 190 km (~120 mi) offshore. Figure 1-1 illustrates the location of the PDA. The Project will also involve shorebase facilities and marine/aviation services to support development drilling, FPSO and subsea equipment installation, and production operations.

EEPGL prepared a separate Environmental Impact Assessment (EIA) which:

- described the local and regional environmental context of the Project;
- described all components of the Project activities;
- identified the environmental issues/risks associated with the Project activities; and
- explained why the Project activities should be considered environmentally acceptable.

This ESMP covers regulatory compliance as well as environmental and socioeconomic management requirements for the Project-related activities described in the EIA. It provides the basis of EEPGL's environmental and socioeconomic management program, which is the mechanism through which the company will ensure that the environmental impacts resulting from the Project activities, including cumulative impacts, will be acceptably managed. Where appropriate, it contains environmental objectives and targets which EEPGL seeks to accomplish in order to avoid, reduce, or remedy negative impacts.

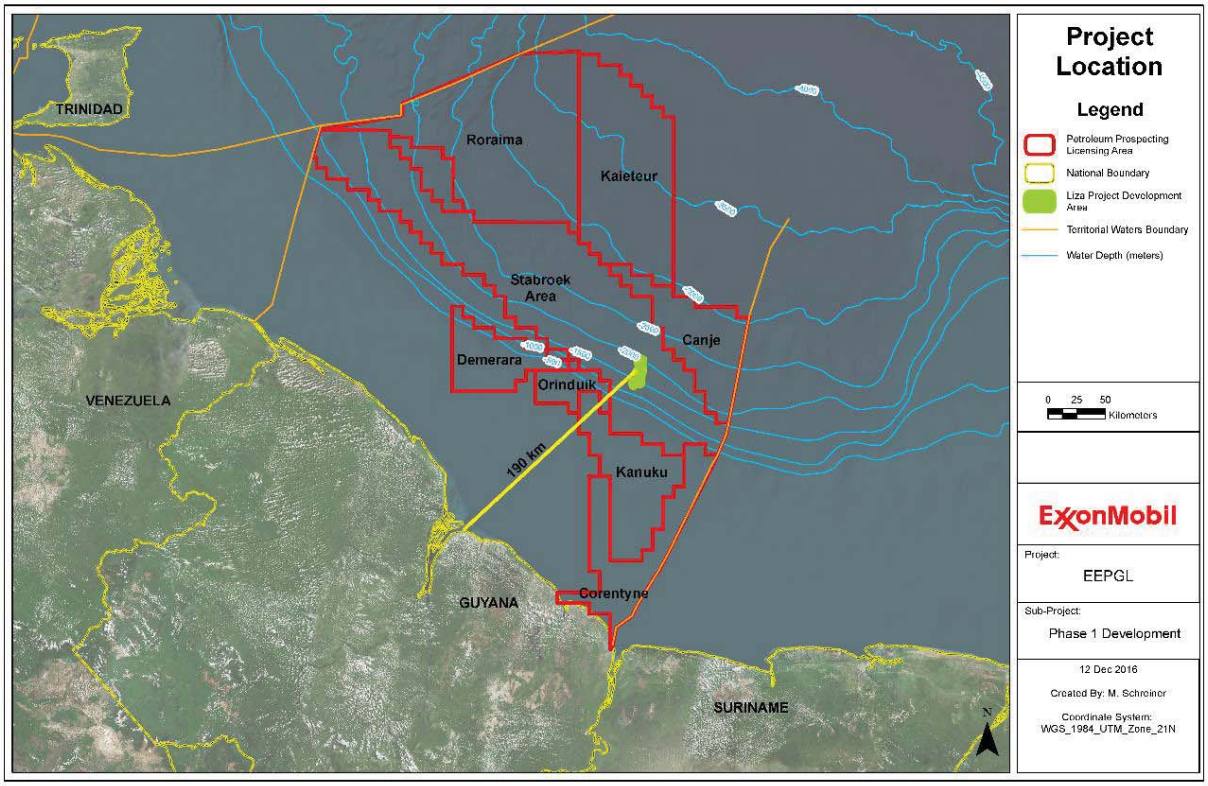
The following are not considered within the scope of this ESMP:

- Regulatory compliance associated with employment visas and taxes associated with the Project;

- Employment, commercial, and financial laws and regulations;
- Environmental and socioeconomic management and regulatory compliance activities for exploration-related activities in the Stabroek block or other nearby blocks where no interfaces are required to be maintained with the Phase 1 Project; and
- Provisions for local content, which are addressed in the Project Development Plan and the associated Local Content Plan as covered in the Project's Petroleum Production Licence.

It is important to note that the ESMP will be used throughout the Project life cycle. However, the document will be regularly updated in an effort to remain aligned with the Project as it progresses from installation to production operations and to decommissioning. As production activities progress, it is envisioned that this plan will be periodically revised as appropriate during the twenty year production operations stage.

Figure 1-1. Location of the Liza Project Development Area within the Stabroek Block



** NOTE: Map does not represent a depiction of the maritime boundary lines of Guyana.*

2.0 ENVIRONMENTAL AND SOCIOECONOMIC MANAGEMENT FRAMEWORK

2.1 Objectives of the ESMP

The objectives of this ESMP are to:

- Demonstrate commitment to compliance with applicable laws, regulations, and executed Project agreements through documented plans and procedures;
- Describe the process the Project will use to identify, evaluate, communicate, and comply with applicable regulatory requirements and obligations and EEPGL policies and procedures, and to maintain a current list of Project-applicable requirements and obligations;
- Establish clear roles and responsibilities and describe how the Project will interface in relation to environmental, socioeconomic and regulatory matters;
- Utilize regulatory compliance management systems, processes, and procedures;
- List the types of reports that will be used to communicate environmental, socioeconomic and regulatory compliance and overall status updates; and
- Identify training and awareness requirements for the Project and contractors.

2.2 Environmental Policy and Legal Framework

The legal framework for this ESMP consists of the key general environmental laws and resource-specific environmental laws that have either a direct or indirect relevance to the Project. Statutes described in this section impose specific legal obligations on EEPGL under Guyana law and include:

- The National Constitution of Guyana
- The Environmental Protection Act
- The Guyana Geology and Mines Commission Act

2.2.1 National Constitution of Guyana

Guyana is governed according to the Constitution of the Co-operative Republic of Guyana, as amended. The constitution took effect in 1980 and expressly provides for protection of the environment. Article 25 establishes "improvement of the environment" as a general duty of the citizenry.

2.2.2 The Environmental Protection Act

In 1996, the Environmental Protection Act (hereinafter referred to as the Act) was enacted to implement the environmental provisions of the Constitution. The Act is Guyana's single most significant piece of environmental legislation because it articulates national policy on important environmental topics such as pollution control, the requirements for environmental review of projects that could potentially impact the environment, and the penalties for environmental infractions. It also provides for the establishment of an environmental trust fund. Most importantly, the Act authorized the formation of the Environmental Protection Agency (EPA),

and establishes the EPA as the lead agency on environmental matters in Guyana (FAO, 2013). The Act further mandates the EPA to oversee the effective management, conservation, protection and improvement of the environment (EPA, 2012). It also requires the EPA to take the necessary measures to ensure the prevention and control of pollution, assessment of the impacts of economic development on the environment, and the sustainable use of natural resources.

2.2.3 The Guyana Geology and Mines Commission Act

The Guyana Geology and Mines Commission Act was enacted in 1979, and authorized the government to establish the Guyana Geology and Mines Commission (GGMC). The GGMC promotes and regulates the exploration and development of the country's mineral resources. The GGMC has a dedicated petroleum division, but petroleum related activities also occur in other divisions, such as the Geological Services division and the Environment Division. The GGMC's most important role with respect to the Project is related to EEPGL's Petroleum Agreement, under which production would be conducted.

2.3 Resource-specific legal requirements for the Project

2.3.1 National Laws and Regulations

In additional to the legal framework described in Section 2.2, several Guyanese environmental laws with more narrowly defined scopes pertain to specific biological or physical natural resources. Other laws which primarily have a public health-related focus are also indirectly related to the environment.

Guyana has several national laws that regulate impacts on physical environmental media, biological resources including wildlife and fisheries, and socioeconomic aspects with potential to be affected by the Project. In addition to these laws, Guyana also has national laws governing waste management and noise. These laws and regulations are described in greater detail in Table 2-1.

Table 2-1. Resource-Specific Environmental and Social Laws

Title	Objective	Relevance to the Project
Biological Resources		
Fisheries Act, 2002	Regulates fishing and related activities in Guyana territorial waters.	Section 33(1) of the Fisheries Act authorizes the prohibition and/or regulation of deposition or discharge of substances harmful to fish. Would primarily affect the contents of routine discharges from Project vessels and the FPSO.

Title	Objective	Relevance to the Project
Wild Birds Protection Act, 1987	Protects listed wild birds in Guyana.	Sections 3 and 6 prohibit knowingly wounding or killing wild birds listed in the First and Second Schedule of the Act and establishes penalties.
Species Protection Regulations, 1999	Provides for the establishment of a Management Authority and a Scientific Authority in compliance with the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).	Provides for wildlife protection, conservation, and management.
Wildlife Management and Conservation Regulations, 2013 (recently supplemented by passing of Wildlife Conservation and Management Bill, 2016)	Provides for the establishment of a Management Authority and the management of the country's flora and fauna.	Provides a supportive mechanism cognizant of the national goals for wildlife protection, conservation, management and sustainable use.
Physical Resources		
Environmental Protection Water Quality Regulations, 2000	Focused on setting effluent standards, reporting requirements and penalties for violations of standards, and permitting requirements for discharges.	Regulates discharges of listed substances, which could include substances used during the Project. Would affect the concentrations of certain constituents (primarily metals, but including others such as nitrogenous compounds, fluoride, and sulfate) that could be discharged in the routine discharges from the Project.
Environmental Protection Air Quality Regulations, 2000	Sets ambient air quality standards, reporting requirements, penalties for violations of standards, and permitting requirements for stationary and mobile sources.	Regulates discharges that could be emitted during the Project, including smoke, particulates, and carbon monoxide (CO).
Environmental Protection Hazardous Waste Regulations, 2000	Establishes requirements for generating, handling, and disposing of hazardous waste as well as penalties for violations of these requirements.	Identifies wastes subject to regulation, including several types of waste that could be produced by the Project.
Toxic Chemicals Control Act No. 13 of 2000, as amended in 2007	Provides for the formation of a Pesticides and Toxic Chemicals Control Board. Establishes requirements for registration, licensure, and trade in pesticides and toxic chemicals. Amended in 2007 to provide rules for the exportation of pesticides and toxic chemicals.	Establishes regulations pertaining to the use of toxic chemicals and pesticides. Pesticides will not be required for this Project, but small amounts of chemicals may be used. The Act would regulate the importation, registration, and use of these chemicals.

Title	Objective	Relevance to the Project
Environmental Protection Noise Management Regulations, 2000	Establishes general provisions for noise avoidance and restrictions from multiple commercial and industrial sources including sound making devices, night clubs, equipment, tools, and construction activities.	Tools and equipment includes pile drivers, steam shovels, pneumatic hammers, pumps, vent or valve devices and any other similar equipment. A regulated facility includes any offshore installation and any other installation, whether floating or resting on the seabed.
Draft Guyana Standard, Requirements for Industrial Effluent Discharge into the Environment, 2015	Compulsory standard used for monitoring of effluents into freshwater, estuarine, and marine water resources.	Sets limits for key parameters in discharges of industrial effluent. Would affect the concentrations of many of the same constituents in routine discharges that would be regulated under the Environmental Protection Water Quality Regulations 2000. Would also dictate the general water chemistry parameters (e.g., temperature, biological oxygen demand, pH) of these discharges.
Public Health		
Occupational Safety and Health Act, 1997	Legally defines the responsibilities of workers and management with respect to keeping workplaces safe.	Would generally apply to workers and Project-related activities on the Project sites.
Food & Drug Regulations (Food and Drug Act)	Regulates the sale, advertisement, preparation, and handling of food products. Regulates the manufacture, advertisement, trade, and administration of pharmaceuticals. Provides the Ministry of Health authority to inspect facilities to establish compliance with sanitation standards.	Governs the preparation of food and provision of medications at Project facilities.
Social / Cultural Resources		

Title	Objective	Relevance to the Project
National Trust Act	Stewardship of historic resources and places of cultural significance.	Governs the management of any building, structure, object, or other man-made or natural feature that is of historic or national cultural significance that could be impacted by the Project. Includes shipwrecks and other marine features. Would only apply to the Project in the event of a chance find, in which case the Act would require EEPGL to work cooperatively with the National Trust to manage any resources discovered.

Most recently, the Minister of Natural Resources, who functions as the sponsoring Minister for the Oil and Gas industry, announced plans in September 2015 to upgrade the country's upstream oil and gas policy, which was originally crafted in 2012 and finalized in 2014, indicating an evolving policy and regulatory framework surrounding the oil and gas industry in Guyana.

To date, there are 16 laws concerning oil and gas in Guyana. The majority of these laws are housed with the EPA, National Advisory Council on Occupational Safety and Health, Guyana Revenue Authority (GRA), GGMC, or Guyana National Bureau of Standards.

2.3.2 National Policy Framework

Guyana's National Development Strategy (NDS), National Environmental Action Plan (NEAP), and Integrated Coastal Zone Management (ICZM) Action Plan relate to environmental protection and natural resource management goals. The NDS identifies several distinct natural "features" of Guyana's that could be affected by the Project including the coastal zone and fisheries. Guyana's NEAP articulates the national government's approach to managing the environment, with particular emphasis on environmental management and pollution control. The ICZM Action Plan articulates the government's strategy for managing coastal environmental resources, several of which could be impacted by the Project. These same documents are also relevant to the Project from a socioeconomic perspective because they outline priorities for the country's economic and social development in the context of environmental protection and natural resource management goals.

2.3.3 International Conventions and Protocols

Guyana is signatory to a number of international and regional conventions and protocols that are relevant to environmental management aspects including air quality/climate change, pollution prevention, and conservation of biodiversity and wildlife habitat. These agreements include several prominent conventions concerning pollution control and waste management such as the International Convention for the Prevention of Pollution from Ships (MARPOL

73/78), the Basel Convention on the Transboundary Movement of Hazardous Wastes and Their Disposal, and the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, and reflect a particular focus on control of pollution and environmental contamination.

Guyana is also a signatory to several international and regional conventions and protocols that are relevant to environmental and socioeconomic aspects, although not all of these agreements have been translated into national legislation. Examples include climate change agreements such as the Kyoto Protocol and the UNFCCC, the UNESCO Convention on the Protection of Underwater Cultural Heritage, and maritime safety conventions such as the International Convention for the Safety of Life at Sea. These international conventions and protocols are described in greater detail in the EIA, Chapter 3: Administrative Framework.

2.4 EEPGL's Management Policies and Commitments

The Company and its affiliates (including EEPGL) are committed to conducting business in a manner that is compatible with the environmental and socioeconomic needs of the communities in which it operates, and that protects the safety, security, and health of its employees, those involved with its operations, its customers, and the public. These commitments are documented in its Safety, Security, Health, Environmental, and Product Safety policies. These policies are put into practice through a disciplined management framework called the Operations Integrity Management System (OIMS).

EEPGL's OIMS Framework[1] establishes common expectations used by Company affiliates worldwide for addressing risks inherent in its business. The term Operations Integrity (OI) is used to address all aspects of its business that can impact personnel and process safety, security, health, and environmental performance.

Application of the framework is required across all Company affiliates, with particular emphasis on design, construction and operations. Management is responsible for ensuring that management systems satisfying the OIMS Framework are in place. Implementation will be consistent with the risks associated with the business activities being planned and performed. Figure 2-1 provides a high level description of the OIMS Framework and its 11 essential elements.

[1] http://corporate.exxonmobil.com/company/about-us/safety-and-health/operations-integrity-management-system

Figure 2-1. The OIMS Framework

2.5 Organizational Structure

EEPGL will have an organization which is responsible for managing the Project activities over the life cycle of the Project. A dedicated in-country organization will be in place throughout each Project stage. The organizational size and makeup will evolve over time to accommodate the business needs associated with drilling development wells, installation of FPSO and SURF components, production operations, logistical support, and ultimately decommissioning.

The in-country organization will be led by a Lead Country Manager, and supported by various discipline managers such as Operations, Engineering, Human Resources, Public & Government Affairs, Business Services (e.g. Procurement, Controllers, Information Technology), Law, and SSH&E. The in-country organization will also be supported by a number of technical, business, and administrative specialists located inside and outside of Guyana. The in-country organization is responsible for all in-country Project activities, and will be the organization which interfaces with government and stakeholders.

The in-country organization will also be supported by several teams which are responsible for managing certain types of Project activities. Examples of such teams include a Drill Team which manages the drilling and completion of the development wells; a Logistics Team which manages logistical support (e.g. shorebase, aviation, marine vessels); and a Project Team which manages the engineering, procurement, construction, and installation of the FPSO and SURF components. Each of these teams has a suite of discipline managers to support the planning and execution of the Project Activities that they are responsible for, including SSH&E. These teams interface with the EEPGL in-country organization in a seamless manner to deliver their scopes of work for the Project. EEPGL will ultimately manage production operations.

The EEPGL management team will be supported by a SSH&E team which provides technical expertise, training, and administrative support for OIMS implementation, which addresses disciplines such as safety, security, health, environmental, regulatory, and socioeconomics.

Organization charts and organizational roles and responsibilities will be further defined in future revisions of this document once the Project achieves a Final Investment Decision (FID).

The management team of EEPGL is accountable for managing the Project activities in alignment with OIMS and EEPGL's established SSH&E policies, in compliance with the laws and regulations of Guyana, and in line with the commitments and obligations associated with the EIA and ESMP.

EEPGL defines SSH&E roles and responsibilities for its organizations and individuals to ensure they understand expectations.

2.6 Competency, Training, and Awareness

EEPGL will assign suitably competent personnel to manage and support the Project activities in alignment with OIMS, which provides guidelines for personnel selection, placement, and competency verification. EEPGL will provide/validate that its personnel have been provided the appropriate SSH&E training, in alignment with OIMS.

EEPGL will verify that its contractors have competency, training, and awareness programs in place which are consistent with EEPGL's programs, in alignment with OIMS.

EEPGL and its contractors will provide SSH&E training and awareness programs which include:

- Country/site specific inductions for new personnel and visitors;
- General training covering broad SSH&E roles and responsibilities for all personnel;
- Management training direct at management and supervisory level personnel; and
- Project and job specific training specific to those with direct duties and roles in SSH&E, commensurate with their level of responsibility.

EEPGL will include ESMP related training and awareness in the above programs as appropriate to ensure that personnel with ESMP roles and responsibilities understand expectations related to commitments and obligations, mitigation measures, monitoring programs, and reporting. Table 2-2 provides a conceptual overview of roles and responsibilities for EEPGL's competency, training, and awareness program.

Table 2-2. Training Roles and Responsibilities

Position	Responsibilities
Management	• Approve overall training processes and procedures • Verify competent and trained personnel are available to support Project activities
Site Supervision	• Ensure their personnel have the required knowledge and skills to perform job tasks • Review and approve training plans for their personnel • Provide time/resources required for their personnel to complete/maintain training • Review training progress for their personnel on an annual basis • Consult with management on actions to take when a person does not meet the requisite knowledge/skills after training has occurred
Personnel	• Complete training requirements • Provide feedback on training received
SSH&E Personnel	• Provide SSH&E training programs with support from training resources
Training Resources	• Provide SSH&E training programs with support from SSH&E personnel • Assist with delivery of training (where appropriate) and evaluate training results

2.6.1 Training Programs and Delivery

EEPGL will develop competency, training, and awareness program appropriate to the Project's needs. Training may be provided through a variety of means, which may include but is not limited to: briefings, toolbox talks, coaching/mentoring, on-the-job training in specific elements or tasks, self-study, instructor-led training, seminars, workshops, computer-based training, or the provision of specific skills as necessary. These and other means (such as posters, signs, site newsletters, etc.) may be used to promote environmental, socioeconomic, and regulatory compliance awareness. Training programs may be delivered by both EEPGL, contractor, and third party training resources.

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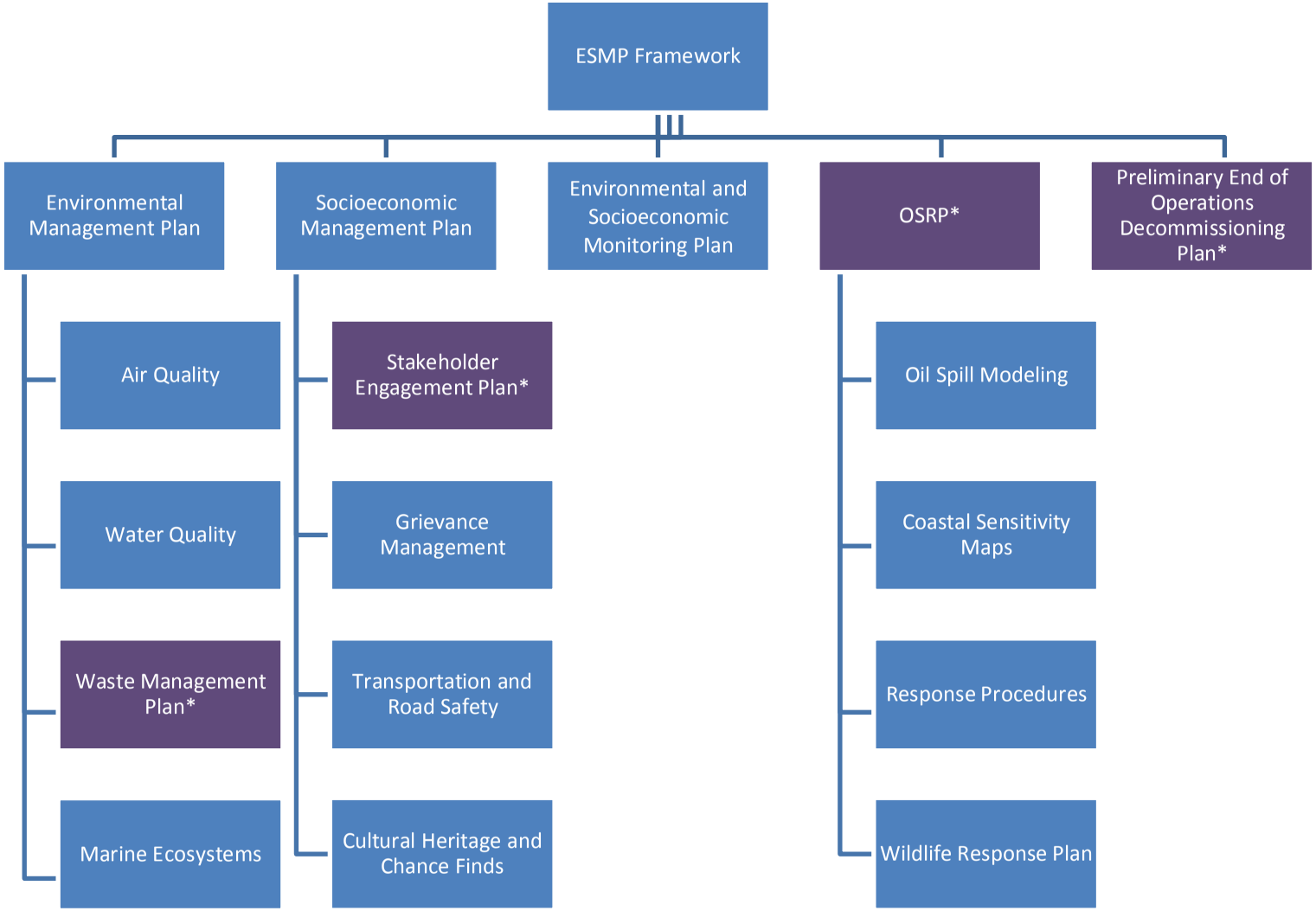
3.0 PROJECT SPECIFIC MANAGEMENT PLANS

In accordance with the structure of the ESMP as described in Section 9.3 of the Liza Phase 1 EIA, the ESMP includes several specific management plans that are organized into five categories:

- Environmental Management;
- Socioeconomic Management;
- Environmental and Socioeconomic (E&S) Monitoring;
- Oil Spill Response; and
- Preliminary End of Operations Decommissioning

Each of the above categories includes one or more specific management plans, which are included within the body of this document unless otherwise noted, as shown in Figure 3-1.

