



Environmental Protection Agency

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Environmental Permit

(Issued under the Environmental Protection Act, Cap. 20:05, Laws of Guyana, the Environmental Protection (Amendment) Act, 2005, and the Environmental Protection Regulations, 2000)

Reference No.:	20160705-EEDPF
Fees:	Extra Large (C1) – US\$3,100 (1 year) i.e. US\$3,100 per year

Addressee(s): **Mr Rod Henson**
Country Manager
Esso Exploration and Production Guyana Limited
99, New Market Street
North Cummingsburg
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Guyana.

Activity: **Liza Phase 1 Development Project – Offshore Operations**

Esso Exploration and Production Guyana Limited (EEPGL), hereinafter referred to as the "Permit Holder", is hereby authorised By the Environmental Protection Agency (EPA) hereinafter referred to as the Agency, in accordance with the Environmental Protection Act, 1996, the Environmental Protection (Amendment) Act, 2005, and the Environmental Protection Regulations, 2000, to undertake Phase 1 of the Liza Development Project, herein after referred to as the "Project", which includes but is not limited to, drilling of subsea development wells, installation and operation of subsea equipment, use of a Floating Production, Storage, and Offloading (FPSO) vessel to process, store, and offload the recovered oil during production operations, within the Stabroek PPL, as well as the use of shorebase facilities and marine /

aviation services to support these activities, in the manner indicated in the Application submitted on July 5, 2016, the approved Environmental Impact Assessment dated June 1, 2017, and the Environmental and Socioeconomic Management Plan dated June 1, 2017, which includes the Revised Oil Spill Response Plan and Wildlife Response Plan, dated June 1, 2017, and are subject to the terms and conditions set forth herein and any existing regulations and standards relevant to this project.

Terms and Conditions for Operation:

The Permit Holder shall:

1.0 GENERAL

- 1.1 Comply with any directions of the Agency where compliance with such directions is necessary for the implementation of any obligations of Guyana under any treaty or international law related to environmental protection.
- 1.2 Comply with all terms and conditions of this permit.
- 1.3 Be obligated to restore or rehabilitate the Environment due to impacts resulting from any breach of the conditions of this permit.
- 1.4 Adhere to/comply with the approved Liza Phase 1 Environmental Impact Assessment, and the Environmental and Socioeconomic Management Plan.
- 1.5 The Permit Holder shall submit an updated Environmental Impact Statement (EIS) and Environmental and Socioeconomic Management Plan (ESMP) within one (1) year of issuance of this permit. The updated EIS and ESMP will focus on the studies below, but may address other information. Should the studies below predict negative impacts which are significant, additional mitigation measures which are technologically and economically feasible shall be implemented:
 - o A targeted environmental baseline survey (EBS) to collect benthic biodiversity data outside the Liza Area of Interest and in selected shallower portions of the continental shelf, to include benthic grab samples and ROV transects. The objective of the study shall be to develop a more complete understanding of benthic biodiversity outside the Liza Area of Interest. Collection of the ROV transects referenced above (still and video images) may be performed as part of pre-production operations.
 - o Ensure continued visual monitoring of marine turtles and marine mammals on offshore vessels, with the objective of increasing scientific knowledge of the occurrence and abundance of marine turtles and mammals, including migratory patterns, feeding and mating patterns offshore Guyana. The study shall consist of periodic visual surveys covering multiple seasons, incremental to any routinely required MMO

support on certain types of offshore vessels (e.g. seismic survey). Such monitoring would be performed on existing marine operations (e.g. supply boats and other marine service vessels).

- Work with appropriate sea turtle conservation organizations and/or academia in Guyana and the region to expand existing sea turtle telemetry programs where practicable.
 - Conduct Marine bird surveys, simultaneously with the periodic incremental marine mammal and marine turtle surveys as described above, with the objective of further understanding the distribution and composition of birds that use the continental shelf and open marine waters offshore Guyana. This study shall be conducted over multiple seasons by qualified field ornithologist(s).
 - Conduct field studies to verify (i.e. ground truth) selected shoreline and coastal habitat classifications contained in the coastal sensitivity maps for regions 1, 2, 3, and 4.
 - Conduct fishery-dependent studies in the nearshore zone augmented by fishery-independent studies in the nearshore and offshore zones. Field methods shall include a sufficient variety of survey techniques to capture surface, mid-water, and bottom-oriented fish. The objective of the study shall be to develop a more complete understanding of the marine fish community outside the Liza Area of Interest. The study shall include at least one wet and one dry season (notionally several weeks duration each) to enable comparison of data across seasons.
 - A Liza phase 1 Environmental and Socioeconomic Monitoring Plan, including protocols, performance standards, and responsibilities. This should be undertaken in consultation with and jointly implemented by the Permit Holder and the Agency. Capacity (e.g. training) within the EPA shall be supported by the Permit Holder where necessary and practicable. External expertise (local and international) may be sourced by the EPA as may be required to augment this monitoring plan and/or conduct associated audits. The Permit Holder will be responsible for all reasonable and jointly agreed upon costs associated with this monitoring plan and its implementation, and any associated independent audits.
 - Notify the Agency of the intent to commence the activities listed above at least thirty (30) days in advance of commencing such activities.
- 1.6 The Permit Holder shall notify the Agency in writing of any proposed changes to the operation at least 21 calendar days prior to making the change. The notification shall contain a description of the proposed change in operation. It is not necessary to make such a notification if an application to vary this permit has been made and the application contains a description of the

