OIL SPILL RESPONSE PLAN

LIBERIA ACCELERATED ELECTRICITY EXPANSION PROJECT (LACEEP)

LIBERIA ELECTRICITY CORPORATION

BUSHROD ISLAND HFO POWER PLANT, TRANSPORT AND STORAGE FACILITIES

JULY, 2014

PREPARED BY
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1 INTRODUCTION

The purpose of this Oil Spill Response Plan (OSRP) has been prepared to outline response actions for potential spills in the context of the Liberia Accelerated Electricity Expansion Project (LACEEP) rehabilitation of the heavy fuel oil off-loading facility/pumping station in the Free Port of Monrovia, and the HFO transport pipeline and storage tanks on the Liberia Electricity Cooperation (LEC) premises on Bushrod Island. A tripartite HFO agreement among the Government of Liberia, LEC and China Union governs access and use of Pier facilities, while LEC is responsible for ensuring that operations are correctly operated and maintained including environmental management aspects. Additionally, Connex and Liberia Petroleum Refining Company (LPRC) will handle offloading and transfer of HFO products to LEC. In other words, while China Union’s facility at the Freeport of Monrovia will be used to offload HFO and other fuel products needed by LEC, Connex and LPRC will be responsible to handle offloading and transfer of HFO and other fuel products to LEC’s storage facilities.

The storage and transfer of liquid petroleum products such as HFO creates the potential for leaks or accidental releases from tanks, pipes, hoses and pumps during loading and unloading of the product, during the transfer and storage of the HFO in pipelines, and storage tanks. The main functions of the OSRP are to minimize the risks from accidental oil spills that may occur during project operations by establishing a predetermined line of response and action, including lines of authority and responsibility and correct reporting and communication procedures. Spill control, isolation and clean up procedures are also included in the plan. The OSRP also includes steps for the development of monitoring and follow-up programs, and root cause assessments to ensure that spill incidents do not recur in the future.

The risks of an HFO spill during operations is small and local and is mainly related to off-loading the HFO at the port from moored vessels and pumping it through the HFO pipeline of about 35-cm diameter and 1.5-km length into the HFO rehabilitated or newly constructed storage tank(s) on Bushrod Island.

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1.1 **OWNER & OPERATOR**

This Oil Spill Response Plan (OSRP) is developed for:

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<tr>
<td>Liberia Electricity Corporation (LEC)</td>
<td>P.O. Box 10 – 165, Waterside</td>
</tr>
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<td></td>
<td>1000 Monrovia, 10 Liberia, West Africa</td>
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1.2 **PURPOSE**

This Oil Spill Response Plan (OSRP) is designed to provide emergency response personnel of Liberia Electricity Corporation with the information needed to respond to incidents in a safe, rapid, effective, and efficient manner. For purposes of this Plan, incidents are defined as events which might potentially impact the environment or property. This OSRP also assists in the development of action plans to facilitate clean-up operations. The ultimate goal is to provide a systematic course of action to mitigate potential impact of an incident as well as to make sure safety measures are implemented and conducted for those involved.

The procedures outlined in this Plan will clarify roles and responsibilities, provide lines of authority, and the sequence of communications to be followed in the event of an emergency response. Proper execution of the procedures detailed in this Plan will help to minimize potential environmental and ecological damage as well as loss or damage to facilities in the event of a hydrocarbon release and/or other emergency.

1.3 **SCOPE**

This Plan applies to emergency response operations carried out by personnel of Liberia Electricity Corporation (LEC), Connex, Liberia Petroleum Refining Company (LPRC), and/or any third party company contracted to undertake tasks on site. These actions will be taken in support of:

1. The transport of HFO and Diesel products through a 1.8Km pipeline extending from China Union’s offloading facility (Figure 1) to LEC’s Bushrod Island facility; and
2. Tank farm at LEC’s Bushrod Island facility.
Figure 1 Project Location and General Layout
1.4 **OBJECTIVES**

The objectives of this plan are to:

- Enable a coordinated and integrated response by Liberia Electricity Corporation and others to protect the environment from potential pollution discharges.
- Protect the health and safety of company personnel, contractors, and others who may be affected by the incident.
- Provide a list of procedures to follow when an incident occurs in order to promote a quick and effective response.
- Minimize damage to the environment, natural resources, and facility installations from a discharge of oil.