Figure 3-1. ESMP Structure



* *Due to the size and/or complexity of these documents, these are standalone plans, and are provided either as an Appendix to this ESMP or as a separate volume to the regulatory submittal for the Liza Phase 1 Project (i.e., OSRP).*

3.1 Environmental Management Plan

3.1.1 Introduction and Scope

The purpose of the Environmental Management Plan (EMP) is to identify specific measures that EEPGL or its contractors would implement to avoid or minimize potential adverse environmental impacts of the Project, and enhance positive benefits. The scope of this plan includes environmental impacts that result directly or indirectly from the Project, and over which EEPGL exercises control.

3.1.2 Management Measures

This section summarizes the impacts of the Project that require management actions as identified in the EIA. The following sub-sections identify the source of impact, receptor, the management measure, and the involved facility for air quality, water quality management, waste management, and marine ecosystems.

3.1.2.1 Air Quality Management

EEPGL will implement measures to manage impacts on air quality as listed in Table 3-1.

Table 3-1. Air Quality Management Measures

SOURCE OF IMPACT	RECEPTOR	MANAGEMENT MEASURE	INVOLVED FACILITY
Emissions to Atmosphere	Air Quality	Re-inject produced gas which is not utilized as fuel gas on the FPSO to avoid routine flaring.	FPSO
Emissions to Atmosphere	Air Quality	Maintain equipment, marine vessels, and helicopters in good working order and operate in accordance with manufacturer's specifications.	Drill Ship, FPSO, Installation / Decommission-ing Vessels, Other Marine Vessels, Shorebase
Emissions to Atmosphere	Air Quality	Shut down (or throttle down) sources of combustion equipment in intermittent use where reasonably practicable in order to reduce air emissions (e.g., vehicles, portable equipment).	Drill Ship, FPSO, Installation / Decommission-ing Vessels, Other Marine Vessels, Shorebase
Emissions to	Air Quality,	Submit an annual emissions inventory including	Drill Ship, FPSO,

SOURCE OF IMPACT	RECEPTOR	MANAGEMENT MEASURE	INVOLVED FACILITY
Atmosphere	Climate	greenhouse gas emissions.	Installation / Decommission-ing Vessels, Other Marine Vessels
Emissions to Atmosphere	Air Quality	Utilize low sulphur fuels for major vessels, where available and commercially viable.	Drill Ship, Installation / Decommission-ing Vessels, Other Marine Vessels
Emissions to Atmosphere	Air Quality	Utilize dust suppression measures to reduce impacts to air quality.	Shorebase
Emissions to Atmosphere	Air Quality	Notify regulator when process upset events or unplanned maintenance occur, resulting in a flaring event averaging at least 10 MMSCFD and lasting 10 days or longer.	FPSO
Emissions to Atmosphere	Air Quality	Avoid routine venting (excludes tank flashing emissions, standing/working/breathing losses) except during safety and emergency conditions.	FPSO
Emissions to Atmosphere	Air Quality	Avoid use of chlorofluorocarbons (CFCs) and polychlorinated biphenyls (PCBs).	FPSO
Emissions to Atmosphere	Air Quality	Implement inspection, maintenance and surveillance programs to identify and prevent leaks.	FPSO
Emissions to Atmosphere	Air Quality	Operate incinerator in accordance with Waste Management Plan and avoid incineration of restricted materials.	FPSO, Drill Ship

3.1.2.2 *Water Quality Management Measures*

EEPGL will implement measures to manage impacts on marine water quality as listed in Table 3-2.

Table 3-2. Water Quality Management Measures

SOURCE OF IMPACT	RECEPTOR	MANAGEMENT MEASURE	INVOLVED FACILITY
Operational Discharges	Marine Water Quality	Produced water discharge will be treated to comply with an oil in water content of 29 mg/L (monthly average) and 42 mg/L (daily maximum).	FPSO
Operational Discharges	Marine Water Quality	Cooling water and produced water discharge designed to avoid increases in ambient water temperature of more than 3°C at 100 m (~328 ft).	FPSO
Wastewater Discharge to Sea	Marine Water Quality	Bilge water will be treated and tested per MARPOL requirements to ensure compliance with an oil in water content of <15 ppm.	Drill Ship, FPSO, Installation / Decommission -ing Vessels, Other Marine Vessels
Wastewater Discharge to Sea	Marine Water Quality	Sewage and food waste will be treated in accordance with MARPOL (e.g., food comminuted to 25 mm diameter particle size or less, sewage goes through a marine sanitation device).	Drill Ship, FPSO, Installation / Decommission ing Vessels, Other Marine Vessels
Discharge of Cuttings to Sea	Marine Water Quality	Use of low-toxicity International Oil and Gas Producers (IOGP) Group III Non-Aqueous Base Fluid (NABF) as well as utilization of solids control and cuttings dryer systems to treat cuttings, such that end of well maximum weighted mass ratio averaged over all well sections drilled using non-aqueous fluids shall not exceed 6.9 percent wet weight base fluid retained on cuttings.	Drill Ship
Discharge of Cuttings to Sea	Marine Water Quality	There shall be no discharge of free oil as a result of the discharge of NADF cuttings.	Drill Ship
Commission-ing Discharges	Marine Water Quality	There shall be no visible oil sheen on receiving water as a result of any discharges.	All Marine Vessels, SURF

SOURCE OF IMPACT	RECEPTOR	MANAGEMENT MEASURE	INVOLVED FACILITY
Drilling and Operational Discharges	Marine Water Quality	All vessel wastewater discharges (e.g. storage displacement water, ballast water, bilge water, deck drainage) must comply with MARPOL.	Drill Ship, FPSO, Installation / Decommission -ing Vessels, Other Marine Vessels
Hydrocarbon Spills	Marine Water Quality	Utilize leak detection controls during FPSO offloading (e.g., for breach of floating hose, instrumentation / procedures to perform volumetric checks).	FPSO
Hydrocarbon Spills	Marine Water Quality	Utilize leak detection controls during installation and operation of SURF equipment (e.g., pigging and pressure testing of lines, periodic ROV surveys of subsea trees, manifolds, flowlines and risers).	FPSO, SURF
Hydrocarbon Spills	Marine Water Quality	Implement and maintain OSRP (see Appendix 3).	Drill Ship, FPSO, Installation / Decommission -ing Vessels, Other Marine Vessels, Shorebase

3.1.2.3 Waste Management

The Project will evaluate waste generation volumes associated with Project activities. Locations and capacities of acceptable waste handling, treatment, storage, and disposal facilities will be further assessed in relation to Project waste generation. The Project's Waste Management Plan is attached in Appendix 1.

3.1.2.4 Marine Ecosystems

EEPGL will implement measures to manage impacts on marine ecosystems as listed in Table 3-3.

Table 3-3. Marine Ecosystem Management Measures

SOURCE OF IMPACT	RECEPTOR	MANAGEMENT MEASURE	INVOLVED FACILITY
Collision Between Vessels and Marine Species	Marine Mammals, Marine Turtles, Seabirds	• Provide awareness training to Project dedicated marine personnel to recognize signs of marine mammals at the sea surface. • Issue standing instruction to Project dedicated vessel masters to avoid marine mammals and marine turtles while underway and reduce speed or deviate from course, when possible, to reduce probability of collisions. • Provide standing instruction to Project dedicated vessel masters to avoid any identified rafting seabirds, when possible, when transiting to and from PDA.	Drill Ship, FPSO, Installation / Decommission-ing Vessels, Other Marine Vessels
Auditory Impacts on Marine Species	Marine Mammals, Marine Fish	• Gradually increase intensity of seismic impulses and hammer energy (during pile driving) to allow sensitive species to vacate area before injury occurs (i.e., soft starts); • Utilize MMOs during VSP (although use of MMOs is more effective for identification of marine mammals, these individuals can also detect marine turtles depending on weather conditions, and they will be tasked with observing for marine turtles as well) and implementation of other measures recommended by the Joint Nature Conservation Committee (JNCC, 2010), as applicable; and • Maintain equipment (including marine vessels) in good working order and operate them in accordance with manufacturers' specifications so as to limit sound levels to the extent reasonably practicable.	Installation Vessels Drill Ship Drill Ship, FPSO, Installation / Decommission-ing Vessels, Other Marine Vessels
Entrainment or Impingement of Marine Fish	Marine Fish	Provide screening for cooling water and ballast water intakes on FPSO and Drill Ship to minimize the entrainment of finfish.	FPSO, Drill Ship
Introduction of Invasive Species	Marine Fish and Benthos	Project vessels will conduct ballasting operations in accordance with IMO regulations.	Drill Ship, FPSO, Installation / Decommission-ing Vessels, Other Marine Vessels

SOURCE OF IMPACT	RECEPTOR	MANAGEMENT MEASURE	INVOLVED FACILITY
Visual Disturbance of Marine Species	Marine Turtles, Seabirds	Where practicable, direct lighting on FPSO and major vessels to required operational areas rather than at the sea surface or skyward.	FPSO, Drill Ship

In addition to the measures listed in Table 3-3, most if not all of the water quality management measures listed in Table 3-2 and several of the waste management measures listed in the Waste Management Plan will also contribute to management of Project-related impacts on marine ecosystems.

3.2 Socioeconomic Management Plan

Under planned operations, the Project is expected to have few adverse socioeconomic impacts, and likely an overall positive impact due to increased revenues to the Guyanese government, as well as increased local business activity as a result of Project procurement and employment. Nevertheless, EEPGL is committed to minimizing any anticipated adverse socioeconomic impacts, as well as enhancing positive benefits associated with the Project through the implementation of a Project-specific Socioeconomic Management Plan (SMP).

3.2.1 Introduction and Scope

The purpose of the Socioeconomic Management Plan (SMP) is to identify discrete and specific actions that EEPGL or its contractors would implement to avoid, minimize, or mitigate potential adverse socioeconomic impacts from the Project, or to enhance benefits of the Project.

The scope of this plan includes socioeconomic impacts that result directly or indirectly from the Project, and over which EEPGL exercises control. In addition, specific actions and goals related to local workforce development are addressed separately under a Project-specific local content plan, which is outside the scope of the EIA and ESMP.

3.2.2 Management Measures

3.2.2.1 Stakeholder Engagement

EEPGL has developed a Stakeholder Engagement Plan (SEP) aimed at fostering ongoing communication with stakeholders, toward the objectives of 1) identifying, understanding, and addressing community/stakeholder priorities and concerns, and 2) improving Project decision-making and transparency. The SEP is considered a key component of the SMP and is an evergreen document subject to update throughout the Project as EEPGL conducts more engagement activities and gains further insight and understanding about different stakeholders and their concerns. The full SEP is included as Appendix 2 to this document.

3.2.2.2 Grievance Management

EEPGL has developed a mechanism by which stakeholders (including employees) can provide feedback in the form of issues or concerns, comments, concerns or grievances, and which will allow the Project to respond to or address such feedback in a consistent, transparent, and timely manner. The implementation of such a mechanism complements proactive or preventative management policies or procedures already in place, ensuring that when administrative controls do not adequately address an issue, there is recourse for resolution. EEPGL has a Community Grievance Mechanism (CGM), which allows EEPGL and its contractors to receive and respond to stakeholders regarding a range of potential Project activities and impacts. The CGM will apply to all aspects of the Project and will be open to any affected stakeholder. As such, it will play a role in monitoring the effectiveness of other socioeconomic management measures (see Section 3.5 Monitoring Program). EEPGL has the responsibility for day-to-day functioning of the CGM.

Objectives of the CGM are to:

- Provide stakeholders with a mechanism to communicate feedback, issues, or concerns requests and/or complaints to EEPGL in a timely manner so that they can be addressed quickly and proactively;
- Process grievances so they are acknowledged, tracked, and addressed by EEPGL in a timely and confidential manner;
- Continuously improve Project performance in key areas as a result of stakeholder feedback provided through the CGM; and
- Demonstrate EEPGL's commitment to meaningful stakeholder engagement and respect for local opinions and concerns.

Guiding Principles of the CGM

The CGM has been developed in line with the following core principles:

- Ensure communities face no barriers to accessing and using the mechanism;
- Establish the mechanism early on;
- Base the mechanism on a transparent, predictable process and ensure it is well publicized and understood;
- Build trust in the legitimacy and fairness of the mechanism; and
- Create an organizational structure and mind-set that support the mechanism.

Definition of Grievances

Inquiries received by EEPGL will fall into one of five categories defined as follows:

1. Complaint – An expression of discontent, regret, pain, censure, resentment, or grief. A direct, tangible incident along with its alleged damage, impact or dissatisfaction that occurred as a result of company or contractor actions, perceived or actual. Complaints

are typically accompanied by a request for resolution and rectification.

2. Concern – A matter that engages a person's attention, interest, or care, or that affects a person's welfare or happiness. Related to questions or requests for information or general perceptions unrelated to a specific impact or incident and/or recorded in an individual grievance. Concerns are good indicators of where stakeholders lack or misunderstand information.
3. Issue – A point in question or a matter that is in dispute, as between contending parties in an action at law. A pre-existing complaint or concern between two non-Project entities, one of which may attempt to use the company's activities as the leverage to achieve resolution. Issues should be transmitted to the entities directly involved along with an explanation as to how they can affect the company. Issues may evolve into loss of the project's social license to operate if not handled properly.
4. Request – The act of asking for something to be given or done, especially as a favor or courtesy; a solicitation or petition. A communication from a stakeholder asking for something – donation, community project, job, contract, or some other benefit for a group or individual. Requests may evolve into loss of the company's social license to operate if not handled properly.
5. Guidance - An advice or information aimed at resolving a problem or difficulty, especially as given by someone in authority.

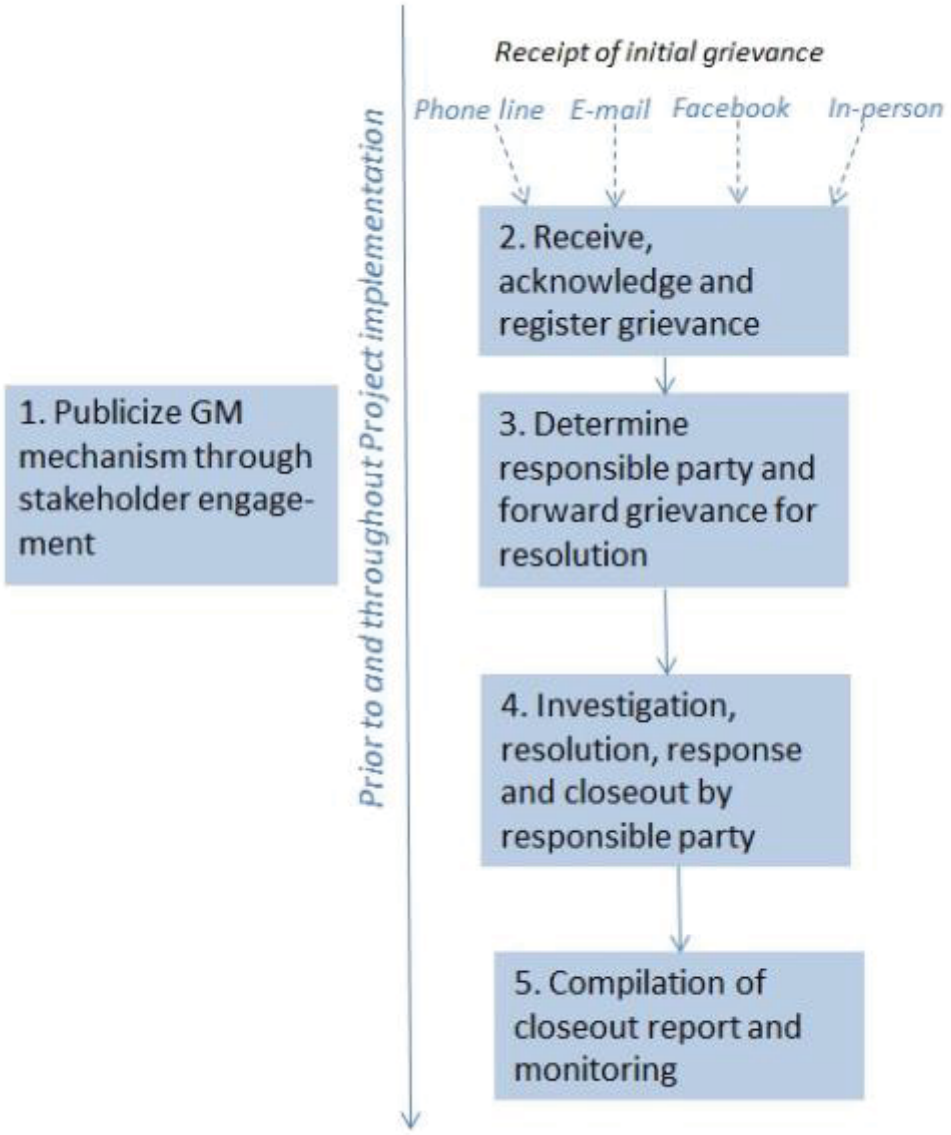
Implementation of the CGM

Contractors and EEPGL should coordinate in the process of addressing issues on a regular basis. It is the responsibility of the Contractors to report all grievances received, along with the required information for entry into the CGM, and it is the responsibility of EEPGL to investigate each grievance and ensure the grievance is addressed in a timely manner. Contractors will be provided a Project-specific CGM log (consistent with EEPGL's log) to ensure the consistent collection of grievance information, which will be completed and submitted to EEPGL on a periodic basis. This will include:

- Type of grievance - issue, concern, compliant (e.g., property damage, work conditions, noise, traffic);
- Brief description of grievance;
- Status of grievance (registered, assessed, under investigation, in resolution, closed);
- Date grievance was received;
- Date the incident occurred, if applicable.

The CGM procedure is depicted in Figure 3-2.

Figure 3-2. EEPGL's Five-Step Grievance Management Procedure



As shown in Figure 3-2, stakeholder feedback can be received by EEPGL or its contractors in the following three ways:

1. In person, either to an EEPGL employee or representative;
2. Via telephone - (592) 231 2866, extension 12400
3. Via email –Guyanastaff@exxonmobil.com

Responsible parties must be identified to manage receipt of the grievances at each feedback avenue, and these individuals must be trained in proper documentation of information and timely input of the data into the database. Upon receipt, EEPGL will register the grievance in a

CGM database, determine the appropriate responsible party, and forward the grievance to that party for resolution. As is required by the type of grievance, the responsible party will then undergo investigation activities as appropriate for resolution and appropriate response to the grievant. Once resolved, a summary of the grievance resolution will be entered into the CGM database to allow for tracking and reporting. This consolidated database will also allow for the monitoring of Project-wide trends and for identification of potential recurring issues associated with specific contractors or Project activities.

Receipt, registration, prioritization, and resolution of grievances using the CGM should adhere to the following guidelines:

a. Established forms to be filled in with all necessary information – clarify that if a grievance is submitted verbally, it must be transcribed as soon as possible after.
b. Details should be compiled – electronically if possible, and registers of chain of custody and communication must be established.
c. When a grievance is received with a name attached, the grievant must be notified within a specific timeline that their grievance has been registered, as well as providing a timeline for future activities, including the timeline by when the Project should have a proposed resolution.
d. When a grievance is received without a name attached, the grievance must be addressed and documented within a pre-specified timeframe. If relevant and practicable (for example in the case of worker grievances), information on the grievance and how it has been addressed should be disseminated publicly. This should in no way infringe on the confidentiality of any grievant.
e. Where necessary/relevant an interview with the grievant could be helpful to obtain further details.
f. Specified timeframes should be established for confirming receipt of the grievance, completing the investigation, and providing a resolution.
g. Options for resolution should include: unilateral response; bilateral response (the aggrieved party and EEPGL developing a solution together); third party response (though a mediator); or through a judicial process as appropriate, outside of the CGM. Given that the purpose of the mechanism is to proactively address concerns before they escalate, it is important to maximize the opportunities for bilateral response wherever possible.

CGM Mechanism Monitoring

In addition to monitoring the effectiveness of the CGM itself, data from the CGM can be a useful tool in monitoring the effectiveness of management measures for a range of Affiliate and Project aspects, in combination with other resource-specific monitoring indicators. CGM indicators that should be monitored include:

- Number of grievances registered within the reporting period (e.g., monthly, quarterly, or annually);
- Number of grievances closed during the reporting period;
- Topic of grievance;

- Distribution of aged grievances (i.e., under 30 days, 30 to 60 days, 60 to 90 days, more than 90 days).

Monitoring of these indicators will allow EEPGL to identify trends across the Project phases, activities and facilities, allowing for adjustment of the CGM or other management plans and procedures.

It should be understood that receipt of a large number of grievances does not necessarily indicate poor Project performance; a large number could in fact be indicative of high quality engagement and dialogue between the Project and the community. The goal of the CGM mechanism process should therefore not be to reduce the number of grievances received, but rather should be to develop and maintain trust and confidence on the part of the community that when valid grievances arise, EEPGL will respond appropriately. Ensuring that the same types of grievances are not raised repeatedly, and maintaining a reasonable average time to achieve closure of grievances, are key indicators of good performance.

3.2.2.3 *Socioeconomic Management Measures*

EEPGL will implement measures to manage socioeconomic impacts as listed in Table 3-4.

Table 3-4. Socioeconomic Management Measures

SOURCE OF IMPACT	RECEPTOR	MANAGEMENT MEASURE	INVOLVED FACILITY
Project Employment	Guyanese Population	Utilize Guyanese nationals where reasonably practical. Partner with select local institutions and agencies to support workforce development programs.	N/A
Project Procurement	Guyanese Population	Procure Project goods and services locally when available, and when they meet minimum standards and when commercially competitive. Engage with local area agricultural development co-ops to identify potential supply contract opportunities.	N/A
Project Workforce	Guyanese Population	Develop a Worker Code of Conduct that includes requirements for interaction with local communities while on shore-leave. Ensure that contract agreements require strict adherence to the Code of Conduct.	N/A
Various	Guyanese Population	Implement a transparent, accessible, and consistent CGM mechanism early on, prior to onset of Project activities. Ensure CGM mechanism is well publicized and understood by the public.	N/A

Various	Guyanese Population	Develop and implement a Stakeholder Engagement Plan.	N/A
Various	Guyanese Population	Monitor grievances received and resolved by the CGM mechanism; adjust CGM mechanism, and other management measures, as required (see Section 3.5: Monitoring Program).	N/A

3.2.2.4 Transportation

EEPGL will implement measures to manage impacts on transportation and road and marine safety as listed in Table 3-5.