proposed change. In this condition 'change in operation' means a change in the nature or functioning, or an extension, or any additional installation, which may have consequences for the environment. Changes to operation may include but not limited to the following:

- Changes in vessels, equipment, or technology;
- Installation of new and/or changes (excluding routine maintenance) to equipment, machine, apparatus, mechanism, system or technology serving the facility or operation; or
- Any change of technology used or installed at the facility from which effluent may be discharged or any changes in the nature, composition, concentration or quantity of the discharge.

- 1.7 Permit Holder will comply with all applicable laws and regulations, including but not limited, to the Guyana Environmental Protection Act, 1996.
- 1.8 The best available techniques, which consider economic and technical feasibility, as well as the facilities and controls described in the EIA, shall be used to prevent or mitigate pollution in relation to any aspect of the operation, which is not regulated by any other condition of this permit.
- 1.9 The Permit Holder shall use an effective Environmental Management System with policies and procedures for environmental compliance and improvements, and shall perform internal audits on at least an annual basis. Permit Holder shall share summary results of the internal audits with the Agency. The Agency may require other independent environmental audits during the course of this permit as maybe necessary.
- 1.10 Employ effective operational and maintenance systems on all aspects of the facility whose failure could impact the environment. A schedule of maintenance of all vessels, equipment, and/or plant shall be kept on site and made available for inspection on request from the Agency. Maintenance shall be carried out in accordance with the relevant manufacturer's specification.
- 1.11 Adhere to the stipulations within the Petroleum Exploration and Production Act, 1986, the Petroleum Exploration and Production (Amendment) Act, 1992, the Pesticides and Toxic Chemicals Act, No. 13 of 2000, the Pesticides and Toxic Chemicals Regulations, No. 8 of 2004, and the Pesticides and Toxic Chemicals (Amendment) Regulations, No.8 of 2007.
- 1.12 Comply with the following legislation/guidelines/conventions as indicated under 3.0 Administrative Framework in the Environmental Impact Assessment, dated May 2017, and under the following headings:
- National Legal Framework;
 - National Policy Framework; and
 - International Conventions and Protocols

- 1.13 Comply with the Wildlife Management and Conservation Regulations (2013) under the Environmental Protection Act, No. 11 of 1996, Wildlife Conservation and Management Act, 2016, the Cartagena Convention, the UN Convention Migratory Species and other applicable international/conventions.
- 1.14 Make all employees and contractors aware of the conditions of the Environmental Permit and provide regular training and/or briefings on good environmental management practices where necessary.
- 1.15 Employ a Health Safety and Environmental Officer or establish a Health and Safety Committee who would be responsible for the implementation of the Environmental and Socioeconomic Management Plan and the terms and conditions of this Permit.
- 1.16 Re-evaluate metocean conditions on an as needed basis, which may include the collection of further data in the field or utilization of commercially available data. Data utilized will be furnished to the Agency, the Guyana Geology and Mines Commission (GGMC), and the Hydrometeorological Service, Ministry of Agriculture.
- 1.17 Monitor the implementation of the conditions of this Permit, insofar as they involve adherence by employees and contractors under your direction.
- 1.18 Do not assign or transfer the Environmental Permit to any person without prior consent of the Agency.

2.0 NOISE MANAGEMENT

- 2.1 Comply with Guyana National Bureau of Standards (GNBS) *Guidelines for Noise Emissions into the Environment* for all onshore and near shore operations:
 - Industrial Limits: **100 dB** (Daytime Limits (06:00 h-18:00 h))
80 dB (Nighttime Limits (18:00 h- 06:00 h))
- 2.2 Offshore, where practical, ensure that sound-making devices or equipment are equipped with silencers or mufflers, are enclosed, and/or utilise soft-start procedures (e.g., pile driving, vertical seismic profiling activities, etc.) to reduce noise as applicable to industrial limits stipulated above, and to the levels that do not cause material harm or injury to marine species.