1.5 **LIBERIA ELECTRICITY CORPORATION, ENVIRONMENTAL POLICY**

*Note:* the Liberia Electricity Corporation has not adopted a formal environmental policy. Presented below is a draft for the Board to consider. In the interim, this draft policy has been used as a provisional foundation for this Environmental Management Plan. ISO 14001 standards require that the environmental policy be defined, documented and communicated. When a formal environmental policy is approved this document will be updated to reflect those changes.

**PROVISIONAL ENVIRONMENTAL POLICY**

The Liberia Electricity Corporation, aware of its social and environmental responsibility and its continuing contribution to the development of the country, commits itself to the sustainable management of the environment in all aspects of the Company’s activities.

This objective is accomplished through the application of good environmental management practices based on the following principles:

- Compliance with, or exceeding, applicable legal requirements and other commitments relating to the Company’s environmental affairs;
- Promoting the education, training and motivation of its employees concerning the environment and the use of technologies which progressively result in appropriate
practices of waste management and other matters related to the environment;

- Improving the Company’s environmental performance by reviewing its environmental objectives and targets annually;
- Documenting and publicly reporting on the Company’s environmental performance; and
- Striving for continual improvement of the Company’s Environmental performance.

1.6 REGULATORY COMPLIANCE

This Plan was developed in support of industry best practices and in conjunction with requirements from the Environment Protection Agency Act of Liberia, and the World Bank.

1.7 DISTRIBUTION LIST

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<td>Liberia Petroleum Refining Company</td>
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<tr>
<td>Any third party contractor hired to carry on tasks on site</td>
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2 PROJECT DESCRIPTION

The fourteen years civil war destroyed much of the electricity generation plants in Liberia. The rehabilitation and restoration of the energy infrastructure is an original component of the Poverty Reduction Strategy (PRS) of the Government of Liberia.

The objective of the “Liberia Accelerated Electricity Expansion Project (LACEEP) is to continue activities to improve the quality and efficiency of electric services, particularly the rehabilitation and expansion of transmission and distribution networks, rehabilitation of facilities for off-loading, transport and storage of Heavy Fuel Oil (HFO), and to ensure that there is a clear framework for observance of environmental and social safeguards during implementation of sub-projects.
The current project consists of the construction of facilities to offload and pump HFO from sea tankers with capacity in the range of 30,000 – 40,000 tons. The HFO will be offloaded at the BMC Pier of the China Union concession (Figure 1) and will be pumped via a new pumping station and transported via a rehabilitated or newly constructed 1.8-km pipeline to a tank farm on Bushrod Island on LEC’s premises with a total capacity of 30,000 m³.

The site of the new HFO pump station has not yet been determined. The site of the pump station could be at the BMC Pier, adjacent to the pier or the existing storage tank, or outside the BMC site.

2.1 Site Description

Liberia is located on the southwest corner of West Africa. It is positioned on the Atlantic coastline of Africa, and has a surface area of 111,370 km² (dry land extent is 96,160 km²). It lies between the longitudes of 7°30’ and 11°30’ west and latitudes 4°18’ and 8°30’ north. The capital, Monrovia, is the country’s largest city. The project is located on Bushrod Island in Greater Monrovia District of Montserrado County, on Bushrod Island.

The sites of operations are divided into three main areas:

- HFO off-loading facility in the Free Port of Monrovia
- HFO pipeline leading from off-loading facility to HFO storage tanks
- HFO storage tank on Liberia Electricity Corporation premises on Bushrod Island. This area is already polluted with HFO that has leaked from storage tanks and will be cleaned, with the contaminated soil being transported out of the site for disposal or secure storage before HFO tank rehabilitation or new construction is to occur.

The site of the new HFO pump is yet to be determined. Possible location sites include those near the BMC Pier or outside the Pier area near the storage tanks. For the purposes of this document the site of the future HFO pump is taken to be at the BMC pier.
3 RESPONSE ORGANIZATION DESCRIPTION

The flow charts below (Figures 2) describe the response organization and the chain of command for responding to a spill or release at the different operation site areas.