Table 3-5. Transportation Management Measures

SOURCE OF IMPACT	RECEPTOR	MANAGEMENT MEASURE	INVOLVED FACILITY
Increased Vehicular Traffic	Road Users (e.g. Drivers, Cyclists, and Pedestrians)	• Development of an onshore logistics/journey management plan to reduce potential conflicts with local road traffic when transporting goods to/from onshore support facilities. • Implement a Stakeholder Engagement Plan that includes a CGM mechanism process for stakeholders.	Shorebase, Waste Management Facility, Other Onshore Support Infrastructure
Increased Aviation Traffic	Other Aircraft and Users of Ogle Airport	• Coordinate with relevant aviation authorities and stakeholders to understand peak Project-related utilization rates. • Implement a Stakeholder Engagement Plan that includes a CGM mechanism process for stakeholders.	FPSO, Drill Ship
Increased Vessel Traffic; Increased Risk of Marine Casualty Event (Collision, Grounding); Reduced Ocean Surface Area for Non-Project	Commercial Cargo and Fishing Vessels; Subsistence Fishing Vessels	• Observation of standard local navigation procedures in and around the Georgetown Harbour and Demerara River, as well as best ship-keeping and navigation practices while at sea, shall be implemented. This includes Notice to Mariners, Trawlers Association, and Co-ops. • Relevant authorities will be informed of the Project activities. • Notices to Mariners will be issued through MARAD to alert mariners of the installation/drilling activities. • EEPGL will conduct an augmented stakeholder engagement process (along with relevant authorities) to identify and	Shorebase, FPSO, Drill Ship, Installation / Decommission-ing Vessels, Other Support Vessels

SOURCE OF IMPACT	RECEPTOR	MANAGEMENT MEASURE	INVOLVED FACILITY
Activities		communicate with maritime users who might not ordinarily receive Notices to Mariners. • Vessels will have radar systems and communication mechanisms to communicate with third party mariners. • Marine safety exclusion zones will be maintained around the Drill Ship (500 m), FPSO (2 nautical miles), and major installation vessels. • Implement a Stakeholder Engagement Plan that includes a CGM mechanism process for stakeholders, including local fishing interests. • Monitor engagement with fishing communities to record locations of fisheries activities and to check for adherence to communications protocol and grievances follow up.	

3.2.2.5 *Road Safety*

EEPGL will implement measures to manage impacts on road safety as listed in Table 3-6.

Table 3-6. Road Safety Management Measures

SOURCE OF IMPACT	RECEPTOR	MANAGEMENT MEASURE	INVOLVED FACILITY
Increased Vehicular Traffic	Road Users (e.g., Drivers, Cyclists, Pedestrians)	Development of an onshore logistics/journey management plan to reduce potential conflicts with local road traffic when transporting goods to/from onshore support facilities.	Shorebase and Onshore Support Infrastructure
Increased Vehicular Traffic	Road Users (e.g., Drivers, Cyclists, Pedestrians)	Definition of typical, primary travel routes.	Shorebase and Onshore Support Infrastructure
Vehicular Incidents	Road Users (e.g., Drivers, Cyclists, Pedestrians)	Definition of required driver training for Project dedicated drivers, including (but not limited to) defensive driving, loading/unloading procedures, and safe transport of passengers, if applicable.	Shorebase and Onshore Support Infrastructure
Vehicular Accidents	Road Users (e.g., Drivers,	Designation and enforcement of speed limits, through speed governors, GPS, or other	Shorebase and Onshore

SOURCE OF IMPACT	RECEPTOR	MANAGEMENT MEASURE	INVOLVED FACILITY
	Cyclists, Pedestrians)	monitoring systems for Project dedicated vehicles.	Support Infrastructure
Increased Vehicular Traffic	Road Users (e.g., Drivers, Cyclists, Pedestrians)	Avoidance of deliveries during typical peak traffic hours or scheduled openings of the Demerara Harbour Bridge, to the extent reasonably practicable.	Shorebase and Onshore Support Infrastructure
Vehicular Breakdowns; Traffic Congestion	Road Users (e.g., Drivers, Cyclists, Pedestrians); Project Drivers	Definition of vehicle inspection and maintenance protocols that include all applicable safety equipment for Project dedicated vehicles.	Shorebase and Onshore Support Infrastructure
Vehicular Incidents	Local Communities	Community safety program for impacted schools and neighborhoods to improve traffic safety.	Shorebase and Onshore Support Infrastructure

3.2.2.6 *Cultural Heritage Management and Chance Finds*

Cultural Heritage Management Plan

EEPGL will implement this Cultural Heritage Management Plan (CHMP) aligned with international best practice to protect cultural heritage that is inadvertently discovered during drilling and installation activities. The CHMP includes a Cultural Heritage Monitoring Plan, Chance Find Procedure, and Cultural Heritage Training Program, as described below.

Cultural Heritage Monitoring Program

In consultation with the Guyana National Trust (GNT) and other relevant cultural heritage stakeholders, EEPGL will implement a Cultural Heritage Monitoring Program for all activities that disturb the seafloor. The purpose of this monitoring is to identify, record, and protect cultural heritage that was not identified during existing condition studies and other pre-drilling or pre-installation cultural heritage investigations.

Monitoring will be conducted by Project staff supported by a remote professional cultural heritage specialist (CHS) who will be on call to assess any potential chance finds that are identified. Cultural heritage monitoring will be conducted by any EEPGL and contractor staff with the potential to discover underwater cultural heritage, which would generally be limited to AUV/ROV operators. These staff will be responsible for reporting any potential chance finds to Project management, who would then notify the CHS.

Chance Find Procedure

The following types of underwater cultural heritage, while not likely based on existing conditions studies, could potentially be encountered during the drilling or installation stages:

- Shipwrecks or parts thereof; and
- Artifacts from debris fields associated with shipwrecks.

The Chance Find Procedure will use a two-tiered approach for identifying, assessing, and resolving potential chance finds. The purpose of this approach is to utilize an on-call CHS to resolve minor chance finds without necessitating consultations with the GNT, and to minimize Project delays by allowing for the quick resolution of non-significant finds. The defining characteristics of each chance find tier and the processes for assessing them and determining if consultation is required will be developed in consultation with the GNT and other cultural heritage stakeholders prior to the drilling and installation programs, as appropriate.

All potential chance finds identified will be reported as soon as practicable (i.e., within approximately 24 hours) to EEPGL and the designated CHS, using the Chance Find Reporting Form in Figure 3-3. The CHS will determine if the potential chance find is cultural heritage and, if so, assign it to a chance finds tier. Figure 3-4 provides a detailed flow diagram of the Chance

Find Procedure. All chance finds will follow the two-tiered hierarchy that is presented in Table 3-8.

Since little to no material from the seafloor is expected to be brought to the surface, the collection of artifacts is not anticipated. In the unlikely event that underwater chance finds are accidentally brought to the surface, they should be immediately placed in a container filled with sea water from the area of the find and maintained indefinitely, as exposure to the air can cause artifacts that have been underwater to decompose or oxidize very rapidly. Documentation of the find, including photographs of the artifact(s) with a scale included in the frame, should be made immediately. Artifacts and associated documentation and photographs taken by Project personnel should be given to the designated CHS.

Although recovery of underwater artifacts to the surface is not anticipated, any recovered artifacts would belong to the Guyanese government, and EEPGL would be responsible for providing them to the GNT. For underwater chance finds not brought to the surface, such as shipwrecks or associated debris fields, avoidance is the preferred approach, as excavation of underwater archaeological sites is costly and time consuming. Specific management guidance will be provided by the Project for each cultural heritage site identified and documented.

The Project will maintain records on chance finds and the implementation of treatment plans. These may include:

- Reports that describe chance finds identified, the results of chance find assessments, internal and external communications and instructions, and supporting documentation (or other reference materials as appropriate); and
- Any additional reports prepared to fulfill specific requirements of the GNT.

Cultural Heritage Training Program

Project and Contractor personnel with the potential to identify underwater chance finds (e.g., AUV/ROV operators) will receive awareness training in the identification of chance finds and the Chance Find Procedure as described above. The Project will develop training materials, such as a quick reference hand-out, which will be provided to applicable Project personnel. The Project will maintain records of all chance find training provided to Project personnel.

EEPGL and its contractors will establish the communication and engagement protocols for the on-call CHS. The Contractor will designate its personnel that require cultural heritage awareness training. The training will provide the necessary information on how to identify and respond to chance finds.

All Project personnel who may have contact with cultural heritage objects will be made aware that it is illegal and forbidden to disturb or remove cultural heritage objects offsite for personal gain.

Chance Find Reporting Form

Date of find:

Location of find (description and GPS):

Project person making the find:

Project person notified of the find:

Date notified:

Time notified:

Cultural Heritage Specialist notified of the find:

Date notified:

Time notified:

Description of the find:

Description of the initial response to the find:

Prescribed treatment methodology for the find and any needed modifications to Project execution:

Date of handover of the artifact(s), if recovered to surface:

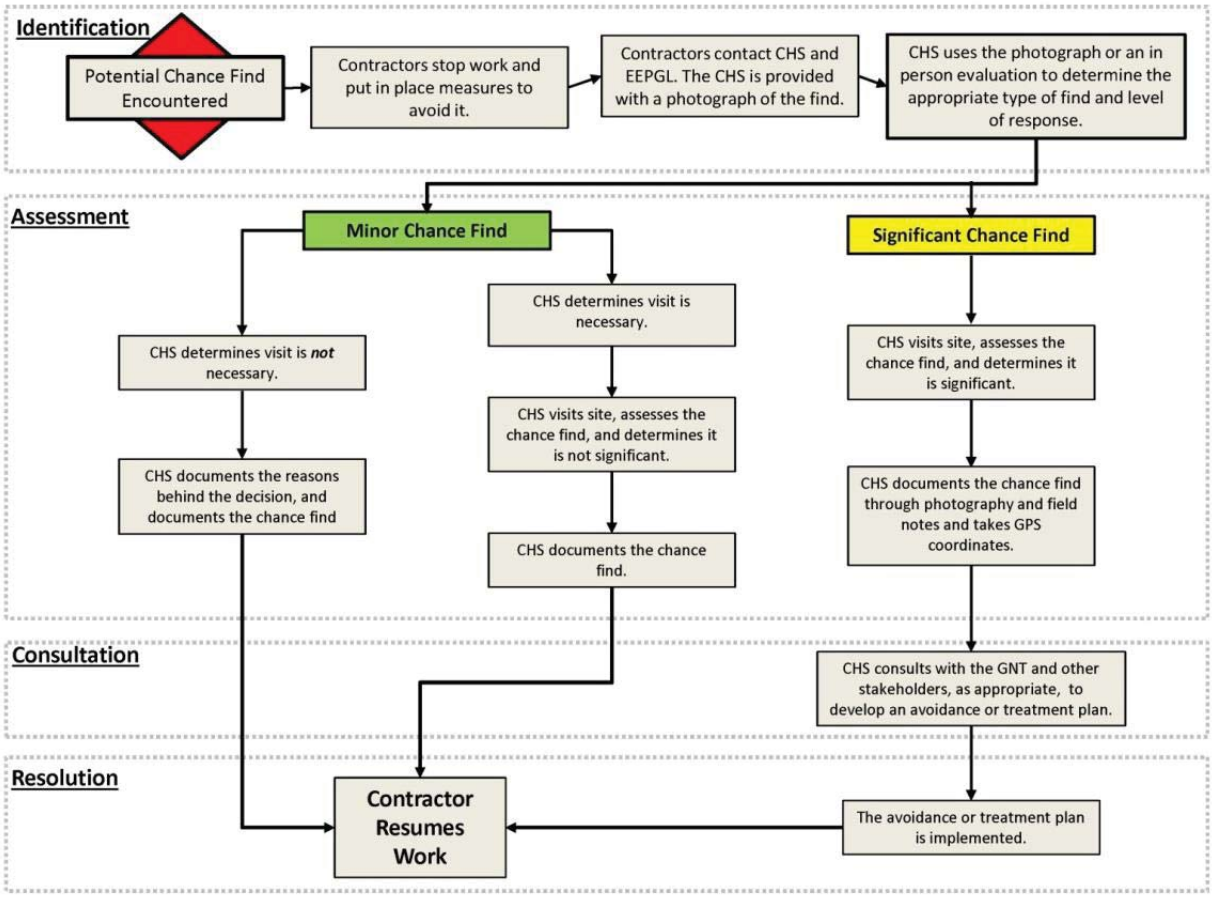
Recipient of the artifact(s), if recovered to surface:

Date of closure of the chance find:

Table 3-7: Two-tiered Chance Find Hierarchy

Chance Find Type	Characteristics	Evaluation Process
Minor Chance Finds	Modern features or objects that do not meet the criteria for cultural heritage under Guyana laws and regulations.	Drilling and installation activities will stop in the area of the find as soon as safely possible, where appropriate and where practical. The potential chance find will be reported to EEPGL (if found by a contractor) and the CHS within approximately 24 hours. In the unlikely event that an artifact is brought to the surface, the CHS will determine if a site visit is necessary to examine the artifact. If the potential chance find is discovered in situ, the CHS will examine images collected from the ROV. If the CHS determines that it is a minor chance find, drilling and installation activities will resume in the area. Drilling and installation activities will not be stopped if there is no reasonable expectation that the potential chance find would not be disturbed/damaged.
Significant Chance Finds	Significant historic features (e.g., shipwrecks), objects (i.e., artifacts), or human remains that meet the criteria for cultural heritage under Guyana laws and regulations.	Drilling and installation activities will stop in the area of the find as soon as safely possible, where appropriate and where practical. The potential chance find will be reported to EEPGL (if found by a contractor) and a CHS within approximately 24 hours. In the unlikely event that an artifact is brought to the surface, the CHS will determine if a site visit is necessary to examine the artifact. If the potential chance find is discovered in situ, the CHS will examine images collected from the ROV. If the CHS determines that it is a significant chance find, the CHS will develop an avoidance or treatment plan in consultation with the GNT. Installation activities will resume in the area upon acceptance of the avoidance plan or completion of the treatment plan. Drilling and installation activities will not be stopped if there is no reasonable expectation that the potential chance find would not be disturbed/damaged.

Figure 3-4. Chance Find Procedure Flow Chart



3.3 Oil Spill Response Plan

The Project's Oil Spill Response Plan can be found in Appendix 3.

3.4 Preliminary End of Operations Decommissioning Plan

The Preliminary End of Operations and Decommissioning Plan can be found in Appendix 4.

3.5 Environmental and Socioeconomic Monitoring Plan

EEPGL will implement an Environmental and Socioeconomic Monitoring Plan to assess the accuracy of the residual impact predictions in the EIA and to assess the effectiveness of the management measures described in this ESMP and other supporting plans. This section provides a monitoring framework that describes the specific monitoring activities that EEPGL will undertake, once the facility has achieved steady-state operations, to validate the findings of the EIA, ensure the effective implementation of the management measures described in Section 3.1 through 3.4, track environmental and socioeconomic performance, and adjust Project operations or mitigations, if necessary, through the life of the Project.

Monitoring activities for environmental and socioeconomic resources in Table 3-7 are organized by the resources / receptors discussed in Section 3.1 (e.g., air quality), and then by Project stage (i.e., Drilling, Installation, Production Operations, and Decommissioning). The table also identifies the specific Project component or "aspect" that each monitoring activity is intended to monitor and the specific environmental or socioeconomic receptor. The specific monitoring activities included in Table 3-7 were selected based on the findings of the EIA; level of stakeholder interest in specific impacts and receptors, as assessed through the stakeholder engagement process; and the EPA's prior monitoring requirements for exploration activities in the Stabroek Block. For monitoring activities that are similar to those that have been undertaken previously during exploration activities, details including the location and frequency of monitoring activities, data to be collected, and reporting frequency is provided. For other activities, ERM and EPA will work collaboratively to develop these details.

At the time this ESMP was prepared, the contracts for key components of the Project had not been finalized so it was not possible to assign responsibility for implementing specific components of the monitoring program. EEPGL will ultimately be responsible for all monitoring, but may delegate some responsibility to contractors. The ESMP is intended to be a "living" document and will be updated to assign these responsibilities as contracts are finalized and responsible parties can be identified. The ESMP will also be updated as necessary throughout the operational stage of the Project to maximize the value of the data collected, capture lessons learned, achieve continuous improvement, and ensure cost-effective tracking of the Project's environmental and socioeconomic performance over time.

Table 3-8. Environmental and Socioeconomic Monitoring Measures

SOURCE OF POTENTIAL IMPACT	ASPECT	RECEPTOR	ACTIVITY	INVOLVED FACILITY
AIR QUALITY				
Production Operations				
Combustion Emissions	Emissions from Flaring	Offshore Air Quality	Keep records of non-routine flaring of produced gas.	FPSO
FPSO Emissions	Fuel Consumption ; Emissions from Flaring	Offshore Air Quality	An air emissions inventory report will be prepared annually.	FPSO
FPSO Emissions	Emissions from flaring	Offshore Air Quality	Monitor flare performance to maximize efficiency of flaring operation.	FPSO
All Project Phases				
GHG Emissions	Fuel Consumption ; emissions from Flaring	Climate	Quantify direct Project GHG emissions from the Project facilities and equipment utilized within the Project AOI.	FPSO, Drill Ship, Installation/Decommissioning Vessels and Support Vessels, Shorebase
Combustion Emissions	Fuel Consumption	Offshore Air Quality	Monitor on an ongoing basis the volume of fuel used by all combustions sources and equipment on FPSO and other marine vessels.	FPSO, Drill Ship, Installation/Decommissioning Vessels and Support Vessels
Combustion Emissions	Fuel Consumption	Offshore Air Quality	Monitor volume of fuel used for helicopter operation.	HELICOPTERS
WATER QUALITY				
Drilling and Installation Phase				
Drilling Discharges	WBDF/ WBDF & NADF Cuttings, Wellwork Fluids, and Cements	Benthic Organisms, Marine Water Quality	Prior to and post-drilling, an ROV will take pictures of the area immediately surrounding the well location to monitor for marine water quality impacts.	Drill Ship

SOURCE OF POTENTIAL IMPACT	ASPECT	RECEPTOR	ACTIVITY	INVOLVED FACILITY
Drilling Discharges	WBDF/ WBDF & NADF Cuttings, Wellwork Fluids, and Cements	Benthic Organisms, Marine Water Quality	Estimate and record volume and type of drilling fluids and cuttings discharged into the sea.	Drill Ship
Drilling Discharges	WBDF/NABF / NADF, Cuttings and Cements	Marine Water Quality	Monitor daily during drilling to ensure that end of well maximum weighted mass ratio averaged over all well sections drilled using non-aqueous fluids shall not exceed of 6.9 percent wet weight base fluid retained on cuttings.	Drill Ship
Production Operations				
Operational Discharges	Produced Water	Marine Water Quality	Monitor daily discharge volume.	FPSO
Operational Discharges	Produced Water	Marine Water Quality	Measure oil and grease content (grab sample once per day).	FPSO
Operational Discharges	Cooling Water	Marine Water Quality	Perform daily inspections to verify no visible sheen from discharge.	FPSO
Operational Discharges	Cooling Water, Produced Water	Marine Water Quality	Monitor discharge temperature to avoid increases in ambient water temperature of more than 3°C at 100 m (~328 ft).	FPSO
Offloading Operations	Offloading Operations	Marine Water Quality	Utilize load monitoring system in the FPSO control room to support FPSO offloading.	FPSO
Production of Hydrocarbons	Offloading Operations	Marine Water Quality	Monitor pressure and temperature of subsea wells and manifolds by a control system on the FPSO to detect and prevent leaks.	FPSO
All Project Phases				
Operational Discharges	Black Water	Marine Water	Monitor chlorine concentration of treated sewage discharges.	FPSO, FPSO, Drill Ship,

SOURCE OF POTENTIAL IMPACT	ASPECT	RECEPTOR	ACTIVITY	INVOLVED FACILITY
		Quality		Installation/Decommissioning Vessels and Support Vessels,
Operational Discharges	Black Water, Gray Water, and Food Wastes	Marine Water Quality	Perform daily visual inspection of discharge points to ensure absence of floating solids and discoloration of the water.	FPSO, Drill Ship, Installation/Decommissioning Vessels and Support Vessels
Operational Discharges	Black Water, Gray Water, and Food Wastes	Marine Water Quality	Record estimated quantities of grey water, black water, and comminuted food waste discharged (based on POB and water consumption) in Garbage Record Book.	FPSO, Drill Ship, Installation/Decommissioning Vessels and Support Vessels
Operational Discharges	Bilge Water	Marine Water Quality	Perform continuous oil in water content (automatic) monitoring to ensure compliance with 15 ppm MARPOL limit and record in Oil Record Book; observe surface of the sea in the discharge area to ensure no formation of oil sheen.	FPSO, Drill Ship, Installation/Decommissioning Vessels and Support Vessels
Operational Discharges	Ballast Water	Marine Water Quality	Record estimated volume of ballast water discharged and location (per ballasting operation).	FPSO, Drill Ship, Installation/Decommissioning Vessels and Support Vessels
Hydrocarbon Spill	Drilling or offloading	Marine Water Quality	Refer to OSRP Section 6.1 Surveillance and Monitoring.	FPSO, Drill Ship, Installation/Decommissioning Vessels and Support Vessels, Shorebase
WASTE MANAGEMENT				
REFER TO WASTE MANAGEMENT PLAN				
MARINE ECOSYSTEMS				
All Project Phases				

SOURCE OF POTENTIAL IMPACT	ASPECT	RECEPTOR	ACTIVITY	INVOLVED FACILITY
Injury/Mortality of Marine Mammals and Marine Turtles	Vessel Traffic	Marine Mammals and Marine Turtles	Monitor on an ongoing basis visual detections of Marine Mammals and Marine Turtles made from Project vessels.	FPSO, Drill Ship, Installation/Decommissioning Vessels and Support Vessels
SOCIOECONOMIC RESOURCES				
All Project Phases				
Project Employment	Economy	Guyanese Population	Monitor percentage of Project workforce made up of Guyanese nationals.	N/A
Project Procurement	Economy	Guyanese Population	Monitor percentage of Project goods and services expenditures procured locally on a calendar year basis.	N/A
Various	Community	Guyanese Population	Track number and types of complaints received via the Project Community Grievance Mechanism (CGM).	N/A
Various	Community	Guyanese Population	Monitor average time for processing and resolution of grievances.	N/A
Various	Community	Guyanese Population	Track percentage of grievances resolved.	N/A
Hearing Impairment	Occupational Safety	Project Workforce	Monitor Project workers' occupational exposure to sound.	All Project Facilities
TRANSPORTATION AND ROAD SAFETY				
All Project Phases				
Vehicular Traffic	Road Safety	Community	Monitor vehicular speed through speed governors, GPS, or other monitoring systems for Project dedicated vehicles.	All Onshore Travel Routes
Vehicular Traffic	Road Safety	Community	Monitor driver fatigue (e.g., supervision, administrative	All Onshore Travel Routes

SOURCE OF POTENTIAL IMPACT	ASPECT	RECEPTOR	ACTIVITY	INVOLVED FACILITY
			constraints for work and rest periods, etc.) for Project dedicated drivers.	
Vessel Traffic	Marine Safety	Community	Record instances of marine vessels entering marine safety exclusion zones.	FPSO, Drill Ship, Major Installation/Decommissioning Vessels

3.6 Documentation, Reporting, and Record Keeping

The requirement for monitoring stems from the need to verify Project Activities are being conducted in accordance with commitments made and to provide performance information to regulators and other relevant stakeholders. As such, the results of monitoring will be reported internally and externally.

Reporting requirements include those stipulated in the following:

1. Applicable regulations required by Guyana and related to the Petroleum Production Licence; and
2. Project commitments, regulatory filings, and Project agreements.