3.0 AIR QUALITY MANAGEMENT

- 3.1 Annually quantify aggregate greenhouse gas (GHG) emissions from all facilities and offshore support activities which are directly owned or controlled by Permit Holder or its dedicated contractors in accordance with internationally recognized methodologies.
- 3.2 Ensure all reasonable attempts are made to implement appropriate methods for controlling and reducing fugitive emissions in the design, operation, and maintenance of offshore facilities and to maximize energy efficiency and design facilities for lowest energy use. The overall objective is to reduce air emissions. Cost-effective and technically feasible options for reducing emissions should be evaluated and adopted as far as practicable.
- 3.3 Operate all mechanical equipment in accordance with the manufacturer's specifications. Additionally, ensure that mechanical equipment, vehicles, vessels and helicopters, utilised during Project works, are regularly maintained and operated at their optimal levels to minimize atmospheric emissions.
- 3.4 Submit and comply with the Ship Energy Efficiency Management Plan (SEEMP) as required by IMO. Submissions will be part of the final vessel documentation provided two (2) months prior to initiation of operations.
- 3.5 Utilize low sulphur fuels for major vessels, where available and commercially viable.
- 3.6 Routine Flaring and Venting are prohibited on the FPSO (excludes tank flashing emission, standing/working/breathing losses). Routine flaring does not include flaring related to FPSO startup, emergencies/process upsets or maintenance events.
- 3.7 Gas is to be re-injected into the reservoir or utilized as fuel gas on the FPSO during normal operations. However, all feasible alternatives for gas utilization should be evaluated and adequately documented.
- 3.8 Adopt risk assessment processes (e.g. hazard and operability study (HAZOP), hazard identifications study (HAZID), etc.) to assess risks associated with process upset and loss-of-containment events which could impact the environment.
- 3.9 Notify the Agency within 24 hours after process upset events or unplanned maintenance occur which result in a flaring event on the FPSO sustaining a volume of at least 10 MMSCFD and lasting 5 days or longer. Volumes from minor flaring events not requiring notification will be captured in aggregate in annual emissions reporting.

- 3.10 Adopt measures as far as practicable in keeping with the Global Gas Flaring and Venting Reduction Partnership when considering venting and flaring options under emergency or upset conditions.
- 3.11 The following conditions should be complied with for when flaring from the FPSO is necessary, particularly under emergency and/or upset conditions :
- 3.11.1 Ensure flare equipment are properly inspected, well maintained, monitored, certified and function\tested, prior to and throughout operations.
 - 3.11.2 Ensure flare is installed a safe distance from storage tanks containing flammable liquids or vapours and accommodation units.
 - 3.11.3 Ensure that combustion equipment is designed and built to appropriate engineering codes and standards certified. Flare must not be operated outside design operating ranges.
 - 3.11.4 Use efficient flare tips and optimize the size and number of burning nozzles.
 - 3.11.5 Minimize risk of pilot blowout by ensuring sufficient exit velocity and providing wind guards.
 - 3.11.6 Ensure use of a reliable pilot ignition system.
 - 3.11.7 Install high-integrity instrument pressure protection systems, where appropriate, to reduce overpressure events and avoid or reduce flaring situations.
 - 3.11.8 Operate flare to control odour and visible smoke emissions, where practicable.
 - 3.11.9 Ensure the volumes of hydrocarbons flared are recorded and submitted to the Agency annually.
 - 3.11.10 Implement burner maintenance and replacement programs to ensure continuous maximum flare efficiency.
 - 3.11.11 Maximize flare combustion efficiency by controlling and optimizing flare fuel, air, and stream flow rates to ensure the correct ratio of assist stream to flare stream.
 - 3.11.12 Minimize liquid carryover and entrainment in the gas flare stream with a suitable liquid separation system, with sufficient holding capacity for liquids that may accumulate and which must be designed in accordance with good engineering practice.