Reporting is summarized in Table 2-3

Table 3-9. Summary of Reporting

Reporting Requirement	Description
Project SSH&E Status Report	EEPGL will provide a high level Project SSH&E Status Report on a semi-annual basis that includes a summary of the Project activities completed during the period, key SSH&E-related performance metrics, and highlights of SSH&E accomplishments, improvement initiatives, and lessons learned. The content and structure of the Project SSH&E Status Report will be developed in collaboration with the EPA.
Statutory SSH&E metrics	EEPGL will periodically provide reports summarizing statutory SSH&E metrics, in line with applicable regulations and in collaboration with EPA. These reports may include, but are not limited to:

	• Air emissions (including GHGs); • Waste types/volumes, disposal methods/locations; • Discharges types/volumes (e.g., wastewater, drill cuttings/fluids, etc.); • Fuel consumption; and • Spills (e.g., hydrocarbons, chemicals).
Emergency/incident notification and reporting	All environmental incidents and excursions will be appropriately documented and reported to the relevant authorities, in line with regulations.

Appendix 1 – Waste Management Plan

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Liza Phase 1 Floating Production Storage and Offloading (FPSO) Development Project

Esso Exploration and Production Guyana Limited (EEPGL)

Preliminary Waste Management Plan (WMP) for Stabroek Block Offshore Guyana

May 2017

Review and Approval

Reviewed by:

Lead E&R Advisor	Prepared by K. Ehmling	1/20/17
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VO SSH&E /OIMS Manager	Email on file (M. Persaud)	
VO Operations Manager	Email on file (D. McGhee)	

Approved by:

EEPGL Country Manager _____ 1 JUN 2017
Date

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1 INTRODUCTION

The objective of this document is to govern waste management associated with Esso Exploration & Production Guyana, Limited's (EEPGL) Liza Phase 1 Floating Production Storage and Offloading (FPSO) Development Project, which includes: drilling, installation, commissioning, production, and decommissioning activities within the Stabroek Block located in offshore Guyana waters in a manner that meets all regulatory requirements and minimizes impacts on the surrounding environment. This plan has been prepared in conjunction with EEPGL's Environmental Management Plan (EMP; section 3.1 of the Liza Phase 1 Environmental and Socioeconomic Management Plan) for the project and will be executed through the proper handling, storage, and disposal of hazardous and non-hazardous wastes. It is an evergreen document and will be updated as needed.

This document:

- Defines and categorizes the different types of waste that may be generated by offshore development and production activities;
- Specifies and documents the management and disposal practices that apply to each category of waste; and
- Specifies and documents the monitoring and reporting guidelines that apply to each category of waste.

This Waste Management Plan is applicable to the management of those wastes generated by the Liza Phase 1 FPSO Development Project during all phases including: drilling, installation, commissioning, production operations and decommissioning. The scope of this document covers waste management procedures and practices from the points of generation both offshore and onshore, through storage, treatment, transportation recycling, reuse and disposal. Planned discharges (e.g. produced water, cooling water) are managed under the Liza Phase 1 EMP and under individual vessel Garbage Management Plans and are therefore outside the scope of this document. Wastes that cannot be managed at the point of generation offshore will be transported to the shorebase and then to the onshore waste management facilities operated by a qualified permitted third party waste management service provider for further segregation, consolidation, treatment, transportation and/or disposal or directly (for non-hazardous wastes) to the final approved recycling, reuse or disposal facilities.

2 PROJECT DESCRIPTION

The Project proposes to develop the offshore resource by drilling approximately 17 subsea development wells and using a FPSO vessel to process, store, and offload recovered oil. The FPSO will be connected to the wells via associated equipment, collectively referred to as subsea umbilicals, risers, and flowlines (SURF), to transmit produced fluids (i.e., oil, gas, produced water) from production wells to the FPSO, as well as treated gas and water from the FPSO to the injection wells.

The Project consists of five primary stages: drilling, installation, hook-up and commissioning, production operations and decommissioning. The Project will generate a variety of recoverable materials as well as solid, semi-solid, and liquid wastes that are both hazardous and non-hazardous, which will vary over time by Project stage. Estimated recoverable materials and waste types and volumes to be generated during each stage of the project has been provided in Attachment 1.

As per the current project schedule, waste could be generated as early as 2018. Waste volumes generated will increase early in the project as concurrent drilling and SURF installation activities occur from 2018 - 2020, which are then followed by the hookup and commissioning of the FPSO. Waste volumes will then begin to decrease as drilling activities conclude in 2020-2021 and significantly decrease thereafter during the stage of production operations alone in 2022 to approximately 2040. When production operations cease, some waste will be generated during the decommissioning stage.[1]

3 SCOPE AND OBJECTIVES

The scope of the WMP includes the following:

- Identifying the sources and processes that generate recoverable materials and wastes;
- Identifying opportunities to avoid waste generation and minimize both the quantities and associated hazards of waste generated;
- Identifying those recoverable materials eligible for recycling, reclaiming, and reuse;
- Identifying the hazards associated with each waste type;
- Estimating the annual quantities for each recoverable material and expected waste type over the various project stages;
- Selecting approved containers and ensuring proper segregation of materials and wastes;
- Identifying preferred management, storage, treatment, and disposal methods for all wastes;
- Identifying and assessing acceptable waste management facilities;
- Identifying and assessing acceptable waste management service provider for transporting recoverable materials received at the shorebases from the FPSO, Drill Ship, Installation, and Supply and Support Vessels that cannot be managed offshore to the final recyclers, reclaimers, handling, storage, treatment and disposal facilities approved by EEPGL by the contracted waste management service providers;
- Providing the process knowledge and Safety Data Sheets (SDS) to ensure safe handling of all materials and wastes to reduce the risk of worker exposure or a release to the environment, including personal protective equipment (PPE).

[1] *Any dates specified in this document are based on the current project schedule which is subject to change. They are provided to help conceptualize anticipated duration of each Project stage.*

- Ensuring the proper reporting and recordkeeping is performed through the utilization of multiple log books and records to document the generation, storage, transportation, and final disposition of all recoverable materials and wastes including an annual waste summary report and incorporation of waste summary information in the end of activity reports (i.e. End of Well, End of Survey, or End of Stage Reports).

The objectives of this plan are as follows:

- Verify EEPGL manages the recoverable materials and wastes generated by the Project in accordance with internationally accepted standards and applicable local (i.e., Guyana) regulations;
- Verify contractors, including Drill Ship, FPSO and installation, supply and support vessel contractors manage their recoverable materials and waste in accordance with their individual vessel waste/garbage management plans, internationally accepted standards and applicable Guyanese Laws and waste regulations.
- Provide practical methods for handling, storing, transporting, recycling, and disposing of wastes generated during all stages of the Project.

4 EEPGL ROLES AND RESPONSIBILITIES

EEPGL is the Owner of this plan and is responsible for its implementation, maintenance, and periodic update as necessary.

EEPGL's obligations include:

- Verify Project drilling, installation, hook-up & commissioning, production operations, and decommissioning conform to the requirements of this plan;
- Ensure all recoverable materials and wastes are properly characterized and profiled based on process knowledge and the sampling and analysis of hazardous wastes as required per the WMP;
- Perform routine inspections and periodic self-assessments to verify compliance;
- Identify qualified third party waste service providers capability of the storage, transportation, treatment, recycling, reuse, and disposal of those wastes generated by the Project;
- Perform periodic audits/assessments of third party waste service providers utilized by EEPGL to verify they are properly permitted and have similar processes and procedures in place in their own individual WMPs or Vessel Garbage Management Plans;
- Verify that vessel owners and operators properly track and manage waste from the point of generation offshore through storage, treatment, reuse and, if needed, transportation to shore for further handling.
- Confirm chain of custody and manifest records are kept documenting the subsequent transfer of recoverable materials and wastes at the shorebase to the third party waste service providers who will perform the final transport, storage, segregation, consolidation, recycle, reuse, treatment, and disposal of materials and wastes in accordance with their WMPs; and

- Ensure that all recoverable materials and waste records are kept and required annual reports prepared, reviewed, and submitted to the Guyana Environmental Protection Agency (EPA) as required and copies are retained by EEPGL for our records.

4.1 EEPGL Specific Responsibilities:

- Will ensure that there are sufficient resources (e.g. people, time, expertise and finances) to manage and monitor the Project waste issues;
- Will ensure that the WMP is implemented, maintained, and periodically reviewed and updated as needed;
- Will identify the permits required and ensure timely application to the appropriate authority;
- Will ensure all permits/licenses are in place prior to carrying out the work;
- Will ensure that all relevant third parties are kept informed as the Project progresses;
- Will ensure that the Venture Office Manager is fully informed on any waste management issue;
- Will, in conjunction with the EMDC Environmental Advisor in Houston, write procedures for area specific issues;
- Will ensure that the Drill Ship, FPSO Vessel, installation, supply and support vessels, onshore logistics, and waste service provider are aligned and are implementing or over seeing their WMP specific waste duties;
- Will review the WMP procedures developed by the contractor and subcontractors;
- Will undertake and carry out internal audits on waste management in line with the program of audits agreed upon by EEGPL and ensure remedial actions are closed out;
- Will ensure that contractors maintain all necessary permits associated with the waste management activities;
- Will ensure all waste management contractors maintain proper documentation in accordance with the Guyana requirements for generation, transportation, and disposal of waste;
- Will ensure all waste management contractors maintain proper documentation in accordance with the Guyana requirements for generation, transportation and disposal of waste;
- Will provide waste related input to the WMP procedures;
- Will control hierarchical waste management approach integral to the EEPGL waste management strategy; and
- Will ensure that the waste records are maintained at the Venture Office for review.

4.2 Marine Vessel Owner/Operator Specific Responsibilities (Supply, Support, Installation, Drill Ships and FPSO):

- Will ensure that the correct equipment and containers are on site when required;
- Will ensure that all equipment and recoverable material/waste storage areas are well maintained and inspected;

- Will be responsible for the completion and maintenance of the waste manifests as they are progressed through the chain of custody process;
- Will carry out surveys as necessary to ensure any waste issues are identified and managed accordingly. This includes ensuring all wastes are correctly segregated;
- Will carry out or supervise all waste monitoring ensuring that all waste records are fully completed and correctly stored and filed. This includes ensuring waste is manifested separate from cargo with all details as to type of waste, volume of waste, quality of waste, and final destination.
- Will ensure that all required labels and placards are in use and are correct. This will need to be coordinated with the waste contractor;
- Will have designated personnel to coordinate with shorebase operators
- Will maintain an up-to-date recoverable material/waste inventory;
- Will maintain and inspect recoverable material/waste storage areas;
- Will ensure that all remedial actions identified by monitoring and inspections offshore and at the shorebase are closed out;
- Will keep copies of all necessary permits associated with waste management activities; and
- Notify EEPGL Logistics Representative of recoverable materials/wastes to be transported to shore.

4.3 Waste Service Provider Specific Responsibilities

- Will spot-check and inspect loads (i.e. bags, containers, skips, totes, and tanks) to verify they conform to the paperwork, bill of ladings, and trip tickets prepared by the generator of the recoverable materials and wastes for transport to the shorebase;
- Will ensure loads are properly labeled from the generator and identify the hazards of such materials and wastes;
- Will oversee the safe offloading and transfer of recoverable materials and waste to trucks for final transport, storage, recycling, recovery, treatment, or disposal;
- Will ensure that any transfers times are recorded and met;
- Will manage the completion of all manifests and other documents to record the final disposition of all materials and wastes with copies to EEPGL and regulatory authorities and maintain the original records as required;
- Will perform periodic self-assessments
- Will provide guidance and training/local capacity building on waste management issues as requested by EEPGL;
- Will ensure that all waste transport trucks are thoroughly inspected and placarded before they leave the shorebase for the disposal facilities;
- Will supervise all waste transfer operations to ensure they are correctly implemented;
- Will provide a point of contact to the EEPGL Logistics Supervisor; and
- Will ensure proper inspection, maintenance, and use of its equipment.

Table 1 summarizes these roles and responsibilities.

Table 1: Summary Roles and Responsibilities Chart

Task	Shorebase Operators & Waste Contractor	Drill Ships, FPSO, Installation Vessels, Supply and Support Vessels	EEPGL
Implement WMP	R	R	A
Designate waste storage areas	R/A	R/A	C
Minimize waste	R/A	R/A	C
Properly utilize all required waste transfer and disposal forms	R	R	A
Keep up to date with waste laws and requirements	R/A	I	R/A
Maintain waste inventory	R	I	A
Document date waste is removed from site	R	A	I
Coordinate contractor procedures	I	R	R/A
Provide periodic waste training	R	R	A
Responsible (R), Accountable (A), Consulted (C), Informed (I)			

5 REGULATORY REQUIREMENTS AND GUIDELINES

This document supports the EIA prepared and submitted for the Liza Phase 1 FPSO Development Project and is Appendix 1 of the Environmental and Socioeconomic Management Plan (ESMP) for the Project. The WMP has been developed to comply with the requirements of the Laws of Guyana, applicable international conventions and supportive of local guidelines including:

- Environmental Protection Act of 1996;
- Regulations made under the Environmental Protection Act 1996 (No. 11 of 1996) of 2000;
- Environmental Guidelines for the Transportation, Storage and Occupational Handling of Chemical/Industrial Hazardous Waste of 2011 (as appropriate);
- Environmental Guidelines for Removal, Treatment & Disposal of Oily Sludge of 2011 (as applicable) (as appropriate);
- Environmental Guidelines for the Storage, Transportation & Occupational Handling of Biomedical Waste of 2011 (as appropriate and as applicable to medical waste that may be generated);
- MARPOL 73/78 - International Convention for the Prevention of Pollution from Ships, Revised Annex V, Ship Garbage Management Plans and Record Books;
- Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (if applicable, no such shipments are currently planned); and

- Further details on these laws and conventions are contained in the following sections.

5.1 Local Regulatory Requirements and Waste Definitions

This plan deals with recoverable materials and wastes that will be generated from the drilling, installation, hook-up & commissioning, production and decommissioning of the Liza Phase 1 FPSO Project activities located in the Stabroek Block, offshore Guyana. Limited recoverable materials and wastes will also be generated by support operations conducted at the shorebase, offices, and warehouses utilized to support offshore operations.

The definition of a hazardous waste per the Guyana Hazardous Waste Regulation, 2000 Part I, 2(e) is "A hazardous waste means a waste or combination of wastes which, because of its quantity, concentration or physical, chemical or infectious characteristics, may pose a substantial hazard to human health and belong to any category contained in Schedule I unless they do not contain any of characteristics contained in Schedule II and include:

(i) Hazardous industrial waste;
(ii) Acute hazardous waste chemical;
(iii) Hazardous waste chemical;
(iv) Severely toxic waste;
(v) Flammable waste;
(vi) Corrosive waste;
(vii) Reactive waste;
(viii) Radioactive waste;
(ix) Clinical waste; or
(x) Leachate toxic waste or polychlorinated biphenyl waste,

as well as a mixture of acute hazardous waste chemical, hazardous waste chemical, pathological waste, radioactive waste, or severely toxic waste and any other waste or hazardous material." Further descriptions of such wastes including hazardous waste chemicals … etc. can be found in Schedule I.

- A "liquid industrial waste" means a waste that is both liquid and industrial waste but does not include:
  (i) Hauled sewage;
  (ii) Waste from the operation of sewage works;
  (iii) Waste from the operation of water works;
  (iv) Waste that is produced in any month in an amount less than twenty-five litres or otherwise accumulated in an amount less than twenty-five litres;
  (v) Waste directly discharged by a generator from a waste generation facility into a sewage works or sewage system;
  (vi) Waste that results directly from food processing and preparation operations, including food packaging, food preserving and restaurants;

(vii) Drilling fluids and produced waters associated with the exploration or production of crude oil or natural gas;

(viii) Processed organic waste; or

(ix) Asbestos waste.

- A “clinical waste” means:

  (i) Any part of the human body including tissues and bodily fluids, but excluding fluids, extracted teeth, hair, nail clippings, and the like that are not infectious;

  (ii) Any part of the carcass of an animal infected with a communicable disease;

  (iii) Non-anatomical waste infected with communicable disease; or

  (iv) Any waste that is generated in the diagnostic, treatment, or immunization of human beings or animals and related activities that include research or autopsies;

- A “flammable waste” means a waste that is either solid, liquid, an oxidizing substance, or an ignitable compressed gas, which, under certain conditions may be readily combustible or may cause or contribute to fire through friction, absorption of moisture or spontaneous chemical changes and when ignited, burns so vigorously and persistently that it creates a danger; and
- An “incinerator waste” means the residue from incineration, other than incinerator ash and fly-ash.

Additional regulations and guidelines govern specific wastes including chemical, industrial, and biomedical wastes. EEPGL and its contractors may generate as a result of offshore clinic operations and associated medical treatment small quantities of sharps or other biological material or biomedical waste also referred to “Red Bag Waste” due to the color of the containers used and special labeling to denote such a potential biohazard. Such wastes could be incinerated offshore or brought to shore for proper treatment and disposal per the Guyana biomedical waste guidelines.

As noted above sewage and other planned discharges are excluded from these chemical/industrial hazardous waste guidelines. All planned discharges from EEPGL offshore operations have been described in and will be managed under the EMP and Monitoring Plan found under sections 3.1 and 3.5, respectively, of the ESMP for the Liza Phase 1 FPSO Development Project and under individual vessel Garbage Management Plans.

5.2 National Environmental Legislation

In 1996 the Environmental Protection Act (hereinafter referred to as the Act) was enacted to implement the environmental provisions of the Guyana Constitution. The Act authorized the formation of the Environmental Protection Agency (EPA), as the lead agency on environmental matters in Guyana (FAO, 2013).

The environmental compliance element of the Project will be regulated under several statutes. These statutes contain measures that must be implemented to ensure compliance with applicable policies, guidelines, and legislation in Guyana. They include the Maritime zone act of 2010 No 18: 2010 and the EPA protection act of 1996.

5.3 Guyana Permits and Licenses

The Liza Phase 1 FPSO Development Project and EEPGL will be governed under the provisions of the Petroleum Sharing Contract (PSC), Joint Operating Agreement (JOA), and Liza Production License for the Stabroek Block that will be issued upon review and approval of the Liza Project Development Plan, and Environmental Authorisation that will be issued upon review and approval of the EIA and supporting plans, including this WMP, by the Guyana EPA. All of these documents may contain general and specific waste management commitments, obligations, and conditions. The WMP will be updated upon issuance of the Liza Production License and Environmental Authorisation to reflect any additional requirements contained in those documents.

5.4 International Conventions

5.4.1 MARPOL 73/78

EEPGL will operate under the provisions of MARPOL 73/78.

MARPOL 73/78 standards place restraints on the contamination of the sea, land, and air by ships. The Convention includes two protocols dealing respectively with reports on incidents involving harmful substances and arbitration, and six annexes which contain regulations for the prevention of various forms of pollution. Table 2 provides short descriptions of each annex.

Table 2: MARPOL Annexes[2]

MARPOL Annex	Description
Annex I: Regulations for the Prevention of Pollution by Oil	Prevention of pollution by oil from operational measures as well as from accidental releases.
Annex II: Control of Pollution by Noxious Substances	Details the criteria and measures for the control of pollution by noxious liquid substances carried in bulk.
Annex III: Prevention of Pollution by harmful Substances Carried by Sea in Packaged Form	Contains general requirements for the issuing of detailed standards on packing, marking, labelling, documentation, stowage, quantity limitation, exception, and notifications.
Annex IV: Prevention of Pollution by Sewage from Ships	Requirements to control pollution of the sea by sewage and grey water.
Annex V: Prevention of Pollution by Garbage from Ships	Deals with different types of garbage and specifies the distances from land and the manner in which they may be disposed of.
Annex VI: Prevention of Air Pollution from Ships	Sets limits on certain air pollutants and prohibits deliberate emissions of ozone depleting substances.

[2] *International Maritime Organization (IMO). (2015). International Convention for the Prevention of Pollution of Ships (MARPOL). Accessed 9 December 2015 at http://www.imo.org/en/About/Conventions/ListOfConventions/Pages/International-Convention-for-the-Prevention-of-Pollution-from-Ships-(MARPOL).aspx.*

All Solid combustible waste (except for food waste) as listed in Table 4 suitable for incineration will be managed on the Drill Ship and FPSO Vessel as the first preference; the remainder will be stored on board and sent back to shore for treatment or disposal in accordance with local regulations. Food waste will be comminuted or ground prior to discharge. Black water / sewage will be treated with chlorine per MARPOL standards and discharged. Management and monitoring measures implemented to ensure treatment standards for these discharges are met are described in the ESMP.

The primary provisions of MARPOL 73/78 relevant to waste management to the Project are those applicable to offshore vessels as follows:

- Waste Management Plan: A formal Waste Management Plan shall be developed and enforced by the Unit owner;
- Waste Record Book: All wastes generated should be recorded in the Waste Record Book;
- Plastic Waste and General Waste (except Food Waste): The disposal to the sea of all plastics, including but not limited to synthetic ropes, synthetic fishing nets, and plastic garbage bags, and all other general waste, including paper products, rags, glass, metal, bottles, crockery, dunnage, lining and packing materials, is prohibited;
- Food Waste: The disposal to the sea of food wastes that have been passed through a comminuter or grinder shall be made not less than 12 nautical miles from the nearest land. Such comminuted or ground food waste shall be capable of passing through a screen with openings no greater than 25 mm; and
- When waste to be disposed of is a mix of waste types having different disposal requirements, the more stringent requirements shall apply.

5.4.2 Basel Convention

The objective of the Basel Convention is to control the transboundary movements of hazardous waste and their disposal and by such protect human health and the environment against the adverse effects of hazardous waste if not managed correctly. Its scope covers a wide range of wastes defined as “hazardous wastes” based on their origin and/or composition and their characteristics, as well as two types of wastes defined as “other wastes” – household waste and incinerator ash.

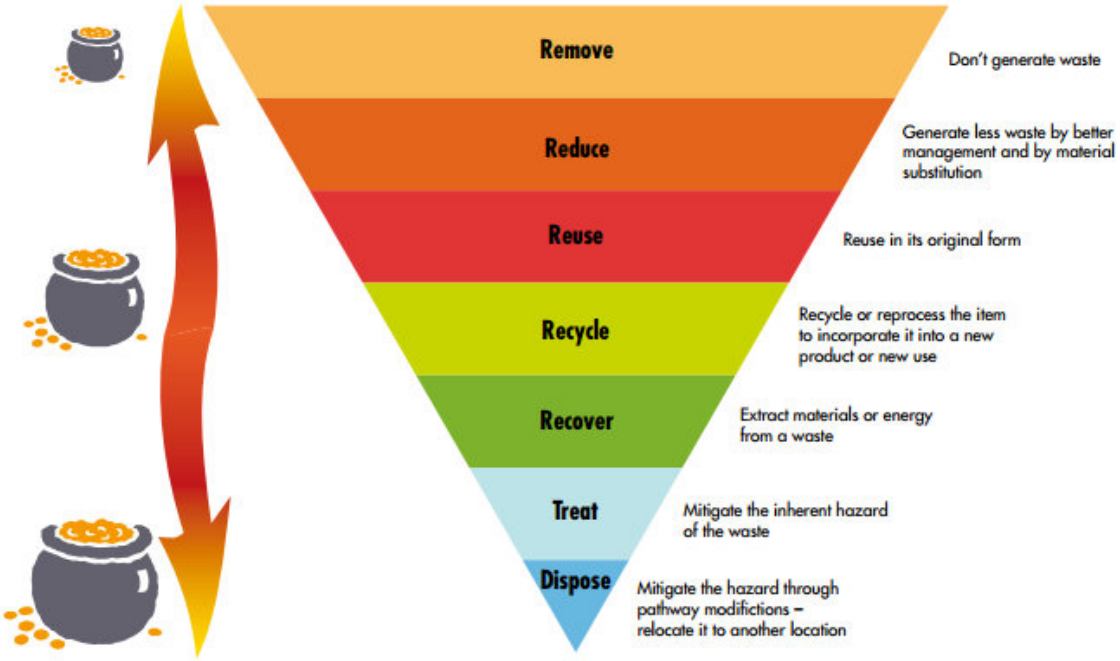
The primary provisions of the Convention center around the following principles:

- The reduction of hazardous waste generation and the promotion of environmentally sound management of hazardous wastes, wherever the place of disposal;
- The restriction of transboundary movements of hazardous wastes except where it is perceived to be in accordance with the principles of environmentally sound management; and
- A regulatory system applying to cases where transboundary movements are permissible.