- 3.11.13 Ensure liquid separation system (e.g., knockout drum) is equipped with high level facility shut down or high level alarms and emptied as needed to increase flare combustion efficiency.
- 3.11.14 Implement source gas reduction measures (i.e., gas re-injection into reservoir) to the extent possible to avoid or reduce flaring from FPSO.
- 3.11.15 Minimize flaring from purges and pilots without compromising safety through measures such as installation of purge gas reduction devices, vapor recovery units, inert purge gas, and softseat valve technology where appropriate, and installation of conservation pilots.
- 3.11.16 Minimize flame lift off and/or flame lick.
- 3.12 In the event of an emergency or equipment breakdown on the FPSO, or when facility upset conditions arise, excess gas should not be vented but rather should be sent to an efficient flare gas system.
- 3.13 Efforts should be made to prevent equipment breakdowns and plant upsets which could result in flaring and provisions should be made for equipment sparing and plant turn-down protocols where practical.
- 3.14 FPSO flaring volumes for the initial commissioning/startup period and for steady state production operations of Liza Phase 1 should be estimated so that appropriate flaring targets can be developed. The volumes of gas flared for all FPSO flaring events should be recorded and reported.
- 3.15 Avoid use of chlorofluorocarbons (CFCs) and polychlorinated biphenyls (PCBs) on the FPSO.
- 3.16 Implement inspection, maintenance and surveillance programs to identify and prevent unplanned emissions to atmosphere onboard the FPSO.
- 3.17 If well testing must be performed, the following measures should be implemented:
- 3.17.1 During well testing, only the minimum volume of hydrocarbons required for the test should be flowed and well-test durations should be reduced to the extent practical. An efficient test flare burner head equipped with an appropriate combustion enhancement system should be selected to minimize incomplete combustion, black smoke, and hydrocarbon fallout to the sea.

Volumes of hydrocarbons flared should be recorded.

- 3.17.2 Provide adequate gas sensors that are to be appropriately located during testing operations, to ensure all sources of gas can be detected.
- 3.17.3 Ensure all pipes and joints are regularly monitored for leakages and fugitive emissions. Additionally, all collected gaseous streams should be burned in high efficiency flare(s), and leak detection and repair programs should be implemented and maintained.
- 3.17.4 Install an efficient test flare burner head equipped with an appropriate combustion enhancement system which should be selected to minimize incomplete combustion, black smoke, and hydrocarbon fallout to the sea.
- 3.17.5 Ensure the minimum volume of hydrocarbons required for the test is flowed.
- 3.17.6 Ensure the well test is kept to the minimum practical time, in keeping with pre-approved schedule between the Agency and Permit Holder. Also, notify the Agency immediately in case of any deviation / variation to the well test.
- 3.17.7 Ensure sufficient compressed air is provided to oil burner for efficient flaring assignment.

4.0 WATER QUALITY MANAGEMENT

- 4.1 Discharges of any pollutant / contaminant in coastal waters (i.e., twelve (12) nautical miles) are prohibited.
- 4.2 Visually check and take appropriate measures to mitigate occurrence of free oil resulting from discharge of NADF drill cuttings.
- 4.3 Maintain an inventory of all drilling fluid constituents added downhole for each well.
- 4.4 Produced water from the reservoir will be treated onboard the FPSO to an acceptable specification prior to discharging. The oil content specification of produced water to be discharged shall not exceed 42 mg/L on a daily basis or 29 mg/L on a monthly average. If the oil content of produced water is observed to exceed these limits, the produced water shall be routed to an appropriate storage tank on the FPSO until the treatment system is restored, and the discharge meet the specification above.

- 4.5 The use of fluids that contain diesel as the principal component of the drilling mud liquid phase is prohibited.
- 4.6 For well sections requiring non-aqueous drill fluid (NADF), use only low-toxicity International Oil and Gas Producers (IOGP) Group 3 base fluid.
- 4.7 Use 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.
- 4.8 Antifoulant chemical dosing to prevent marine fouling of offshore facility cooling water systems should be carefully considered. Available alternatives should be evaluated and, where practical, the seawater intake depth should be optimized to reduce the need for use of chemicals. Appropriate screens should be fitted to the seawater intake, if safe and practical, to avoid entrainment and impingement of marine flora and fauna.
- 4.9 The cooling water discharge should be designed to ensure that the temperature is within 3 ° C of ambient seawater temperature at 100 meters.
- 4.10 Monitor temperature of FPSO cooling water discharges to ensure a temperature rise of no more than 3C above ambient water temperatures at 100 m.
- 4.11 Abide with the International Maritime Organization (IMO) Guidelines including the International Convention for the Control and Management of Ship's Ballast Water and Sediments (2004), and the International Convention for the Prevention of Pollution from Ships (MARPOL).
- 4.12 Ensure that all operational controls regarding material storage, wash-downs and drainage systems are adhered to.
- 4.13 Treat bilge water in accordance with MARPOL to ensure compliance with an oil in water content of <15 ppm as applicable.
- 4.14 Ensure there is no visible oil sheen from commissioning-related discharges (i.e., flowlines/risers commissioning fluids, including hydrotesting waters) or FPSO cooling water discharge.
- 4.15 Prohibit the discharge of drilling fluids, which contain used/waste engine oil, cooling oil, gear oil or lubricant, and which has previously been used for purposes other than borehole lubrication.