Guyana became a signatory to the Basel Convention on March 7, 2001.

6 WASTE MANAGEMENT STRATEGY

1. Generation of waste should be Avoided, Prevented, or Reduced at the source whenever feasible;
2. Wastes that are not Prevented should be Reused or Recycled in an environmentally safe manner, whenever feasible;
3. Waste that are not Prevented or Recycled should be Treated in an environmentally safe manner, whenever feasible; and
4. Finally, Disposal should be employed as a last option and when employed, should be conducted in an environmental responsible manner.



Source: OGP. (2009). Guidelines for waste management with special focus on areas with limited infrastructure. Accessed 21 November 2015 at http://www.ogp.org.uk/pubs/413.pdf.

Figure 1: Waste Management Hierarchy

EEPGL will encourage its contractors and suppliers (e.g., of equipment, materials, goods and services) to minimize packaging on products wherever possible, or to package products in recyclable materials, to limit waste generation at each stage of the Project. Whenever practicable, surplus and unused materials will be returned to a vendor or recycled as the means of management i.e. reused for the same or a new purpose, converted into a new product, enable the reduction in the consumption of a new product or raw material.

Where possible, measures will be implemented to minimize contractor waste generation. These include:

- Avoiding single use items where reusable items could be used (e.g., use washable plates rather than paper plates);
- Purchasing supplies with minimal or recyclable packaging;
- Using reusable and/or biodegradable materials;
- Order only what is needed;
- Store products properly to prevent spillage or contamination;
- Keep all product containers in good condition, clearly labeled; and
- Maintain good housekeeping and maintenance of facilities.

6.1 Waste Categories

A description of the recoverable materials, common waste types, and categories expected to be generated by the Liza Phase 1 FPSO Development project have been summarized in Table 3.

Table 3: Recoverable Materials, Waste Types and Categories

#	Waste Category	Waste Types
1	Non-hazardous wastes	General & domestic trash, incinerator ash & residue (must be tested), production solids (e.g. scale, sand), dry filters, abrasive blast media, filter media, desiccant/drying agents
2	Recyclable materials	Wood, paper, cardboard, glass, aluminum cans, plastic, scrap metal including metal packaging, clean empty steel drums, empty/punctured aerosol cans
3	Hazardous waste liquids	Used lube/motor oil, contaminated hydrocarbons (crude, diesel, etc.), oily water, contaminated water-based drilling fluid, non-aqueous drilling fluid, drilling slops, well treatment & completion fluids, waste brines, treatment chemicals, liquid paint waste, drum/container rinse, acid & caustic solutions, hydraulic fluid
4	Hazardous waste solids	Production solids & sludges, oily trash/debris, oily/wet filters, drums/containers with chemical residues, dried paint waste, consumables (e.g. non-empty aerosol cans, oil filters, grease tubes, dope brushes)
5	Special hazardous wastes	Medical/biological waste, batteries (including alkaline, lead-acid, nickel-cadmium), fluorescent light bulbs & ballasts, mercury and mercury-containing equipment, radioactive waste including Naturally Occurring Radioactive Material (NORM), electronic waste

6.2 Waste Management Practices

The key waste management practices covered by this WMP include:

- Proper waste classification and identification;
- Proper handling, segregation and storage;
- Proper recycling, reclaiming or recovery; and
- Proper treatment and disposal.

Each of the categories and individual types of wastes listed above has been summarized with the preferred waste management practices to be used in Table 4.

Table 4: Waste Management Practices

Waste Management Practices	Recoverable Materials and Waste Streams
Recycle	Plastic, glass, scrap metal including empty steel drums and empty/punctured aerosol cans
Landfill	General trash, used PPE, dessicant and other drying agents, filter media, abrasive blast media, uncontaminated cement, incinerator ash and other hazardous waste treatment residues that have been tested to ensure safe for land disposal
Recycle into FPSO Process	When possible, the following will be recycled into the FPSO production/separation process: used lube/motor oil, used glycol, oily water, de minimis quantities of off-spec product/materials, by-products, oil slops
Offshore Incineration (non-hazardous wastes)	Wood, paper, cardboard, general trash
Offshore incineration (hazardous wastes)	Used lube/motor oil (when not possible to recycle into FPSO process), contaminated hydrocarbons (crude, diesel, etc.), oil filters and oily debris (rags, gloves, wood, vegetation, sorbent pads, paper, etc.), paint waste, medical waste
Onshore Treatment	Drilling slops (mixture of used drilling muds, water, cement spacer, additives), oil-contaminated cement and completion brines, used drilling muds not discharged w/ cuttings, production sludges and solids, tank bottom sludge, pigging waste, used and unused chemicals/solvents, hazardous drum rinse, oily water, contaminated drums, containers, packaging, non-empty aerosol cans, batteries (lead acid, nickel-cadmium, lithium, mercury cell), electrical/electronic waste, mercury-containing equipment, e.g. thermometers and other instruments (should be very little), radioactive/NORM waste (only in case that it is produced)

6.3 Waste Classification

Proper waste management begins with an accurate classification of each waste, which is critical for safe storage, transportation, and treatment/disposal planning. This will be based on generator processes and process knowledge, review of manufacturer's safety data sheets, product specifications, and select laboratory testing and analysis as required to ensure the hazards are known for each waste including whether they are flammable, corrosive (acid or base), reactive (oxidizer, pyrophoric, reducer), and/or toxic.

Whenever supporting analytical results are necessary to initially profile and characterize a waste stream, the following analytical tests will commonly be baseline of what will be performed:.

- Flashpoint;
- pH;
- Toxicity (TCLP metals, and in some cases volatiles, e.g. BTEX); and
- Reactivity (reactive sulfides, reactive cyanides).

The disposal contractor will be consulted to ensure appropriate analytical methods and tests are performed. EEPGL will audit and approve labs used to analyze EEPGL waste and other materials.

Waste sampling will be performed by properly trained personnel using the appropriate PPE. Samples will be packaged in appropriate containers and properly labeled. A chain of custody form (sample provided in Attachment 5) must accompany all lab samples during transport.

6.4 Handling of Wastes

Personnel involved in the handling of hazardous, scheduled wastes must recognize and understand the associated potential hazards and shall be trained to a level commensurate with their job duties.

Standard personal protective equipment (PPE) for hazardous/scheduled waste-handling activities include the following:

- Gloves: leather or chemically resistant (depending on the type of waste);
- Safety glasses, goggles or face shield;
- Hard hat;
- Steel-toed shoes or boots; and
- Coveralls or other suitable work clothes.

Additional PPE may be required for specific hazardous/scheduled wastes (e.g., latex boot covers and air-purifying respirator). Further information is also contained in the Safety Data Sheet (SDS) documents.

6.6 Handling of Hazardous Materials

All hazardous materials shall be stored in designated areas on the Drill Ship and FPSO Vessel where the potential for damage to containers is minimized (i.e. paint stored in paint locker, acids stored in enclosed areas, etc.). Additionally, hazardous materials must be stored in areas with adequate containment.

Any hazardous materials to be shipped offshore will not be accepted by the Drill Ship, FPSO Vessel, or installation, supply and support vessels unless the following requirements are met:

- Appropriate Safety Data Sheets (SDS) must accompany the material;
- Materials have been accounted for under the Guyana Revenue Authority Investment Development Agreement (IDA);
- Applicable requirements for materials import, customs clearance and use; and
- Materials have been approved under the Guyana Pesticides and Toxic Chemicals Control Act of 2000 (if applicable).

Hazardous materials shall be transported in proper containers affixed with a hazardous waste label and placard(s) indicating the applicable hazard class(es). Placards containing internationally recognized symbols exist for the following hazard classes (see Attachment 8):

1. Explosives
2. Flammable liquids
3. Flammable solids or waste solids other than explosives which may be readily combustible
4. Oxidizing substances
5. Organic peroxides
6. Poisonous substances
7. Infectious substances
8. Corrosives
9. Toxic gases
10. Toxic substances which if inhaled or ingested may cause delayed or chronic effects
11. Ecotoxic substances which if released may present immediate or delayed adverse impacts to the environment by means of bioaccumulation and/or toxic effects upon systems; and
12. Materials capable, after disposal, of yielding another material which possesses any of the characteristics specified in items 1 – 11.

All containers with hazardous materials transferred to and from the Drill Ship, FPSO Vessel, and installation, supply and support vessels must be clearly identified on the cargo manifest, properly placarded per the hazard classes listed above, and accompanied by a SDS if applicable.

6.7 Waste Segregation and Storage

Waste generated on the Drill Ship, FPSO Vessel, and installation, supply and support vessels will be collected in appropriately labeled bin collectors, tanks, bottles, drums, or other designated receptacle. Proper containers will be used for each recoverable material and waste. Secondary containment will be provided for all liquid and hazardous wastes.

Non-hazardous wastes, including recyclables, shall be physically separated from Hazardous Wastes (HW) and segregated by type in order to:

- Maximize the possibilities for waste recycling or reuse;
- Minimize the possibility of contamination of non-hazardous wastes by HW;
- Ensure that waste storage is contained; and
- Ensure the proper management of each specific waste;

Additionally, the following segregation & storages practices will be utilized:

- Wastes shall be stored in containers that are in good condition and compatible with characteristics of the materials in question
- Sealable containers shall be provided for hazardous/scheduled wastes;
- Incompatible wastes are segregated to minimize potential chemical reactions;
- Containers bearing wastes should be labeled in accordance with regulatory requirements; and
- Different types of HW shall be stored separately from each other and from non-hazardous waste.

Containers bearing wastes should be labeled with the following information:

- Classification, i.e. hazardous or non-hazardous;
- Name/description of the waste
- Applicable hazardous waste characteristics (see list in Section 6.5);
- Physical state of the waste (i.e. solid or liquid).

In addition to the requirements stated above, HW containers must be labeled with the following information:

- Name and address of EEPGL;
- Placard(s) corresponding to the applicable hazard class(s) (during transport only); and
- Packaging or start of accumulation date.

Hazardous waste should be labelled in the specified format as follows:

- The size of the label should not be less than 20 centimeters (cm) x 30 cm [7.9 inches (in) x 11.8 in];
- Labels should have a yellow background with black lettering conspicuously marked in paint or another permanent form of marking;
- The material of the label should be scratch proof, resist to tampering and able to withstand open weather exposure;
- The basic label form is provided below in Table 5;
- Generally, the label should be attached to the side of the vessel, container, and tank. In case of repeated use of the vessel, container, and tank, the label should be a plate and hung on the side of it. For containment buildings, all hazardous wastes types contained in the building should be included in the plate;
- The label should identify the hazardous characteristic(s) of the waste (e.g. flammable, corrosive, toxic, etc.)

Labelling procedures should be completed at the location where the waste was generated and should be retained at the destination treatment, storage, and disposal facilities.

Table 5: Basic Label Form

Hazardous Waste		
Waste Information	Waste type / description	Name and/or description of the waste/material
	Waste Classification	Hazardous or non-hazardous
	Hazard Class	Name of the hazard class (see placards in Attachment 8; e.g. Toxic, Corrosive, Flammable, Explosive, Reactive, Infectious)
	Physical Form	Liquid, Solid, or Sludge
	Quantity	Quantity of the hazardous waste contained in the vessel, container or tank
	Packaging date	Date the hazardous waste is packed in the vessel, container or tank
	Shipping date	Date the hazardous waste must be removed from the storage area and transported off site if applicable
	Waste transport record number	Manifest number if transported off site
Container Information	Capacity	Maximum capacity or volume of the container
	Material	Material that a vessel, container or tank is made of
Generator Information	Name	Name of the waste generator (company name)
	Address	Address of the waste generator
	Telephone #	Telephone number of the waste generator

6.8 Waste Tracking Process

A Marine Transport Manifest (see Attachment 6) will be used for all vessel shipments of hazardous and non-hazardous wastes and must contain the types and quantities of hazardous and non-hazardous wastes being transported.

Additionally, a waste manifest (sample included in Attachment 7) shall be completed and must accompany all shipments of hazardous and non-hazardous wastes. This includes over-water shipments as well as land shipments. The purpose of this manifest is to track each shipment of waste from the point of generation to the point of final treatment, recycling or disposal. EEPGL is responsible for completing waste manifests prior to shipment.

In compliance with MARPOL 73/78, marine vessels including the supply, support, installation vessels as well as the Drill Ship, and FPSO Vessel will maintain a Garbage Record Book and record of used oil generated (See Attachments 3 and 4). The Garbage Record Book can be modified to allow tracking of Project-related wastes outside the scope of the categories specified in the MARPOL regulations; therefore, it will be referred to as a Waste/Garbage Record Book in the remainder of this document.

Vessels must retain copies of all Marine Transport Manifests and waste manifests with the Waste/Garbage Record Book for a minimum of two years.

6.9 Waste Transfer to Shore

Marine vessels used to transport waste shall have necessary licenses and approval from the Guyana authorities. Crews on vessels that transport hazardous waste must have training in basic emergency response, and knowledge of labeling and placarding requirements.

Vessels transporting waste must carry both a completed Marine Transport Manifest (see Attachment 6) and a completed waste manifest (see example in Attachment 7). These documents must contain the name, description and quantity of all wastes being transported..

All waste containers must be labeled per the requirements described in Section 6.6. Hazardous waste containers must be affixed with the appropriate placard(s) corresponding to the hazard class(es) of the waste being transported. .

EEPGL will confirm vessel waste shipments meet the requirements above and that vessel crews have completed and documented compliance with the minimum training requirements.

7 WASTE MANAGEMENT METHODS

The following treatment and disposal methods may be employed to manage Project waste:

- **Offshore:**
  - Incineration;
  - Discharge (macerated food);
  - Other methods allowed by Environmental Permit.
- **Onshore:**
  - Incineration;
  - Other thermal treatment (e.g. thermal desorption);
  - Neutralization;
  - Stabilization (e.g. solidification);
  - Bioremediation;
  - Liquid waste treatment;
  - Burial disposal (landfill);
  - Beneficial reuse.

EEPGL's contracted waste service provider will be expected to furnish all required equipment and facilities for the storage, handling, transportation, treatment, and disposal of hazardous and non-hazardous waste brought onshore. In some cases (i.e. special hazardous wastes), waste may need to be shipped to other approved facilities owned and/or operated by a different service provider.

7.1 Incineration/Thermal Treatment

Thermal treatment, including incineration, is a preferred technology for the management of combustible solid wastes and liquid wastes. It can be performed utilizing a variety of incinerators (single and dual chamber), thermal desorption units, or other thermal treatment technologies. The Drill Ship and FPSO Vessel will be equipped with incinerators designed to handle the types and quantities of combustible wastes specified in Attachment 1 and capable of destroying hazardous constituents in those waste streams. EEPGL's contracted waste service provider may also utilize incineration or other forms of thermal treatment for hazardous and non-hazardous wastes that cannot be managed by the offshore incinerators. Incinerator ash and residue will be analyzed as described in Section 6.3 of this plan to ensure suitability for land disposal prior to shipment to the landfill. There can be an expected 75% - 85% reduction by volume of incinerated solid wastes, and a significantly higher percent reduction for incinerated liquid wastes.

7.2 Neutralization

Neutralization is an effective treatment method for certain waste acids and caustics in which chemicals are mixed to raise or lower the pH to a neutral level. Appropriate health and safety considerations must be taken and specific controls put in place when performing neutralization. It is important to verify that waste liquids can be safely neutralized prior to mixing of any chemicals, which can often result in an exothermic reaction. Commonly used chemicals for neutralization are a 98% sulfuric acid (to neutralize a base) and 50% sodium hydroxide or calcium hydroxide (lime) (to neutralize an acid).

7.3 Stabilization

Stabilization can be any process used to alter the physical or chemical properties of a waste to render it suitable for land disposal or further treatment. One form of stabilization is solidification, in which waste is physically or chemically bound or encapsulated it in a stabilizing material to form a hardened block that will prevent the potential constituents of concern (e.g. metals) from being released or leached into the environment. Common binding agents or stabilizing materials are cement, clay, fly ash or asphalt. Stabilization/solidification is sometimes used as a secondary treatment following incineration for wastes that may have residual leachable constituents after all volatiles and hydrocarbons have been removed through thermal treatment.

7.4 Bioremediation

Bioremediation can be an effective form of treatment for organic wastes, such as hydrocarbon or hydrocarbon-contaminated wastes (e.g. hydrocarbon-impacted soil). Bioremediation is often performed in open pits or other open spaces where natural or added organisms and surrounding oxygen are used to break down the organic material in the waste until hazardous constituents are reduced to a level suitable for land disposal. It is important to utilize a barrier to protect groundwater sources beneath the bioremediation area and design facilities to prevent runoff or contamination outside of the designated bioremediation area. EEPGL has strict criteria for which wastes are eligible for bioremediation (generally only exploration and production (E&P) wastes in which hydrocarbons are demonstrated through analytical testing to be the only hazardous constituent present. Once the hydrocarbon content of bioremediated waste is reduced to 5% or less, it can become eligible for beneficial reuse.

7.5 Liquid Waste Treatment

There are a variety of forms of industrial liquid waste treatment that can be used to remove hazardous constituents from liquid wastes, making them suitable for land disposal (i.e. discharge). A properly designed treatment plant is the preferred management method for large volume liquid wastes, such as slops, oily water, or washwater from vessel tank cleanouts.

7.6 Burial Disposal (Landfill)

Non-hazardous solid wastes that are not recycled, reclaimed or reused will be transported and disposed of at an approved and permitted landfill. Wastes must be demonstrated to meet standards for land disposal through generator knowledge or analytical testing prior to landfilling. In Guyana, the Haags Bosch Landfill has been permitted by the Guyana EPA and is managed by the Ministry of Communities. Should additional engineered landfills become available in Guyana, those will be assessed and reviewed for use.

7.7 Beneficial Reuse

It may be possible to use exploration and production (E&P) wastes for beneficial purposes. EEPGL has strict standards for when a waste is eligible for beneficial reuse. Untreated wastes that are demonstrated through analytical testing to meet certain criteria (i.e. hydrocarbon content less than 5%, all other constituents of concern below levels that could cause harm to the environment) can be eligible for beneficial reuse. Wastes that do not initially meet these criteria may be treated to meet the standard. Such reuse can offer important environmental benefits such as waste minimization (avoids unnecessarily using up landfill space), dust suppression, and improved road maintenance.

8 SPILL AND EMERGENCY RESPONSE

EEPGL, marine vessels, waste transporters, and the waste service provider will all have Emergency Response (ER) Plans to address possible emergency contingencies such as spills, fires, and explosions. These plans include specific and actionable steps for multiple risk scenarios. The action steps and the resources applied increase as the seriousness of the emergency or release increases. In the case of scenarios outside the local capability (Tier I), EEPGL will activate its Regional Response Team (RRT) (Tier II-III). The RRT is a large group of responders that have been trained for response actions around the world. The ER Plans also include all required internal and external incident communications processes and contact numbers.

8.1 Oil Spill Cleanup – Waste Management

All waste generated as a result spill cleanup activities will be managed in accordance with this plan, EEPGL's Oil Spill Response Plan (OSRP), as well as Guyana law and local regulations. The typical waste streams associated with a cleanup are, but not limited to, recovered product not able to be reintroduced into the system, oily water, absorbent materials, decontamination materials, contaminated trash and debris, general trash and debris, vegetation/foliage, etc. Should a significant spill occur, an incident specific waste management plan will be developed as part of the response.

Additional waste management provisions can be found in Section 6.9 of the EEPGL OSRP, which is found in Appendix 3 of the ESMP. Procedures for the disposition of deceased wildlife are included in the Wildlife Response Plan (Appendix E of the OSRP).

9 WASTE MONITORING AND REPORTING GUIDELINES

Monitoring and reporting of those recoverable materials and wastes generated and their final management are critical components to the successful implementation of this WMP for EEPGL and its contractors.

9.1 Waste Monitoring

The monitoring program will be facilitated by regular inspections conducted by EEPGL. A summary of monitoring guidelines is provided in Table 7.

Table 6: Waste Monitoring Guidelines

Monitoring Activity	Frequency	Originator	Documentation
Record type and quantity of each individual waste stream onboard	Any time new waste is generated	Dedicated personnel on all vessels	Waste/Garbage Record Book; Oil Record Book; Incinerator Log
Inspect waste storage area and containers; log inspections	Daily	Dedicated personnel on all vessels, at shore base, and Waste Management Service Provider's facility	Daily inspection log
Document marine waste transfer	Each instance waste is transported	Dedicated personnel on all vessels and at shorebase	Marine Transport Manifest and Waste Manifest
Sample and perform analytical testing	As needed to properly classify waste	EEPGL / Waste Management Service Provider	Chain of Custody; Laboratory analysis results
Complete Recoverable Material and Waste Summaries	Monthly; Annual	Waste Management Service Provider / EEPGL	Monthly Waste Inventory and Annual Waste Summary Report
Complete and submit reports required per the Environmental Permit	Dependent on final permit conditions	EEPGL	End of Survey, End of Well, End of Stage Reports, EPA Recording and Reporting Form, any other reports required by Environmental Permit
Waste facility audits & inspections	Periodic	EEPGL	Inspection logs & reports

9.2 Waste Recordkeeping and Reporting

Waste management performance will be measured against agreed upon reporting and recordkeeping requirements including:

- Types and volumes of wastes (hazardous and non-hazardous) generated;
- Maintenance of required vessel Waste/Garbage Record Book and Oil Record Books;
- Maintenance of required incinerator logs;
- Maintenance of Marine Transport Manifests and waste manifests to document custody transfer and the final means of disposition for each recyclable material and waste;
- Preparation of waste reports required per the Environmental Permit, such as the Guyana EPA Recording and Reporting Form shown in Attachment 2;
- Maintenance of monthly waste inventories;
- Preparation of annual waste management summary reports;
- Routine inspections and periodic assessments of Waste Management Service Provider's facilities; and
- Maintenance of hazardous substances / chemical inventory register and transboundary shipment forms, if required. These forms should be kept by EEPGL personnel at either the shore base or venture office.

Any issue of non-compliance will be tracked and documented in the monthly report.

10 WASTE TRAINING

General training will be conducted prior to the project with all EEPGL personnel, contractors, and any others that will be involved with recoverable material and waste generation and management during the life of the Liza Phase 1 FPSO Development Project. This training will cover:

- EEPGL Waste Management Practices;
- Environmental Permit requirements;
- Typical waste streams;
- Identification, classification, and labelling of hazardous and non-hazardous waste;
- Handling, segregation, storage, and treatment/disposal options;
- Personal Protective Equipment (PPE) requirements; and
- Waste management during normal operating conditions as well as emergencies.

In addition to the general waste management training, additional offshore and onshore-specific waste training will be provided to the appropriate personnel.

10.1 Offshore Waste Management Training

EEPGL personnel and contractors working offshore will attend a training focused on waste management in the offshore environment. This training will support compliance to both Guyana regulations as well as EEPGL responsible waste management practices. Topics to be covered in these trainings will include, but not be limited to:

- Opportunities to minimize waste generation;
- Waste generation offshore and potential impacts on marine life;
- Specific types of hazardous and non-hazardous waste that can be generated offshore and associated risks;
- Handling, storing, and transporting wastes, with particular focus on hazardous waste to ensure safety of personnel and environment; and
- Waste tracking, monitoring, and auditing standards and practices.