- 4.16 Prohibit the discharge of cuttings generated using drilling fluids, which contain conventional mineral oil (IOGP Group 1), except when the mineral oil is used as a carrier fluid (transporter fluid), lubricity additive, or pill.
- 4.17 Ensure that there is no discharge of diesel oil, halogenated phenol compounds, or chrome lignosulfonate.
- 4.18 Treat sewage and food waste in accordance with MARPOL prior to discharge.
- 4.19 Utilize leak detection controls during FPSO offloading (e.g., for breach of floating hose, instrumentation / procedures to perform volumetric checks).
- 4.20 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).

5.0 WASTE & MATERIALS MANAGEMENT

- 5.1 Ensure effective management of waste and recoverable materials generated by the project in accordance with international acceptable standards and the EP Act Cap 20:05 part V Section 19(1)(2)(3)(4): Section 20(1)(2).
- 5.2 Adhere to the provisions of the Environmental Protection (Hazardous Wastes Management) Regulations, 2000.
- 5.3 Dispose of all wastes in accordance with the Waste Management Plan and individual vessel Garbage Management Plans.
- 5.4 Ensure that waste management companies that are contracted to manage waste which includes collection transportation, storage, treatment and disposal are authorized by the Agency.
- 5.5 Maintain a high level of housekeeping, sanitary and hygienic practices, and environmental standards of all facilities, vessels and associated structures at all times.
- 5.6 Operate the Drill Ship and FPSO incinerators in accordance with the Manufacturer's Operating Manuals and Waste Management Plan. Ensure that the incinerators are operated only by trained personnel.
- 5.7 Perform period inspections of FPSO waste storage areas and containers. Maintain an inspection log.
- 5.8 Maintain an inventory of wastes stored aboard the FPSO and Drill Ship.

- 5.9 Maintain an incinerator operations log documenting all waste types and quantities being incinerated.
- 5.10 Maintain copies of waste manifests and chain of custody forms.
- 5.11 Periodically audit waste contractors to verify appropriate waste management practices are being utilized.
- 5.12 Utilise low toxicity chemicals/materials where practical. Each chemical/material should be managed in accordance with the associated Safety Data Sheet.
- 5.13 To the extent practicable, limit quantities of hazardous materials stored on offshore facilities and minimize the frequency of chemical transfers and loading activities.
- 5.14 Manage wastes resulting from emergency response activities in accordance with the Oil Spill Response Plan and Waste Management Plan.
- 5.15 Radioactive sources will be returned to their supplier and radioactive wastes will be sent, according to the Waste Management Plan, to a facility permitted to manage such wastes .
- 5.16 The Agency considers all materials listed in Schedule I and II of the Environmental Protection (Hazardous Wastes Management) Regulations, 2000, to be hazardous. Please see attached list of Hazardous Wastes to be controlled.
- 5.17 Ensure fuel, oils and chemicals are appropriately secured and contained in areas far away from the discharge points of the rig, vessel or onshore storage location, and in accordance with their Safety Data Sheets.
- 5.18 Limit quantities of chemicals stored to a minimum level required for operational processes. Submit in the annual report required under Section 11, the types and quantities brought on board the FPSO. Minimize the frequency of chemical transfers and loading activities.
- 5.19 Spent oils, lubes and chemicals that cannot practically and safely be recycled through the FPSO process or incinerated offshore will be sent to shore for disposal in a manner approved by the EPA. Disposal of used/waste oils and chemicals in the marine environment or in any waterways is prohibited, as well as, disposal onshore if untreated.

6.0 SEISMIC-RELATED ACTIVITIES

6.1 Notify the Agency of the intent to commence seismic-related activities (e.g., Vertical Seismic Profiling (VSP), site investigations or monitoring surveys) in the Liza phase 1 Area of Interest at least **thirty (30) days** in advance of commencing activities.

6.2 Employ sufficiently trained Marine Mammal Observers (MMOs) during the conduct of seismic-related activities (e.g., at least one trained MMO for VSPs or at least two trained MMOs for other seismic surveys requiring more than 12 continuous hours of observation per day).

6.3 Conduct a continuous observation of a mitigation zone (500 metres around a sound source) to verify whether it is clear of marine mammals and marine turtles before commencing sound producing seismic operations.

6.4 Shall not commence sound producing seismic operations (including soft starts) if marine mammals or turtles are sighted within the mitigation zone during the 30 minutes prior to commencing sound producing operations in water depths less than 200 metres, or 60 minutes prior to commencing sound producing operations in water depths greater than 200 metres.

6.5 Adhere to the Joint Nature Conservation Committee (JNCC) Guidelines (2017) during the conduct of seismic-related activities.

6.6 Record all marine mammals, protected species, and marine turtle observations and respective mitigation actions (e.g., delay of soft start) in a standardized report format and submit a copy of the report to the Agency within **forty-five (45) days** of the activity completion.

The report should contain at minimum the following:

- The location, date and start time of the activity;
- Name, qualification and experience of MMOs involved in the survey;
- The location, time and reasons when observations were hampered by poor visibility or high winds;
- The location and time when any start-up delays, power downs or stop work procedures were initiated due to marine mammal, protected species and marine turtle sightings;
- The location, date, time and distance of any marine mammal, protected species and marine turtle sighting including species where possible and whether the sound source was active at the time of sighting; and
- The date and time when the activity was completed.

7.0 FPSO / DRILL SHIP / INSTALLATION AND SUPPORT VESSELS

7.1 Ensure that the vessels travel at a reduced speed within 300 metres of the vessel approaching observed marine mammals and sea turtles, and not allow the vessel to approach closer than 100 metres.

7.2 Ensure that lighting on the vessels are in accordance with maritime safety regulations/standards.

7.3 Where practicable, direct lighting on FPSO and major vessels to required operational areas rather than at the sea surface or skyward.

7.4 Ensure vessel anchoring procedures minimise anchor dragging on the seabed, where practicable.

7.5 Procedures for loading, storage, processing, and offloading operations, either for consumables (i.e., fuel, drilling fluids, and additives) or for liquid products, should be utilized to minimize spill risks. Pumps, hoses, and valves should be inspected and maintained or replaced as necessary.

7.6 FPSO may be subject to inspection and certification by an appropriate national or international body, in accordance with International Maritime Organization (IMO) requirements. Double hull vessels are preferred, whenever available.

7.7 All offloading activities should be supervised by the designated Mooring Master, according to the conditions of the sea.

7.8 The conditions and characteristics of the export tankers should be assessed by the Mooring Master and reported to the Offshore Field Manager prior to commencing offloading operations; only properly registered and well-maintained double-hull vessels should be utilized.

7.9 In accordance with MARPOL 73/78 requirements, maintain an Oil Record Book to document the manner in which sludge, oil, bilge water, waste oil, etc., are disposed.

7.10 In accordance with MARPOL requirements, maintain a Garbage Management Plan and Garbage Record Book to record the manner in which waste (e.g., sewage, macerated food waste, etc.) are managed and disposed. The Garbage Management Plan shall include all information as per MARPOL specification (waste type, quantity stored on-board, waste delivered ashore, amount of waste generated, and waste discharged at sea in accordance with MARPOL Requirements).

7.11 Ensure equipment on board (engines, compressors, generators, sewage treatment plant and oil water separators) are regularly checked and maintained

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in accordance with manufacturer's guidelines, in order to maximise efficiency and minimise malfunctions, and unnecessary discharges into the environment.

8.0 Well Blowout Prevention (BOP)

8.1 A well BOP system should be installed that can be closed rapidly in the event of an uncontrolled influx of formation fluids and that allows the well to be circulated to safety by venting the gas at surface and routing oil so that it may be contained. The BOP system should be tested at installation and at regular intervals (at least every 14 days or as operations allow).

8.2 The BOP system should be pressure tested at installation, after the disconnection or repair of any pressure containment seal in the BOP system, and at regular intervals, as operations allow. Subsea BOP stack should be tested to the maximum anticipated wellhead pressure for the current well program. Annular preventers should not be tested to greater than 70% of the working pressure of the preventer.

8.3 Facility personnel should conduct well-control drills at regular intervals, and key personnel should attend well control courses periodically; well control training and drills should be documented.

8.4 BOP testing should be conducted by the drill ship contractor.

8.5 The BOP system design, maintenance, and repair should be in general compliance with international standards. It is recommended that, at a minimum, subsea BOP systems consist of one annular preventer, two shear ram preventers one of which must be sealings, and two pipe ram preventers, and that they be equipped with choke and kill lines and failsafe choke and kill close valves. The BOP preventers should be able to close on the maximum OD drill pipe string used for the drilling operations. BOP systems shall operate (failsafe) in the event of a loss of control signal and hydraulic supply from the surface. At a minimum, subsea BOP systems should allow closure of one set of pipe rams and all blind-shearing type rams by Remotely Operated Vehicle (ROV) intervention, should automatic systems fail.

8.6 Contingency plans should be prepared for well operations and should include identification of provisions for well capping in the event of uncontrolled blowout (providing indication of the tools, equipment, and intervention time required) and identification of spill recovery measures.

8.7 Within 1 year of issuance of this permit, an emergency plan should be prepared, detailing the measures in place to prevent a blowout and the provisions for well control in a blowout scenario (including capping tools and oil spill recovery means)..

9.0 OIL SPILLS AND OTHER EMERGENCY MANAGEMENT

9.1 Adhere to the Oil Spill Response Plan contained within Volume IV of the Environmental Impact Assessment, dated May, 2017.