10.2 Onshore Waste Management Training

Onshore waste management training will be conducted for EEPGL personnel and contractors as appropriate. The waste management service provider will also provide training for all its waste personnel and verify training has been performed for waste transporters. This training will cover more specific topics, including:

- Application of Guyana laws and guidelines;
- Opportunities to minimize onshore waste generation;
- Waste generation onshore and potential risks to health, safety, and the environment;
- Specific types of hazardous and non-hazardous wastes that can be generated offshore and sent to shore for treatment/disposal, as well as potential waste generated from onshore activities;
- Handling, storing, and transporting wastes onshore, with particular focus on hazardous waste to ensure safety of personnel and the environment; and
- Waste tracking, monitoring, and auditing standards and practices.

Attachment 1: PROJECT WASTES, MANAGEMENT METHODS AND ESTIMATED ANNUAL QUANTITIES

Hazardous Wastes

Waste Information: Hazardous Wastes				Volume By Year / Metric Tonnes					
Waste Stream	Waste Source	Primary Disposal Method	Alternate Disposal Methods	2018	2019	2020	2021	2022–2039	2040
Used lube oil / motor oil	Equipment and vehicle maintenance and repair (of internal-combustion engines, pumps, and compressors)	When practicable, recycle into FPSO process	Offshore or Onshore Incineration, Onshore Recycling	76	175	236	94	9	4
Contaminated hydrocarbons (contaminated crude, diesel, etc.)	General maintenance activities and spill response	Offshore incineration	Onshore treatment	4	13	18	10	5	8
Oily Debris (rags, gloves, wood, vegetation, sorbent pads, paper, etc.)	Routine operations & maintenance, rags and oil spill clean-up activities	Offshore incineration	Onshore treatment	6	21	26	12	5	12
Oily Filters and Oil Filter Sludge	Vehicle and equipment engines during all project phases	Offshore incineration	Onshore treatment	6	21	30	17	10	15
Paint waste	Equipment and facilities activities and maintenance during all phases	Onshore Treatment		2	7	8	3	1	3
Medical waste	First aid and routine clinical procedures	Offshore incineration	Onshore treatment	1	3	4	2	1	1
Drum rinse	Drum and container rinsing	Onshore treatment		2	7	7	2	0	5
Pigging waste	General maintenance activities	Onshore treatment		0	4	6	5	5	3
Slops containing used drilling muds (NAF), cement spacer, chemical additives, washwater	Drilling operations	Onshore treatment		1210	2720	3626	1360	0	0
Oil contaminated completion brines	Well completion activities	Onshore treatment	Offshore incineration	18	40	54	20	0	0
Oily water	Tank and operating equipment cleaning	When practicable, recycle into FPSO process	Onshore treatment	24	58	81	37	10	5
Unused or contaminated solvents/chemicals	Operations, wastewater or water treatment systems, laboratories	Onshore treatment		4	13	56	61	57	57
Glycol	Operations and vessel equipment maintenance	When practicable, recycle into FPSO process	Onshore treatment	2	7	15	12	10	5
Oil sludge/Tank bottom sludge	Operations and vessel equipment maintenance	Onshore treatment		25	80	94	38	10	30
Oil contaminated cement		Onshore treatment		370	830	1110	415	0	0
Fluorescent bulbs	Replacement of light tubes	Stabilize & landfill		0	1	1	0	0	1

Waste Information: Hazardous Wastes				Volume By Year / Metric Tonnes					
Waste Stream	Waste Source	Primary Disposal Method	Alternate Disposal Methods	2018	2019	2020	2021	2022–2039	2040
Non-punctured Aerosol / pressurized spray cans	General maintenance activities	Onshore treatment		2	5	6	3	1	1
Batteries (Lead Acid, Nickel-Cadmium, Lithium, Mercury Cell)	Instruments and small equipment	Onshore treatment / send to approved battery recycler		5	15	46	45	39	22
Electrical/electronic waste	Instruments and computer related equipment	Onshore treatment / send to an approved E-waste recycler		0	2	2	1	1	6
Contaminated drums, containers, packaging (metal or plastic)	Operations and general maintenance	Onshore treatment	Landfill (plastic drums)	8	26	44	31	22	16
Radioactive waste		Send to facility permitted to manage NORM		<1	<1	<1	<1	<1	<1
Mercury-containing equipment		Onshore treatment		<1	<1	<1	<1	<1	<1

Waste Information: Non-Hazardous Wastes

Waste Information: Non-Hazardous Wastes				Volume By Year / Metric Tonnes					
Waste Stream	**Waste Source**	**Primary Disposal Method**	**Alternate Disposal Methods**	**2018**	**2019**	**2020**	**2021**	**2022–2039**	**2040**
Recyclable domestic trash (plastic & glass)	Discarded items from, kitchen, living quarters, bathroom, laundry, warehouse, offices	Recycle	Landfill	39	100	136	62	19	24
Incinerator Ash	Incinerator	Landfill		17	40	55	24	5	7
General/domestic trash: non-recyclable	Discarded items from kitchen, living quarters, bathroom, laundry, warehouse, offices	Incinerate offshore or landfill		96	269	495	335	200	216
Desiccant	Air drying equipment (i.e. instrument air, air filtration systems)	Landfill		0	0	4	5	5	3
Production solids (e.g. sand, scale)	Operational maintenance from wells and producing equipment	Landfill		0	0	<1	<1	<1	15
Abrasive blast media (uncontaminated)	Construction and general maintenance	Landfill		0	0	2	3	3	2
Dry Filters	General Maintenance	Offshore incineration, recycle carcasses with scrap metal when possible	Landfill	4	10	20	15	10	8
Paper, Cardboard & Wood	Wooden pallets, construction, general maintenance	Offshore incineration	Recycle, landfill	154	360	503	218	45	45
Scrap metal	Equipment maintenance, metal packaging	Recycle	Landfill	24	61	110	72	45	25
Empty aerosol / pressurized spray cans	General maintenance	Recycle	Landfill	1	2	3	1	1	1
Empty steel drums	Construction & Operations	Recycle	Landfill	22	53	71	29	4	4

Attachment 2: GUYANA HAZARDOUS WASTE RECORDING AND REPORTING FORM

EPA-EMD2012HWRRF1R1

RECORDING AND REPORTING FORM OF HAZARDOUS WASTES (*for* New and Existing Operations)

General Instructions/Requirements/Information

The Recording and Reporting Form must be completed by the holder of an Environmental Authorization no later than forty-five days after the end of the operating year.

Note: The report should be prepared on activities relating to the previous calendar year.

1. This Form must be completed in BLOCK LETTERS (preferably completed electronically) and a hard copy along with any additional information requested submitted to:

   The Executive Director
   Environmental Protection Agency
   Ganges Street
   Sophia, Georgetown, Guyana
   Telephone: (592) 225-2062 / 1218 / 0506 / 6917
   Fax: (592) 225-5481
   Email: epa@epaguyana.org Website: www.epaguyana.org

2. The information provided in this form must be kept by the holder of the authorization for a period of not less than three years or for such other extended time as the Agency may determine.

Specific Instructions for Completing Form

3. **Block A:** Provide the Permit Reference number, the name of the Company, Project address, mailing address (if different). In this section also provide the name, designation, telephone number, email/fax of a contact person.

4. **Block B:** Provide a description of the operation process. Identify all hazardous materials/chemicals used within the operation process. Also provide the number of years the project has been operational.

5. **Block C:** Provide information on **hazardous materials/chemicals used** in the life cycle of the project. Provide the type of hazardous material/chemicals used (see attached list), its hazardous, physical and chemical characteristics (see attached list), the quantity and the type of storage e.g. containers, bags etc.

6. **Block D**: Provides information on the **hazardous wastes generated.** Provide the type of hazardous material/chemicals used (see attached list), its hazardous, physical and chemical characteristics (see attached list), the quantity and the type of storage e.g. containers, bags etc.

7. **Block E**: Once authorized all spills must be reported. Provide information on the date of incident, type and amount of waste spilled, measures taken to mitigate incident.

EPA-EMD2012HWRRF1R1

A. IDENTIFICATION INFORMATION			
Generator's Permit Reference Number:			
Company Name:			
Project Address:		Region	
Mailing Address (if Different):		Region	
Contact Personnel			
Name :			
Designation:			
Telephone number:			
FAX:			
Email:			

B. OPERATION DETAIL

Brief description of operating process and raw materials (specifically hazardous materials and quantity) used:

No. of Years of Operation: 1-4 years ☐ 5-19 years ☐ over 20 years ☐

C. HAZARDOUS MATERIALS/ CHEMICALS (All Parts of This Section Must Be Completed)

Types of Hazardous Materials/ Chemical	Hazardous Characteristics	Quantity of Hazardous Materials/Chemical		Physical Characteristics	Chemical Characteristics	Type of Storage
		Mass (kg/gallons)	Volume (m^3)			

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D. HAZARDOUS WASTES (All Parts of this Section Must Be Completed)						
Type of Hazardous Wastes generated	**Hazardous Characteristics**	**Quantity of Hazardous Waste Generated**		**Physical Characteristics**	**Chemical Characteristics**	**Type of Storage**
		Mass (kg/gallons)	**Volume (m^3)**			

E. SPILLS/CHEMICALS RELEASE		
Date/s of Incident	**Type and Approximate Amount of Waste Lost (kg/gallons)**	**Measures Taken to Resolve the Incident**

OTHER	
Data for off-site Shipment of Waste (transporter and receiver details, location of the off-site facility, etc.)	
Treatment Standard for Waste (if applicable)	
Waste Minimization Efforts (different ways used by the company to reduce the waste generated)	
Details on any Pollution Prevention Plan by the company	

Other Information (e.g. Emergency Response Plan, Occupational Handling Measures)	

Attachment 3: SAMPLE WASTE/GARBAGE RECORD BOOK

Ship's Name:

Official No:

IMO No:

Garbage Categories:

- Category 1: Plastics
- Category 2: Floating dunnage, lining, or packing material
- Category 3: Ground-down paper products, rags, glass, metal, bottles, crockery, etc.
- Category 4: Cargo residues, paper products, rags, glass, metal, bottles, crockery, etc.
- Category 5: Food waste
- Category 6: Incinerator ash except from plastic products which may contain toxic or heavy metal residues
- Other Releases - Treated sanitary wastewater, grey water, ballast

NOTE: The discharge of any garbage other than food waste is prohibited in special areas. . Garbage other than Category 1 transferred to reception facilities need only be listed as a total estimated amount.

Waste Type	Date/ Time	Position of the Ship	Estimated Amount of Waste Generated Solid (m3); Liquid (L)	Category 1-6	Estimated Amount of Food Waste Comminuted and Discharged (m3)	Estimated Amount Transferred to Reception Facilities or to Other Ship Solid (m3); Liquid (L)	Estimated Amount Incinerated Solid (m3); Liquid (L)	Certification / Signature
Food Waste	1/1/17; 13:00		2 m3	5	2 m3	NA	NA	
Paper Products	1/15/17; 07:30		15 m3	3	NA	NA	15 m3	
Used Oil	2/20/17; 15:20		50 L	4	NA	50 L		

Master's Signature:

Date:

Attachment 4: SAMPLE OIL RECORD BOOK

Ship's Name: _____

Distinctive Number or Letters: _____

Gross Tonnage: _____

Period From: _____ To: _____

Machinery Space Operations (All Ships) or Cargo / Ballast Operations (Oil Tankers)

(*Delete that operation above which does not apply*)

Date	Code Letter	Item Number	Record of Operations / Signature of Officer in Charge

Master's Signature:

Date:

Attachment 5: SAMPLE CHAIN OF CUSTODY FORM FOR LAB SAMPLES

CHAIN-OF-CUSTODY RECORD

1. Facility Information:

   Facility Name_____

2. Sample Information:

   Time Sample Collected _____:_____ [ ] AM or [ ] PM (Check One)

   Date Sample Collected _____/____/_____ (Month/Day/Year)

   Name of Sampler (Print) _____

   Signature of Sampler _____

   Sampler's Company Name _____

   Analysis Information: _____

3. Chain-of-Custody: (To be completed by each person relinquishing sample)

Name (Please Print)	Signature	Facility	Relinquished To (Name / Facility)	Date mm/dd/yr	Time

4. Laboratory Shipping Information:

   Laboratory Name: _____

   Laboratory Address: _____

   _____

   Date Shipped: ____/____/____ (Month/Day/Year)

   Estimated Arrival Date: ____/____/____ (Month/Day/Year)

   Estimated Arrival Time: Collected _____:_____ [ ] AM or [ ] PM (Check One)

Attachment 6: SAMPLE MARINE TRANSPORT MANIFEST

Generator:		From	MANIFEST Nr: GUY-18-XXX
Prepared Date:	Day- Month - Year	Well Nr/Ref:	OPERATOR REF: Vessel Owner-Operator
Shipped Date:	Day- Month - Year	VESSEL:	OTHER REF:
Lease Holder:	EEPGL		DESTINATION: Georgetown Supply Base

ITEM	QTY	WASTE CAT	DG REF	UN CODE	PACKING	S/N ID/REF	OTHER REF	DESCRIPTION	OWNER
1	1	n/a	n/a	n/a	n/a	13220		Containers c/w:	
	8	8	n/a	n/a	Bags			Old Grout Bag, Non Hazardous, Non Recyclable	
	6	8	n/a	n/a	Big Bags			Sack Room Waste, Non Hazardous, Non Rec	
2	1	n/a	n/a	n/a	n/a	13190		Containers c/w:	
	6	1	n/a	n/a	Big Bags			General - Non Hazardous - Non Recyclable	
3	1	n/a	n/a	n/a	n/a	13258		Containers c/w:	
	1	3	n/a	n/a	Skip			Wood - Non Hazardous - Non Recyclable	
4	1	n/a	n/a	n/a	n/a	13262		Containers c/w:	
	1	3	n/a	n/a	Skip			Wood - Non Hazardous - Non Recyclable	
5	1	n/a	n/a	n/a	n/a	13195		Containers c/w:	
	6	8	n/a	n/a	Big Bags			Sack Room Waste, Non Hazardous, Non Rec	
									Sub Totals

1st Transporter	2nd Transporter	Final Destination	Totals
DATE:	VEHICLE REG/ID:	DATE	VEHICLE REG/ID:
NAME:		NAME	
SIGN:		SIGN	

Grand Totals

Final destination receiver to return a completed signed copy to originator.

Waste Categories

Glass	8 Chemical Waste	Oily Effluents	Tetra Pack
d - Aluminium	9 Hospital Waste	Hydraulic / Lube Oil / Fuel	Vegetable Oil
		14 Mud	Others
		15 Waste Water Mud	

Declaration: I hereby declare that the information contained herein, is true and correct, to the best of my knowledge:

Vessel Name: _____ ***Signature:*** _____

Name: (Print) _____

Attachment 7: SAMPLE WASTE MANIFEST

WASTE GENERATOR INFORMATION

Generator: _____
Address: _____
Contact Information: Office _____ Mobile _____email_____
Contact Person: _____ Position_____
Manifest Number:_____

WASTE INFORMATION (To be completed by waste generator)

Waste Description: ☐ Hazardous ☐ Non Hazardous

(Provide a brief description)_____
Process Generating Waste: _____
_____
Physical State ☐ Solid ☐ Liquid ☐ Sludge ☐ Other _____
Physical Properties Colour _____
Odour _____
MSDS ☐ Yes ☐ No
Special Handling Requirements ☐ Yes ☐ No
Waste Volume ☐ _____Barrels (42 Gal.) ☐_____ Drum (55 Gal.) ☐_____ Gallons
☐ _____ Cubic Meters ☐_____Pounds

DISPOSAL INFORMATION (To be completed by TTTU)

Disposal Option ☐ Recycling ☐ Thermal Desorption
☐ Incineration ☐ Landfill
Disposal Facility ☐ Tiger Tanks ☐ Haag Bosch
☐ Other (Recycling) _____
Haulage /Storage ☐ Truck ☐ HWS Skip ☐ Cuttings Box ☐ Other

WASTE RECEIPT AT GENERATORS FACILITY

Physical State ☐ Solid ☐ Liquid ☐ Sludge ☐ Other _____
Physical Properties Colour _____
Odour _____
MSDS ☐ Yes ☐ No
Waste Volume ☐ _____Barrels (42 Gal.) ☐_____ Drum (55 Gal.) ☐_____ Gallons
☐ _____ Cubic Meters ☐_____Pounds

Dispatched By: _____ Signature_____ Date _____
Received By:_____ Signature_____ __ Date_____

Attachment 8: HAZARD CLASS SYMBOLS FOR HAZARDOUS WASTE AND MATERIALS

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Appendix 2 – Stakeholder Engagement Plan

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Esso Exploration and Production Guyana Limited

Stakeholder Engagement Plan

Liza Phase 1 Development

Stabroek License Area
Offshore Guyana

[For Public Disclosure]

May 2017

Contents

Figures

Glossary

Terms	Description
Stakeholder	Any individual or group who is affected by a project or may have an interest in, or influence over it
Consultation	The process of sharing information, ideas and concerns in a two-way dialogue between project proponents and stakeholders, allowing stakeholders to express their views and for these to be considered in the decisions about project planning and implementation
Disclosure	The process of publishing and making available information in various ways (such as on the internet, in paper form or in press announcements)
Engagement	General term for activity including disclosure and consultation
Environmental Impact Assessment (EIA)	A systematic process for identifying and managing the potential environmental, social and health aspects, impacts and related risks associated with major projects
Environmental Management Plan (EMP)	A project-specific plan developed to identify and implement measures to protect the environment and comply with environmental legislation
Environmental and Social Management Plan (ESMP)	A system to manage the environmental and social risks and impacts of a project's activities
Esso Exploration and Production Guyana Limited (EEPGL)	A subsidiary of ExxonMobil in Guyana
Feedback	Formally issued inquiry, comment, concern or complaint about the Project or associated activities by individuals or organizations
Feedback Mechanism	Process by which inquiries, comments, concerns or grievances are formally submitted by interested parties, and tracked and addressed by the Project proponent
Strategic Environmental Assessment (SEA)	A systematic decision support process to consider environmental and possibly other sustainability aspects during the planning phases of a project
Terms of Reference (TOR)	Document that describes the purpose, scope, limitations and structure of a project or process

1 INTRODUCTION

The Esso Exploration and Production Guyana Limited (EEPGL) Stakeholder Engagement Plan (SEP) is designed for an ongoing exchange of information that allows the Company to 1) identify, understand and address community/stakeholders priorities and concerns, and 2) improve decision-making and transparency. This is an evergreen document that will evolve according to EEPGL activities. For example, Appendix 1 is the Liza Phase 1 EIA – Summary of Stakeholder Engagement Activities.

Environmental Resources Management (ERM) has been contracted by EEPGL to support the Liza Phase 1 environmental permitting process, including completion of the Strategic Environmental Assessment (SEA), Environmental Impact Assessment (EIA) and associated stakeholder engagement activities. All efforts occur on behalf of EEPGL.

1.1 Objectives

This SEP has been developed to meet the expectations of the company, regulators and the communities. The SEP describes the stakeholder identification process and outlines an engagement program to promote meaningful, timely and effective engagement with stakeholders. It builds on previous engagement efforts, including those documented in the SEA and those underway for Liza Phase 1 EIA.

Engaging stakeholders is an important aspect of managing ongoing social and environmental performance and non-technical risks.

The objectives of stakeholder engagement are to:

- Promote the development of respectful and open relationships between stakeholders and EEPGL;
- Identify stakeholders and understand their interests, concerns and influence in relation to ongoing activities;
- Provide stakeholders with timely information about Company activities, in ways that are appropriate to their interests and needs;
- Support alignment with the Government of Guyana requirements and corporate standards and guidelines for stakeholder engagement;
- Record feedback and resolve any grievances that may arise through a formal feedback mechanism.

2 ADMINISTRATIVE FRAMEWORK

Socioeconomic and stakeholder components are considered in a number of laws, including the Environmental Protection Act. Additionally, Guyana is a signatory to a number of international and regional conventions and protocols aimed at addressing socioeconomic and stakeholder concerns. EEPGL proposes to conduct stakeholder engagement to comply with the spirit and intent of these laws, Guyana National Plans, and international agreements, including those outlined in the Liza Phase 1 EIA Terms of Reference (TOR).[1]

2.1 The Environmental Protection Act

In 1996, the Environmental Protection Act (hereinafter referred to as the Act) was enacted to implement the environmental protection provisions of the Constitution. The Act is Guyana's single most significant environmental legislation because it articulates national policy on important environmental topics such as pollution control, the requirements for environmental review of projects that could potentially impact the environment, and the penalties for environmental infractions. Most importantly, the Act authorized the formation of the Environmental Protection Agency (EPA), and establishes the EPA as the lead agency on environmental matters in Guyana (FAO, 2013). The Act further mandates the EPA to oversee the effective management, conservation, protection and improvement of the environment (EPA, 2012). It also requires the EPA to take the necessary measures for the prevention and control of pollution, assessment of the impact of economic development on the environment, and the sustainable use of natural resources.

The Act outlines the process for conducting an EIA with timeframes for some step. It specifically regulates stakeholder involvement. The stakeholder engagement process describes how a project proponent should undertake consultation to provide stakeholders with opportunities to express their views on project risks, impacts and mitigation measures, and to allow the project to consider and respond to them. There is a 28-day public consultation period for the scoping phase in which a Project Summary is submitted and the 60-day public consultation period after the entire Draft EIA is submitted.

Outside of and in addition to these EIA public consultation periods, EEPGL is committed to promoting and providing means for adequate engagement with stakeholders throughout the project lifecycle on issues that could potentially affect them and so that relevant environmental and social information is disclosed and disseminated. EEPGL's ongoing and planned engagement activities are complementary to EIA-regulated disclosure periods.

[1] *Terms of Reference (TOR) define the scope and intention of the Liza 1 Project EIA*

3 STAKEHOLDER ENGAGEMENT STRATEGY

3.1 Overview

The stakeholder engagement strategy is one component of managing project risk by familiarizing stakeholders with EEPGL's activities and efforts to protect safety, health and the environment, incorporate stakeholder input into business decisions, and build a positive relationship between EEPGL and the community.

EEPGL's engagement strategy:

- Proactively identifies and engages stakeholders to provide an overview and understanding of activities;
- Collects stakeholder input for the identification of potential impacts and associated management plans;
- Facilitates the consideration of stakeholder input when making business decisions;
- Outlines a mechanism to address concerns/grievances in a timely manner;
- Monitors and reports trends.

The stakeholder engagement strategy integrates the following elements:

- Identification and assessment of stakeholders;
- Mechanisms, methods, and tools for engagement;
- Engagement activities that have been undertaken to date;
- Planned engagement activities;
- A formal stakeholder feedback mechanism;
- Monitoring and reporting of engagement activities.

3.2 Stakeholder Identification Methodology

One of the first steps in stakeholder engagement planning is the identification of stakeholders. Stakeholders typically include government officials, regulators, co-venturers, members of the community and public at large, non-governmental organizations (NGOs) and civic leaders, media, employees and contractors, and industry associations. Stakeholders can be individuals working on a project, groups of people or organizations, or even segments of a population. A stakeholder may be actively involved in a project's work, affected by the project's outcome, or in a position to affect the project's success.

To develop an effective SEP, it is necessary to identify stakeholders and to understand their needs and expectations for engagement, and their priorities and objectives in relation to the Project.

As part of this process it is particularly important to identify individuals and groups who may find it more difficult to participate and those who may be differentially or disproportionately affected

by the project because of their marginalized or vulnerable status. It is also important to understand how stakeholders may be affected – or perceive they may be affected – so that ongoing engagement can be tailored to inform them in an appropriate manner and address their views and concerns.

One way to characterize stakeholders is by their relationship to the effort in question, for example:

- *Primary stakeholders* are the people or groups that stand to be directly affected, either positively or negatively, by an effort or the actions of an agency, institution, or organization;
- *Secondary stakeholders* are people or groups that are indirectly affected, either positively or negatively, by an effort or the actions of an agency, institution, or organization;
- *Key stakeholders*, who might belong to either or neither of the first two groups, are those who can have a positive or negative effect on an effort, or who are important within or to an organization, agency, or institution engaged in an effort.

While an interest in an effort or organization could be just that – intellectually, academically, philosophically, or politically motivated attention – stakeholders are generally said to have an interest in an effort or organization based on whether they can affect or be affected by it. The more they stand to benefit or lose by it, the stronger their interest is likely to be; and the more heavily involved they are in the effort or organization, the stronger their interest is as well.

Stakeholders' interests can be many and varied. A few of the more common include:

- Economics;
- Social Change;
- Labor;
- Environment;
- Safety and Security.

3.3 Stakeholders

Stakeholders are identified at the beginning of new activities. Once identified, stakeholders are assessed based on their anticipated degree and topics of interest, as well as their role in processes which may affect activities. (Figure 1) The information is input into a stakeholder log. The SEP is an evergreen document, so additional stakeholders will be added to the stakeholder log as they are identified. Potential stakeholders, including those identified through the EIA baseline data collection process, are listed in Annex A. This table is not exhaustive.

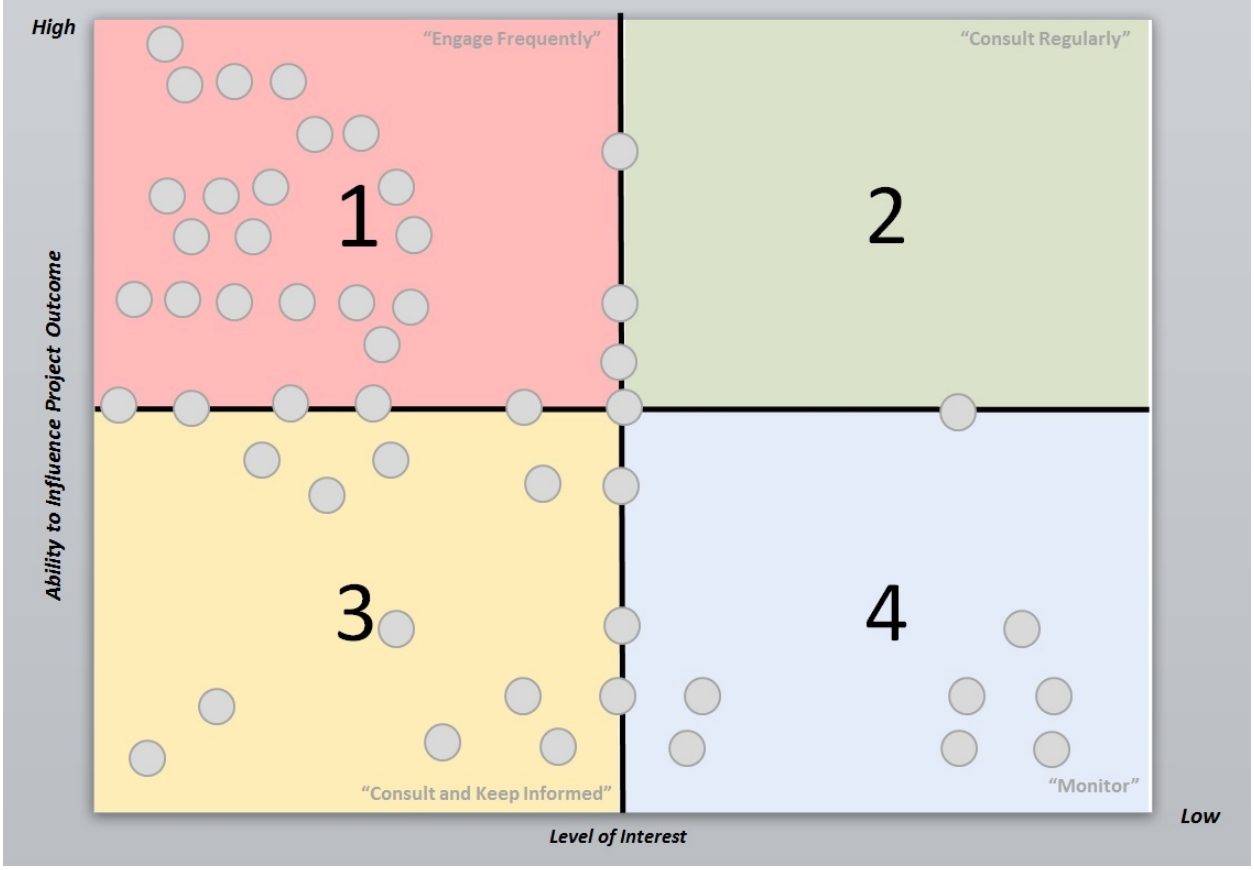

Figure 1: Example Liza 1 Development Workshop Stakeholder Map

Methods and Tools

EEPGL's stakeholder engagement strategy includes methods and tools to facilitate stakeholder communication and dissemination of public information. As shown in Figure 2, the different types of methods employed interact to allow informed engagement. The first method is information provision, which offers stakeholders information to support their understanding of the proposed activities. The other methods are consultation, which supports dialogue and active receipt of stakeholder feedback/input based on the information provided, and incorporation of input. These methods capture opinions, concerns and knowledge on how activities may interact with a stakeholder's natural and social environment, allowing EEPGL to gather information concerning topics that are important to its stakeholders. These activities provide stakeholders an opportunity to ensure their comments and opinions are heard and concerns addressed.

The tools and mechanisms listed in italics in Figure 2 describe how EEPGL intends to provide information to stakeholders, consult with and solicit information from stakeholders, and report back on how stakeholder input has been incorporated into key documents such as project plans.

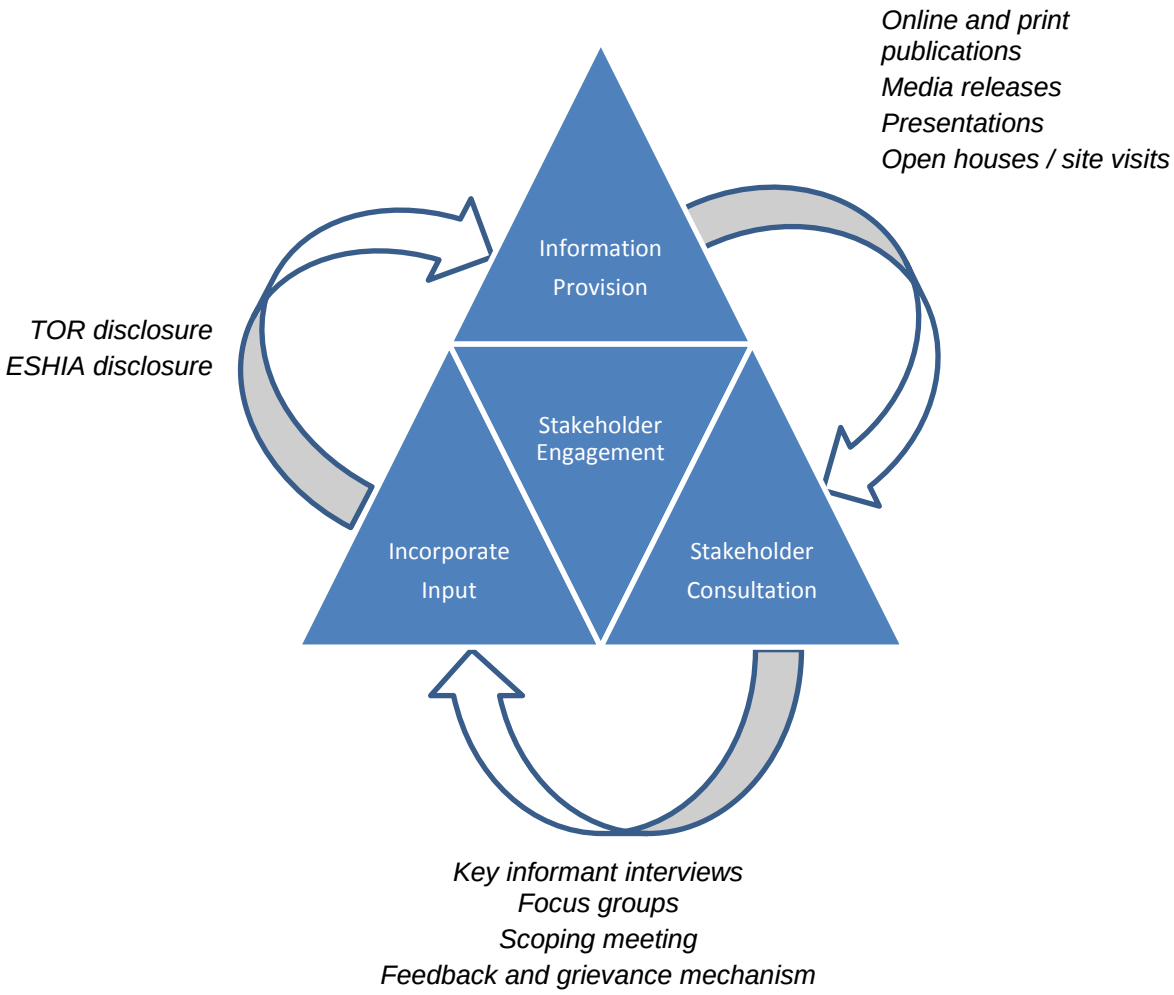

Figure 2: Example Stakeholder Engagement Strategy for EIA Development

Information Provision activities provide information to a broad audience or group of stakeholders as efficiently as possible. Activities include dissemination of online material and print publications, media releases, presentations and open houses.

Stakeholder Consultation activities involve a two-way flow or exchange of information between stakeholders and the Project. Activities include one-on-one and small group meetings, public meetings including a question and answer session, town hall meetings, feedback mechanism such as a webpage, email address or dedicated phone line.

Incorporate Input activities include TOR disclosure and ESHIA disclosure, which includes making the documents available for review and comment.

Stakeholder Grievance Mechanism

EEPGL has a community grievance mechanism (CGM) for stakeholders to provide feedback related to any issues or concerns, guidance, requests and/or complaints (considered grievances) associated with activities. The Project will address these in good faith through a transparent and impartial process.

Objectives of the CGM are:

- Provide stakeholders with a mechanism to communicate feedback, issues or concerns requests and/or complaints to EEPGL in a timely manner so that they can be addressed quickly and proactively
- Process so they are acknowledged, tracked and addressed by EEPGL in a timely and confidential manner
- Continuously improve Project performance in all areas
- Demonstrate EEPGL's commitment to meaningful stakeholder engagement and respect for local opinions and concerns

For a full description of the CVM please refer to the Environmental and Socioeconomic Management Plan (ESMP).

EEPGL will consider any feedback that it receives as a critical component of the broader stakeholder engagement activities, including monitoring and reporting.

Stakeholders can contact EEPGL to submit feedback in three ways:

1. In person, either to an EEPGL employee or representative;
2. Via telephone – (592) 231 2866, extension 12400; or
3. Via email –Guyanastaff@exxonmobil.com

NOTE: The EPA prescribes that stakeholder feedback and comments related to SEA/EIA should be addressed to:

The Environmental Protection Agency

c/o Director – Environmental Management Permitting Division

Ganges Street, Sophia, Georgetown

Phone: 225-0506 / 225-5467-8 / 225-5471-2

Fax: 225-5481

E-mail epa@epaguyana.org

Website: www.epaguyana.org

Monitoring and Reporting

Monitoring is an important part of determining the effectiveness of the activities undertaken, and revising them, as required, to ensure effective engagement. A tool is used to log all engagements with stakeholders, and capture feedback received from stakeholders. This tool allows for an analysis of trends in stakeholder interest and concern, which will help EEPGL design further engagement programs and activities.

As part of EEPGL's management systems, performance indicators are assigned to the monitoring process and will be tracked for completion. A number of key performance indicators will be monitored by EEPGL on a regular basis in relation to stakeholder engagement measures. These may involve the following parameters:

- Number of consultation meetings and other public discussions /forums conducted within a period (e.g. monthly, quarterly, or annually)
- Number of grievances received within a period (e.g. monthly, quarterly, or annually)
- Number of those closed within the prescribed timeline and the reason for aged grievances within the prescribed timeline and trends
- Type of public grievances received and trends

3.4 Roles and Responsibilities

In order for a SEP to be implemented successfully, adequate resources and responsibilities need to be designated. Please note that this does not include roles assigned to the Government of Guyana and the EPA.

Role	Responsibilities
EEPGL	
Lead Country Manager	• Review and approve SEP • Assist in implementation of the SEP
Public and Government Affairs Manager	• Review and approve SEP to ensure alignment with current affiliate stakeholder engagement information, philosophies, activities, and relationships • Own and steward the affiliate's feedback mechanism, including the management of grievances • Assist in the development and implementation of the SEP • Assist in documentation of engagements conducted • Help maintain a comprehensive archive on captured data
SSH&E Manager	• Review and approve the SEP • Review and authorise any financial provisions for stakeholder engagement (tied to SEA/EIA Stakeholder engagement)
ER&S Lead	• Review, approve and steward the SEP to ensure it meets permitting requirements • Assist in the definition, development and implementation of the SEP, ensuring correct application of the EEPGL internal requirements • Periodically review progress in the development and implementation of stakeholder engagement activities • Periodically review SEP, monitoring outcomes, and elaborate where necessary

Role	Responsibilities
Service Department and Business Leads/Advisors and Contractors	• Conduct engagements as directed by the affiliate and/or ER&S Lead • Complete all reporting including outcomes and stakeholder input for all engagements
Houston based ExxonMobil Management	
Project Leadership	• Provide adequate resources to implement the SEP • Ensure that the SEP is designed, developed and implemented as per legal requirements and ExxonMobil requirements for all operations
ERM	
Environmental and Social Consultant	• Engage with stakeholder to explain EIA process and collect information required to complete a robust EIA • Document all engagements conducted • Maintain a comprehensive archive on all items captured / generated during / related to the conduct of the EIA (lists of concerns / issues / comments, newspaper articles, handouts / posters developed, fact sheets, etc.).

3.5 Conclusion

This SEP will be periodically revised and updated as necessary according to EEPGL ongoing activities. This will help to maintain the validity and adequacy of the information presented, and that the identified methods of engagement remain appropriate in relation to the legislative requirements and specific phases of the Project development. Any major changes to the Project activities and to its schedule will be duly reflected in the SEP.

APPENDIX A: LIZA PHASE 1 EIA – SUMMARY OF STAKEHOLDER ENGAGEMENT ACTIVITIES

Ongoing positive stakeholder relationships throughout the entire lifecycle of a project are critical to its success. Stakeholder engagements are in progress, and will continue specifically through the environmental authorization application and the corresponding EIA processes.

A.1 Overview of Engagement Activities to Date

EEPGL began pro-active communication regarding the company's activities in 2013 to lay the groundwork for establishing and maintaining stakeholder relations. Informational meetings and exchanges of information were conducted between the Project team members and key external audiences, including government officials, stakeholders within the general public, and representative non-governmental organizations. In addition to being a good business practice, these early engagements helped to inform the Strategic Environmental Assessment that was submitted to the EPA in March 2014.

Stakeholder engagements have been ongoing since then and included meetings with individual stakeholders, public forums and training for local agencies and officials in the form of workshops on topics such as oil spill response. Newspaper notifications were printed in July 2016 to increase public awareness.

A schedule of the larger and more structured stakeholder engagement activities is presented in Annex A. Not all stakeholder engagement activities are included, for example, face-to-face meetings which are part of the normal course of business for EEPGL.

A.2 Overview of Planned Activities

The intention of EEPGL is to undertake a sufficient level of engagement to keep the public and interested parties aware of its progress and milestones and to facilitate stakeholder feedback.

A.2.1 Regular government engagement

Continuous engagements with government and agencies that have oversight of the Project, such as the Ministry of Natural Resources, Guyana Geology and Mines Commission and Environmental Protection Agency, will take place throughout the lifecycle of the project.

A.2.2 Environmental Application and Public Comment Period

Stakeholders had the opportunity through a 28-day public review period to provide input on EPA's determination on whether an EIA was required. The EPA determined an EIA is required.

A.2.3 TOR and Public Comment Period

EEPGL held face-to-face meetings with select members of civil society to provide specific Project information prior to the TOR submittal. Stakeholders had the opportunity through a series of six sector and public scoping meetings to provide input into the issues and concerns

they wish to be considered within the EIA. Once the TOR was submitted, EEPGL held regular meetings with the EPA and Guyana Geology and Mines Commission to discuss the submittal.

A.2.4 EIA Baseline Data Collection

On behalf of EEPGL and as part of the EIA preparation, ERM held key informant interviews with the following stakeholders in an effort to collect relevant baseline data:

- Ministry of Agriculture, including the Department of Fisheries;
- Ministry of Communities;
- Ministry of Public Health;
- Department of Tourism;
- Ministry of Social Protection;
- Ministry of Indigenous Peoples Affairs;
- Ministry of Public Infrastructure ;
- Maritime Administration Department;
- Guyana Land and Surveys Commission;
- Bureau of Statistics;
- National Trust of Guyana;
- Private Sector Commission;
- Protected Areas Commission;
- University of Guyana Centre for the Study of Biological Diversity;
- Guyana Marine Conservation Society;
- Conservation International;
- World Wildlife Fund;
- Association of Trawler Owners and Seafood Processors;
- National Aquaculture Association of Guyana;
- Guyana Rice Producers' Association;
- Supenaam-Parika Speedboat Owners' Association;
- Mainstay Amerindian Village;
- Vilvordeen-Fairfield Women's Association;
- Pomeroon Women's Agro-Processors Association;
- West End Agricultural Development Society;
- Big Bird & Sons Fishing Complex (Charity);
- Lima Fishermen's Development Co-op;
- Georgetown Fishermen's Co-op Society Ltd.;
- Parika Fishermen's Development Co-op;
- Ogle International Airport;

- African Culture Development Association;
- Guyana Hindu Dharmic Sabha;
- Region 2 Development Council.

A.2.5 EIA Preparation

Through 2016, the EEPGL team has planned for additional targeted one-on-one meetings with the EPA, Guyana Geology and Mines Commission and civil society in addition to larger and more structured engagements such as:

- October 2016: Scoping meeting with key agencies and informants to define potential impacts and scope of study; and
- October/November/December 2016: Public Scoping Meetings for all interested stakeholders to provide Project information, solicit questions and input from the public
  - Region 1 public consultation was held on November 11, 2016;
  - Region 2 public consultation was held on October 26, 2016;
  - Region 3 public consultation was held on October 24, 2016;
  - Region 4 public consultation was held on December 3, 2016;
  - Region 5 public consultation was held on December 2, 2016;
  - Region 6 public consultation was held on November 8, 2016.

A.2.6 Draft EIA Submittal and Public Comment Period

Once EEPGL submits the Draft EIA, a 60-day public comment period will begin. Per the Environmental Protection Act, during the course of the environmental impact assessment, the developer and the person carrying out the environmental impact assessment shall consult members of the public and interested bodies and organizations.

It is anticipated that in addition to public consultation meetings led by ERM, EEPGL will also conduct round-table meetings with groups of stakeholders (NGOs; members of interest groups, etc.) to discuss the preliminary EIA impacts and proposed mitigating measures, to seek feedback on progress and to help identify gaps/issues which may need to be addressed in more detail or new concerns/issues that need to be further investigated.

A.2.7 Other Engagements

The Project is committed to provide stakeholders with regular access to information about the activities as well as access to a feedback mechanism through which stakeholders may provide input and receive response to feedback.

Annex A: Sample of Identified Potential Stakeholders

Stakeholder Category	Interest in Project	Potential Stakeholders
Regulatory /Government	National authorities have an interest in the EIA and permitting procedures and Guyanese resources. Local and regional authorities have a general interest in potential impacts and benefits to their respective communities, and may facilitate engagement with local communities. Provides permits for Project activities and business licenses for onshore and offshore facilities.	President of Guyana; Ministry of Natural Resources; Sectoral Committee on Natural Resources; Members of Cabinet; Opposition Government leaders, Guyana Geology and Mines Commission; Environmental Protection Agency; Protected Areas Commission; Government Information Agency; Civil Defense Commission; Guyana Maritime Administration Department; leadership of Regions 1-10; Attorney General; Civil Aviation Authority; Guyana Defence Force; Transportation and Harbors Department; Pesticides and Toxic Chemicals Board; Hydrometeorological Service; Guyana Forestry Commission; Guyana Tourism Authority; Bureau of Statistics; National Trust of Guyana; Toashao's council
Community	Communities who may potentially be impacted positively or negatively by Project activities, or are concerned that they may be impacted.	Georgetown residents; coastal beach users/residents; indigenous people; commercial fishermen
Civil Society, Interest Groups, NGOs	Non-governmental or other organizations and entities that may be interested in a diverse set of issues including environmental protection, socioeconomic development and human rights.	NGOs focused on indigenous peoples' issues; Conservation International; World Wildlife Fund; Religious organizations; Guyana Marine Conservation Society; Mangrove Restoration Project; ECO1
Private Sector	Businesses of any scale that could be affected positively or negatively by the Project.	Fuel and Waste; SURF, Drilling, FPSO Shorebase Contractors
Media	News media outlets that may range from local to international in distribution.	Stabroek News, Kaieteur News, Guyana Chronicle, Guyana Times, www.demerarawaves.com, www.inewsguyana.com, www.newsroom.gy, www.newsourcegy.com, www.newsnow.gy, www.citizensreportgy.com, www.gnnonline.com, National Communications Network TV
Academic Institutions	Academic institutions or foundations that provide research on specific topics of interest.	National Agricultural Research and Extension Institute; Caribbean Agricultural Research and Development Institute; Universities and technical institutes
Professional, Business and Workers' Associations	General or industry-specific associations with interest in how Project activities may represent opportunities for the members or impacts to them.	Private Sector Commission; Guyana Oil & Gas Association, Guyana Manufacturing and Services Association; Guyana Association of Trawler Owners and Seafood Processors; Shipping Association of Guyana; Chambers of Commerce; Rotary Clubs; National Aquaculture Association of Guyana; Tourism and Hospitality Association of Guyana

Annex B : Synopsis of Stakeholder Engagement Activities

SYNOPSIS OF PREVIOUS STAKEHOLDER ENGAGEMENT ACTIVITIES			
Project Activity	**Objective / Desired Outcome**	**Stakeholders / Audience**	**Potential Concerns, Issues & Sensitivities**
Liza-1 Well Drilling Program [August 2011 to November 2013]	Liza-1 well SEA and Environmental Permit	Ministry of Natural Resources	Available skilled/unskilled labor in oil and gas operations
		GGMC	Meeting or exceeding GOM standards Education and communication on Project and Deepwater OSRP
		EPA	• First Deepwater well in Guyana • Resource-or constituency – related concerns
		Natural Resource Management Division of EPA	Potential impact on fisheries resources and supporting coastal ecosystems
		Environmental Assessment Board	First Deepwater well in Guyana
		Ministry of Labor, Human Services and Social Security, and Special Department of Occupational, Safety and Health Department	Local employment
		• Ministry of Labor, Human Services and Social Security • Special Department of Occupational, Safety and Health Department	Occupational, Health and Safety requirements
		Ministry of Local Government and Regional Development	Potential effect on communities
		Guyana Defense Forces and Guyana Police Forces	• Port Security issues • Road Safety through Town
		Ministry of Local Government – Solid Waste Management Department	Capacity and stability of waste management facility
		Ministry of Public Works, and Maritime Administration Department (MARAD)	• Maritime issues, maritime traffic • Security issues, incidents
		Transportation and Harbors Division, and Harbour Master	Wharf/Port access and development
		National Trust Department	• Cultural heritage issues • Archaeological finds
		Mangrove Restoration Project – National Agriculture Research and Extension Institute (NARI)	• Risk and impact to Mangrove ecosystem • Impacts on coastal livelihood artisan fishing, beekeeping and sea defense protection
		Guyana Marine Turtle Conservation Society (GMTCS) and Volunteer Youth Corp (Math and Science Initiative)	• Potential disturbance to sea coastline and transboundary movement • Community and social benefits from Project • Impacts of sound and noise from exploration on sea turtles and other