9.2 Install an Emergency Shutdown System on the FPSO to initiate automatic shutdown actions to bring the offshore facility to a safe condition and which should be activated in case of any significant release.

9.3 Ensure adequate corrosion allowance for the lifetime of the facilities and/or installation of corrosion control and prevention systems in all process equipment, and tanks, etc. as applicable.

9.4 Develop and implement appropriate maintenance and monitoring programs to ensure the integrity of well field equipment.

9.5 Implement adequate personnel training and field exercises in oil spill prevention, containment, and response.

9.6 Ensure that spill response and containment equipment are routinely inspected and maintained, periodically operationally exercised and tested, and are available as necessary for response.

9.7 Document all spills and near misses.

9.8 Notify the Agency and seek prior authorization for the utilization of in-situ burning and/or use of dispersant (e.g., Corexit).

9.9 Build Capacity where applicable and/or Ensure continued Oil Spill Response capacity building among key national Agencies, Community Based Organizations, Regional Democratic Councils, Neighbourhood Democratic Councils and other relevant stakeholders in Regions 1, 2, 3, 4, 5, and 6.

10.0 EMPLOYEES

10.1 Operate in accordance with the **Occupational Safety and Health Act, No. 32 of 1997**.

10.2 Employees must, at all times, be provided with the necessary personal protective equipment to job specification.

10.3 Make all employees and contractors aware of the conditions of the Environmental Permit and provide training on good environmental management practices.

- 10.4 Employ a Health Safety and Environmental Officer/ or establish a health and Safety Committee who would be responsible for the implementation of the Health, Safety, Environmental and Social Management Plan and the terms and conditions of this Permit.

11.0 COMPLIANCE REPORTING

11.1 Prepare and submit to the Agency no later than forty-five (45) days after the end of the operating year, a report relating to the activities for the previous year. The report shall include:

- The identification information of the facility.
- Types and quantities of waste including hazardous waste generated, treatment and disposal (both onshore and offshore).
- Notwithstanding the obligation to immediately report any accidents and/or non-compliances with this permit, a summary of any accidents and non-compliances that may have occurred and any action(s) taken should be provided.
- Notwithstanding conditions 1.5 and 6.6, include a report on all routine marine species observations on vessels, and any mitigation measures implemented to avoid injury or harm.
- Provide an inventory of prior years' emissions including but not limited to particulate matter, sulphur dioxide, volatile organic compounds, carbon monoxide, nitrogen dioxide, and other greenhouse gases as applicable.
- Report on generation, treatment, and disposal of wastewater generated on all vessels associated with the project.
- Any other matter the Agency may require.

11.2 Retain copies of all reports required by this Permit for a period of at least **three (3) years**.

11.3 Provide any information or copies of records requested within a reasonable timeframe, as requested by the Agency.

11.4 Submit to the Agency annually a summary of any non-conformances with the Environmental Permit and corrective actions taken.

11.5 Submit to the Agency Ballast Water Management Plans prepared specifically for the FPSO, Drill Ship, installation and support vessels, outlining how ballast water and sediments are managed to the international standard.

11.6 Submit to the Agency within **one (1) week** of commencement of drilling a list and estimated quantities of all additives to be used in the drilling fluids.

11.7 Notify the Agency in a timely manner of any changes in the type of drilling fluid to be used, and outline the disposal/recycle/treatment methods to be applied.

11.8 Submit End of Well Reports **ninety (90) days** following the completion of drilling operations for each well with estimated quantities of fluids, additives and cuttings discharged, duration of discharges, and estimated maximum concentration of each constituent in the discharged drilling fluid.

11.9 Inform the Agency in the End of Well report of tests conducted with the Blow out Preventer (BOP) equipment, detailing occasions where there was an influx of formation fluids, the well control methods applied, and their effectiveness.

11.14 Inform the Agency in a timely manner of any variation or intentions to conduct other activities not stipulated in this permit, such as, but not limited to Sidetracking of a well.

11.15 Notify the Agency within **one (1) month** prior to well abandonment on all Well Abandonment Plan(s) to be submitted for approval.

11.16 Notify the Agency in advance of plans to decommission the Project and submit revised End of Operations Decommissioning Plan for approval.

11.17 Submit to the Agency a No-objection issued by the Guyana Telephone and Telegraph (GTT) Company for the Project with respect to the Suriname Guyana Submarine Cable System (SGSCS) **one (1) month** prior to commencing field activities.

11.18 Submit to the EPA report(s) on the progress of the Project activities and compliance with the conditions under which this Permit was granted within **two (2) months** after the closure of activity specific Project stage (e.g., drilling, installation, etc.).

11.19 Report spills to the Agency and other relevant authorities in accordance with the Oil Spill Response Plan.

11.20 Notify the Agency within **21 days** in event of death, bankruptcy, liquidation or receivership of the Permit Holder or if the Company becomes a party to an amalgamation.

11.21 Inform the Agency prior to or within **30 days** of any change of name or ownership of the Project.

12.0 LIABILITY FOR POLLUTION DAMAGE

12.1 The Permit Holder shall be strictly liable for any loss or damage to the environment through any act caused intentionally or recklessly, through the adverse effect of any discharge or release, or cause or permit the entry of pollution, contaminant in any amount, concentration or level in excess of that prescribed by the regulations or stipulated by any environmental authorization which are attributed to any Project (and more specifically petroleum activities). S. 19(1) EP Act, Cap. 20:05.

12.2 The Permit Holder shall comply strictly with section 39 (1), (2), (3) and (4) of the Environmental Protection Act Cap 20:05.

12.3 The Permit Holder shall be liable to any gross negligence or wilful misconduct caused by the Permit Holder, to the marine environment, biodiversity, protected species and natural habitat with respect to any release or discharge, spill, contaminant fluids, oil or lubricants from fuel storage at any facilities permitted under this project.

12.3 The Permit Holder shall strictly observe section 19 (3) (e) of the Environmental Protection Act Cap 20:05.

12.4 The Permit Holder may be liable for environmental damage due to pollution from its activities within Guyana, its territorial waters, contiguous zones, continental margins continental shelf, and Exclusive Economic Zone.

13.0 INSTITUTIONAL AUTHORITY

13.1 The EPA reserves the right to review and amend the conditions attached to this Permit in accordance with Regulation 14 of the Environmental Protection (Authorisations) Regulations, 2000.

13.2 The EPA reserves the right to conduct regular inspections of the Permitted operation(s) as part of its monitoring and enforcement requirements under the Environmental Protection Act, 1996, the Environmental Protection (Amendment) Act, 2005, and the Environmental Protection Regulations, 2000.

13.2 The Permit Holder shall, at all times, allow entry to the permitted facility to any Officer designated by the EPA for the purposes of conducting inspections or any other legitimate business of the Agency.

13.3 The EPA shall have the right to cancel or suspend this Permit for breach of any of the terms and conditions contained herein.

13.4 This Environmental Permit is not the final development consent. Permission from the other relevant regulatory bodies must be obtained prior to Project implementation as required.

13.5 Failure to comply with the requirements of this Permit may render the Permit Holder liable to prosecution and to penalties prescribed under the Environmental Protection Act, 1996, the Environmental Protection (Amendment) Act, 2005, and the Environmental Protection Regulations, 2000, and governing legislations and regulations under the laws of Guyana, including civil penalties and injunctive relief.

13.6 This Permit is effective for the period stipulated herein (**June, 2017 to December, 2040, or until notification by Permit Holder of completion of decommissioning activities, whichever is later**).

13.7 This Permit and conditions herein, and applicable fees will be reviewed every **five (5) years**, and/or as may be determined by the EPA from time to time, in accordance with Regulation 14 of the Environmental Protection (Authorisations) Regulations, 2000, in consideration of:

- any changes in fee structure as determined by the EPA for projects of this nature,
- improvement in environmental best practices, and best available techniques which consider economic and technological feasibility (as described in 1.8), but not limited to any material change in activities and /or operations proposed by the Permit Holder
- Recommendations arising from the updated Environmental Impact Statement and Environmental and Socioeconomic Management Plan and the studies provided for under section 1.5
- Any other information arising from compliance monitoring

13.8 This Environmental Permit shall remain valid until December 31, 2040, unless otherwise revised, amended, suspended, or revoked in accordance with the provisions of this Permit or the Environmental Protection Act, 1996, the Environmental Protection (Amendment) Act, 2005, and the Environmental Protection Regulations, 2000.

Signed by  on behalf of the Environmental Protection Agency.

Kemraj Parsram
Executive Director (Ag.)

Date: 1.6.2017

Environmental Permit - Ref. No. 20160705-EEDPF
(Issued under the Environmental Protection Act, Cap. 20:05, the Environmental Protection
(Amendment) Act, 2005, and Environmental Protection Regulations, 2000)

Esso Exploration and Production Guyana Limited (EEPGL) hereby accepts the above terms and conditions upon which this Environmental Permit is granted and agree to abide by the Environmental Protection Act, Cap. 20:05, Laws of Guyana, the Environmental Protection (Amendment) Act, 2005, and the Environmental Protection Regulations, 2000, and any forthcoming regulations and standards made under this Act.

NAME: RODNEY D. HENSON

DESIGNATION: COUNTRY MANAGER EEPGL

SIGNATURE: *Rodney D Henson*

DATE: 1 JUN 2017