SYNOPSIS OF PREVIOUS STAKEHOLDER ENGAGEMENT ACTIVITIES			
Project Activity	**Objective / Desired Outcome**	**Stakeholders / Audience**	**Potential Concerns, Issues & Sensitivities**
			sensitive biodiversity • Blowout Prevention and emergency response
Six-Well Drilling Program (Liza-2 and Liza-3 wells) [mid-December 2015 to February 2016]	Six-well Drilling Program EMP and Environmental Permit(s) and present out comes of Multi-well EMPA Process	EPA, GGMC, CI, WWF and other external stakeholders	• Marine sound • Waste management • Effluent discharge standards • Oil spill preparedness and response
	Ongoing dialogues with agencies	EPA/GGMC	Ongoing clarity of EMP and permit status. Discussing document comments and revisions
Liza Phase 1 Development EIA [July 2016 to present]	• Presidential briefing • Continue to build public support for the Project and confidence EEPGL capability. • Identify potential roadblocks/issues before they cause project risk.	President of Guyana	• Legislative requirements, policy requirements, general compliance and project support. • Economic development and local workforce and supplier participation in the project
	• General briefing • Ensure timelines and process is well understood. • Identify potential roadblocks/ issues before they cause project risk.	EPA/GGMC	• Legislative requirements, policy requirements, general compliance and project support. • Capacity concerns due to increasing activities in sector • Evolving regulations and legislation that can affect the agency • Pressure to evolve regulations to meet international standards
	EIA information sharing and baseline data collection interviews	Ministry of Agriculture, Department of Fisheries	• Potential overlap of Project activity with new deep-sea tuna fishery • Potential security concerns related to illegal fishing vessels entering FPSO exclusion zone
		Ministry of Communities	No Project-specific concerns/issues identified
		Ministry of Public Health	• Potential for added burden on Guyanese health system • Potential for social investment in the health sector
		Department of Tourism	• Possible changes to Guyana's image as a "green" nation
		Ministry of Social Protection	• Proper fulfilment of OHS requirements for contractors; ensure contracts are clear on who is responsible • Proper payment and documentation for worker insurance coverage • Potential for informal communities to arise, with potential for prostitution or other exploitation
		Ministry of Indigenous Peoples Affairs	Need for consultation with indigenous communities in Region 1
		Ministry of Public Infrastructure	Possible traffic disruption if offsite storage facilities are used
		Maritime Administration Department	Maintenance of maritime safety and security in Project area
		Guyana Land and Surveys Commission	• Current land speculation in relation to the Project

SYNOPSIS OF PREVIOUS STAKEHOLDER ENGAGEMENT ACTIVITIES			
Project Activity	**Objective / Desired Outcome**	**Stakeholders / Audience**	**Potential Concerns, Issues & Sensitivities**
			• GLSC vetting of any new data produced
		Bureau of Statistics	Project information required to develop economic indicators for the country's new petroleum sector
		National Trust of Guyana	• No Project-specific concerns or issues identified • Interest in CSR support
		Private Sector Commission	• Ensure appropriate local content targets • Accountability and involvement in proper management and investment of the country's revenues from the Project • EPA capacity • Retention of institutional knowledge and experience from this Project
		Protected Areas Commission	Potential impacts of an oil spill on Shell Beach; recommendation for consultation with the 18 communities living on or adjacent to Shell Beach
		University of Guyana Centre for the Study of Biological Diversity	Lack of data regarding pelagic species beyond the continental fish
		Guyana Marine Conservation Society	• EPA/EEPGL transparency; availability of data and studies conducted to date for the Project • Recommendation for consultation with indigenous communities
		Conservation International	• Short timeline of the EIA and lack of EPA capacity • Appropriate use of mitigation hierarchy • Participation of ExxonMobil in the sustainable development of the country
		World Wildlife Fund	No Project-specific issues or concerns identified
		Association of Trawler Owners and Seafood Processors	No Project-specific concerns identified; the Project will be well seaward of trawling activity
		National Aquaculture Association of Guyana	No Project-specific concerns or issues identified; fish farms are segregated from seawater intrusion using the same irrigation and drainage systems as rice fields.
		Guyana Rice Producers' Association	• Main concern for rice industry is improved access to lower cost fuel, which is a significant industry input. • No other concerns or issues identified; rice fields are protected from potential seawater intrusion (and thus oil spills) by elaborate drainage and irrigation systems whereby fields are always upgradient of tidally influenced drainage canals
		Supenaam-Parika Speedboat Owners' Association	No Project-specific issues or concerns identified
		Mainstay Amerindian Village	Reliance of Amerindian communities on natural resources

SYNOPSIS OF PREVIOUS STAKEHOLDER ENGAGEMENT ACTIVITIES			
Project Activity	**Objective / Desired Outcome**	**Stakeholders / Audience**	**Potential Concerns, Issues & Sensitivities**
		Vilvordeen-Fairfield Women's Association	No Project-specific issues or concerns identified
		Pomeroon Women's Agro-Processors Association	• Interested in whether fuel costs will go down • Potential for damage to livelihoods in event of a spill for those residing near the mouth of the Pomeroon River
		West End Agricultural Development Society	No Project-specific issues or concerns identified
		Big Bird and Sons Fishing Complex	No Project-specific issues or concerns identified
		Lima Fishermen's Development Co-op	No Project-specific issues or concerns identified
		Georgetown Fishermen's Co-op Society Ltd.	• Potential for oil spills and their impact on those directly and indirectly employed by fishing • Expected communication from EEPGL sooner, given that exploration has been ongoing
		Parika Fishermen's Development Co-op	No Project-specific issues or concerns identified
		Ogle International Airport	No Project-specific issues or concerns identified
		African Culture Development Association	• Use of Kingston seawall area for festivals and religious ceremonies • Local employment, including skills and technology transfer
		Guyana Hindu Dharmic Sabha	• Use of seashore for religious ceremonies, including funerals • Community investment
		Region 2 Development Council	• Importance of face to face consultation with Region 1 and 2 local stakeholders • Potential for spills • EPA capacity • Community investment
	Two (2) Agency EIA scoping meetings led by EPA	Multiple public and private agencies and NGOS including EPA, GGMC, Ministry of Public Health, Ministry of the Presidency, PAC, GMCS, WWF, CI, others.	• Oil spill response procedures and capabilities • Timing and process for updating TOR to reflect scoping comments • EIA methodology including existing conditions data collection, types of surveys and studies, limitations, predictive analysis and consideration for mitigation • Area of Influence (AOI) determinations • Subcontractor management and monitoring, logistical support rrequirements, and shorebases • Decommissioning • Type of anchor mooring on offshore vessels, types of SURF and FPSO equipment and methods • Strategic Environmental Assessment (SEA) details, current and previous stakeholder engagement

SYNOPSIS OF PREVIOUS STAKEHOLDER ENGAGEMENT ACTIVITIES			
Project Activity	**Objective / Desired Outcome**	**Stakeholders / Audience**	**Potential Concerns, Issues & Sensitivities**
			• Other potential uses of produced gas • Government revenues from Project • Local employment
	Six (6) Public EIA scoping meetings (Regions 1-6) led by EPA	Various national, regional and local agency representatives as well as private citizens.	• National and local benefits, proper management/oversight of revenues • Local employment • Oil spill response procedures and capability • Impacts to air quality • Impacts to marine species • Impacts to fishing • Impacts to coastal resources • Impacts to indigenous people, lands, and resources • Oil spill potential impacts and locations • Potential for social changes such as trafficking, prostitution, and drugs • Role of MMO and MMO data availability • Waste management and discharge • Use and disposal of hazardous substances • Management and use of producted gas • Creditials and experience of the company developing the EIA • Impact of potential natural disaster on Project infrastructure and development area • Recommendations to increase public participation at scoping meetings • Other potential uses for produced gas

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Appendix 3 – Preliminary End of Operations Decommissioning Plan

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Esso Exploration and Production Guyana Limited

Preliminary
End of Operations Decommissioning Plan

May 2017

Contents

Figures

1 INTRODUCTION

Esso Exploration and Production Guyana Limited (EEPGL) is the Operator for the development of the Liza prospect in the eastern half of the Stabroek Block (hereafter referred to as the Liza Phase 1 Development Project, or the Project), which is located approximately 190 km (~120 mi) offshore from Georgetown.

1.1 Purpose and Objectives

The purpose of this Preliminary End of Operations Decommissioning Plan (hereafter the Plan) is to provide a preliminary plan for the proposed abandonment and decommissioning of Project wells and facilities at the end of operations, and to describe the anticipated work required to confirm that the abandoned facilities will be left in a condition that avoids harm to the environment.

The objectives of this Plan are to:

- Describe the proposed methods for the safe abandonment, removal, disposal, and/or decommissioning of the Project assets; and
- Describe the plans for managing potential impacts as a result of decommissioning activities through mitigation measures and monitoring.

1.2 Project Overview

The Liza field will be developed during Phase 1 with approximately 17 development wells drilled from two drill centers, each with separate production, gas, and water injection manifolds. Figure 1 illustrates the preliminary field layout of the proposed Liza field development, which includes the development wells, SURF, and a spread-moored FPSO vessel. The facility layout will continue to evolve during the design development process. The various components shown on Figure 1 are further described in the relevant Drilling, SURF, and FPSO sections in Chapter 2 of the Liza Phase 1 Environmental Impact Assessment (EIA).

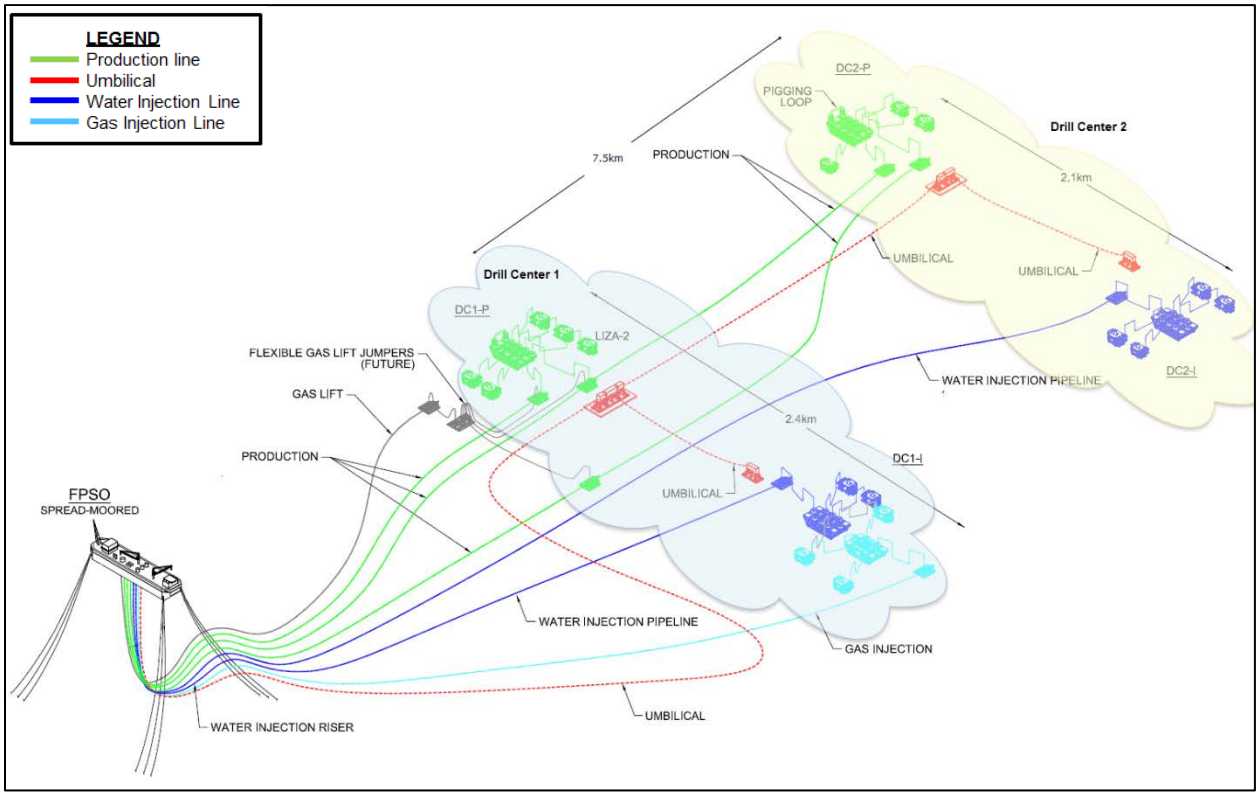

Figure 1: Preliminary Liza Phase 1 Field Layout

1.3 Scope

The scope of this Plan covers the preliminary plans for the plugging and abandonment of the development wells and the decommissioning of Project production facilities. As the Project approaches the end of field life (e.g., several years prior to commencement of decommissioning), it is envisioned that this Plan will be revised to cover the ultimate decommissioning of the facility in compliance with the laws and regulations in effect at that time, while also considering the technology available at that time. This Plan was developed as part of the Environmental and Social Management Plan (ESMP), and as described in the EIA. The current scope of abandonment and decommissioning activities includes:

- Subsurface – approximately 17 development wells;
- Subsea – trees, manifolds, jumpers, flowlines, umbilical, risers, and other subsea equipment;
- FPSO vessel – marine vessel, topsides facilities, and the vessel mooring system; and
- End of operations-related waste.

2 LEGAL FRAMEWORK

The offshore decommissioning process is regulated by a framework of international conventions and guidelines, regional seas conventions, and national legislation. Guyana is currently a party to some of these international conventions and guidelines that pertain to offshore decommissioning, such as:

- United Nations Convention on the Law of the Sea (UNCLOS);
- Basel Convention on the Transboundary Movement of Hazardous Wastes and their Disposal;
- IMO Guidelines for the Removal of Offshore Installations and Structures (1989).

The decommissioning plan and strategy will be based on a notice of the intent for plugging and abandonment of the development wells and decommissioning the production facilities, which will be provided to the appropriate Guyanese agencies, (e.g. GGMC, EPA) to obtain approval in accordance with the following requirements, or with future applicable legislation:

- Environmental Protection Act (1996);
- Guyana Petroleum (Exploration and Production) Act (1998).

Section 2 of the ESMP further identifies these international conventions, guidelines, and laws; summarizes their relevance to the Project; and articulates the environmental performance criteria they impose.

3 MAJOR DECOMMISSIONING COMPONENTS AND ACTIVITIES

3.1 Prior to Decommissioning

EEPGL will perform inspections, surveys, and testing to assess current conditions that will provide the basis and required information to prepare a plan for decommissioning. All risers, pipelines, umbilicals, subsea equipment, and topside equipment will be safely and properly isolated, de-energized, and cleaned to remove hydrocarbons and other hazardous materials to a suitable level prior to being taken out of service.

Near the time of decommissioning, EEPGL will select, in consultation with the appropriate Guyanese agencies, the final decommissioning strategy based on a comparative assessment, which is designed to evaluate the potential safety, environmental, technical, and economic impacts and associated mitigation measures in order to finalize the decommissioning plan. Consultation with stakeholders would also be conducted by EEPGL during decommissioning planning. A revised Plan will be submitted to the appropriate Guyanese agencies in advance of commencing field work.

3.2 Development Wells

Wells will be permanently plugged and abandoned (P&A) by restoring suitable cap rock to prevent escape of hydrocarbons to the environment. P&A barriers will be installed in the wellbore, of adequate length to contain reservoir fluids, and deep enough to resist being bypassed by fracturing. The number of barriers required will depend on the distribution of hydrocarbon-bearing permeable zones within the wellbore.

3.3 Subsea Equipment

It is expected that the risers, pipelines, umbilicals, subsea equipment, and anchor piles will be disconnected and abandoned in place on the seafloor at the production location, consistent with current standard industry practice, unless an alternative strategy is selected based on the results of the comparative assessment.

3.4 FPSO

The FPSO will be disconnected from its mooring system, removed from the production location, and towed to a new location for re-use or decommissioning. The FPSO anchor piles and mooring lines are expected to be disconnected and abandoned in place on the seafloor at the production location, unless an alternative strategy is seleted based on the results of the comparative assessment, consistent with current standard industry practice.

3.5 Decommissioning Waste

Waste streams associated with decommissioning activities, including hazardous and non-hazardous wastes, will be managed and disposed of in accordance with applicable Guyanese regulations, applicable international conventions and guidelines, and standard industry practice. Methods may include injection downhole into the reservoir for certain types of wastes, separation and incineration offshore for certain types of wastes, or transport to onshore waste management facilities for management and disposal for certain types of wastes. Further details on waste management can be found in the Waste Management Plan.

4 MITIGATION AND MONITORING

There will be areas of disturbance at the sea surface and the seafloor associated with the end of operations activities, as noted in the EIA. The Project Development Area (PDA) will be the site of marine vessel activity for the duration of the decommissioning program as support vessels transfer supplies and personnel to and from the PDA. All disturbances at the sea surface will be temporary in nature.

Disturbances at the seafloor will be associated with the decommissioning of the development wells, FPSO mooring lines, and SURF equipment.

EEPGL will implement measures to manage potential decommissioning-related impacts as listed in Sections 4.1 and 4.2.

4.1 Description of Embedded Controls for Decommissioning

This section of the Plan identifies the embedded controls that EEPGL will implement to reduce environmental and socioeconomic impacts related to decommissioning activities. Additional embedded controls that are specific to the decommissioning stage may be identified during the future comparative assessment performed by EEPGL.

- Maintain marine safety exclusion zones with a 500 m (~1,640 ft) radius around major decommissioning vessels to prevent unauthorized vessels from entering potentially hazardous areas;
- Provide trained medical personnel on board major decommissioning vessels to minimize reliance on medical infrastructure and facilities in Guyana;
- Maintain equipment and marine vessels in good working order and operate in accordance with manufacturer's specifications in order to reduce atmospheric emissions and sound levels to the extent reasonably practicable;
- Shut down (or throttle down) sources of portable combustion equipment in intermittent use where reasonably practicable in order to reduce air emissions;
- Utilize secondary containment for bulk fuel storage and hazardous materials, where practical;
- Regularly check pipes, storage tanks, and other equipment associated with storage or transfer of hydrocarbons/chemicals for leaks;
- Treat sewage to applicable standards under MARPOL;
- For those wastes that cannot be reused, treated, or discharged/disposed on the major decommissioning vessels, they will be manifested and safely transferred to appropriate onshore facilities for management. Onshore waste management contractors will be vetted prior to utilization. If deficiencies in contractors' operations are noted, an action plan to address the identified deficiencies will be established;
- Utilize oil/water separators to limit oil in water content in bilge water to <15 parts per million (ppm; per MARPOL);
- Provide standing instruction to Project dedicated vessel masters to avoid marine mammals and turtles while underway and reduce speed or deviate from course, when possible, to reduce probability of collisions;
- Provide standing instruction to Project dedicated vessel masters to avoid any identified rafting seabirds, when possible, when transiting to and from PDA;
- Observe standard international and local navigation procedures in and around the Georgetown Harbour and Demerara River, as well as best ship-keeping and navigation practices while at sea;
- Project workers will be subject to health screening procedures to minimize risks of communicable diseases;

- Utilize an established Safety, Security, Health, and Environmental (SSHE) program to which all Project workers and contractors will be required to mitigate against risk of injury/illness to workers; and all workers and contractors will receive training on implementation and will be required to adhere to its principles;
- Maintain an Oil Spill Response Plan (OSRP) to ensure an effective response to an oil spill, including maintaining the equipment and other resources specified in the OSRP and conducting periodic training and drills;
- Where practicable, direct lighting on major vessels to required operational areas rather than at the sea surface or skyward.

4.2 Description of Mitigation Measures for Decommissioning

This section of the Plan identifies the mitigation measures that EEPGL will employ to mitigate environmental and socioeconomic impacts related to decommissioning activities. Additional mitigation measures that are specific to the decommissioning stage may be identified during the future comparative assessments performed by EEPGL.

- Report direct GHG emissions from the major vessels owned or controlled by the Project to the EPA on an annual basis in accordance with internationally recognized methodologies and good practice;
- Procure select goods and services locally to the extent reasonably practicable;
- Utilize Guyanese nationals where reasonably practicable;
- Issue Notices to Mariners via MARAD, the Trawler's Association, and fishing co-ops for movements of major marine vessels to aid them in avoiding areas with concentrations of Project vessels and/or where marine safety exclusion zones are active;
- Augment ongoing stakeholder engagement process to identify commercial cargo, commercial fishing, and subsistence fishing vessel operators who might not ordinarily receive Notices to Mariners, and where possible communicate Project activities to those individuals to aid them in avoiding Project vessels;
- Promptly remove damaged vessels (associated with any vessel incidents) to minimize impacts on marine use, transportation, and safety;
- Proactively communicate the Project's limited staffing requirements for decommissioning as a measure to reduce the magnitude of potential population influx to Georgetown from job-seekers;
- Implement the Chance Find Procedure that describes the requirements in the event of a potential chance find of heritage or cultural resources during decommissioning activities;
- Project workers will be required to adhere to a Worker Code of Conduct, which will address shore-leave considerations.

4.3 Description of Monitoring Program

The Project will implement the Environmental and Social Monitoring Plan to ensure that Project activities, including decommissioning, are undertaken in an environmentally responsible

manner, and in a manner that is compliant with applicable laws and regulations, as highlighted in Section 2 of this Plan and in the EIA.

5 SCHEDULE

End of operations / decommissioning activities are expected to begin around 2040. A comparative assessment will be performed in accordance with IMO guidelines in effect at the time, which considers environmental and socioeconomic aspects. A revised Plan will be submitted to the appropriate Guyanese agencies in advance (e.g., several years) of commencing field work. The Plan would be approved prior to the commencement of abandonment and decommissioning activities in the PDA.

6 INFORMATION MANAGEMENT AND REPORTING

Reporting requirements for decommissioning activities include those stipulated in the following:

- Applicable laws and regulations in Guyana; and
- Project commitments contained in regulatory filings and Project agreements.

Decommissioning-related reporting to be provided may include, but is not limited to:

- SSHE reports;
- Emergency/incident reporting;
- Summary of waste volumes/types disposed;
- Air emissions;
- Wastewater discharges;
- Fuel consumption (e.g., supply/support vessesl, helicopters, etc.);
- Close-out reporting at the conclusion of decommissioning activities.

7 TRAINING AND ENVIRONMENTAL AWARENESS

EEPGL will appoint suitably competent staff and develop and implement training programs so that requirements are well understood and systematically applied.

EEPGL personnel will be provided with training appropriate to their level of responsibilities on key environmental, regulatory, and socioeconomic issues and on the required mitigation, monitoring, and reporting measures.

Training may be provided in a variety of means including formal training, as well as informal training such as briefings, toolbox talks, and coaching. Other training may take the form of on-the-job training in specific elements or tasks or the provision of specific skills as necessary. These and other means (such as posters, signs, site newsletter, etc.) may be used to promote SSHE awareness.

EEPGL will verify that its contractors supporting the decommissioning activities have implemented a training program which is consistent with EEPGL competency requirements.