Figure 2 shows the response organization flow chart for possible spills at the BMC port area primarily run under the auspices of China Union. Figure 2 shows the response organization flow chart for possible spills from the HFO pipeline and storage tanks areas under the auspices of the LEC. The LEC is responsible for ensuring that the overall environmental management aspects of all the sites and as such, spills will be reported to the LEC’s assigned Environment and Safety Manager.

A minor spill is defined as a release of HFO which is less than one hundred liters (100L) whereas a major spill is defined as a release of HFO which is more than or equal to 100L².

Minor spills will be tracked and documented by LEC area supervisor and submitted to the LEC Environmental and Safety Officer and head office during working hours. The LEC Environmental and Safety Manager will then file a report with the LEPA at a pre-determined reporting interval.

Major spills will be immediately reported to the LEC Environmental and Safety Manager and head company office. The Environment and Safety Manager will also notify and continuously update EPA on actions taken and containment and cleanup operations. The LEC environment and safety manager will then file a full report with the EPA of the incident.

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² Guidelines for Spill Contingency Planning by Water Resources Division Indian and Northern Affairs, Canada (2007)
Figure 2 Flow Chart of response organization for possible spill at Pipeline and Storage Tanks (LEC)

1. **Spill or release identified by staff or contractors (including Connex & LPRC)**
   - Assess personal safety and safety of others
   - Identify Product
   - Notify LEC area supervisor/response team

   **Minor Spill**
   - Remove all sources of ignition
   - Stop spill if safely possible
   - Contain the spill and ensure spill does not enter water body
   - Document incident with spill report form
   - Notify LEC Environment and Safety Manager during working hours
   - Notify EPA and file report

   **Major Spill**
   - Remove all sources of ignition
   - Stop spill if safely possible
   - Contain the spill and ensure spill does not enter water body
   - Document incident with spill report form
   - Notify LEC Environment and Safety Manager immediately
   - Notify EPA and file report
4 ACTION PLAN

The initial action is to ensure the safety of all personnel in the vicinity of the spill, and to alert the response team. The spill and site conditions are assessed including speed of spill and direction, and potentially impacted surrounding environment. All combustibles, flammables, and ignition sources (such as running engines) likely to result in a fire will be removed from the vicinity of the spill and anyone in the area will be advised to stay upwind of the spill site. Where possible, attempts will then be made to stop the spill (e.g. by shutting the pump, or patch leaking a pipeline hole).

A determination is then made for the best location for containing the spill and measures taken to avoid spills reaching nearby water bodies. The spill is then isolated and contained depending on its nature and location, either on land or on water.

4.1 SPILL CONTAINMENT ON LAND

To decrease risk of spills from the HFO tank to the surrounding environment, the areas surrounding fuel storage tanks will have concrete flooring, and a secondary containment retaining wall which will be designed to hold 110% capacity of the largest tank. In addition the tanks will be fitted with high-level (filling) alarms to minimize over-filling and spillage.

Where spills escape the tank containment areas or occur along the HFO pipeline, the spills will be isolated and contained by the placement of sorbent materials if the liquid fuel oil from the spill is migrating slowly. Spill kits will be kept at the project site and on the transport vehicles to readily clean up small spills.

Faster migrating spills will be contained by digging containment dykes using surrounding soil, either around the perimeter or down slope of the spilled fuel. A plastic tarp placed at the base of the dyke can be used to pool the spilled fuel for later sorbent material collection or pumping. If dyke building is not feasible, trenches will be dug and lined with plastic tarp for containment instead.

All soil contaminated by spills will be excavated and disposed of in accordance with the LEC’s hazardous waste management procedures, EPA requirements, and best industry practice. Excavation and disposal will be handled by an EPA certified solid waste contractor. Disposal
will be done at a site approved by EPA. Disposal will be undertaken in a timely fashion with due regard for potential adverse environmental impacts, health and safety and regulatory requirements.

4.2 **SPILL CONTAINMENT ON WATER**

Spills on water can severely impact aquatic life and water quality. Spills floating on water surfaces can be spread by the action of wind, waves and currents and is affected by wind speed, and local air and water temperatures. The spilled fuel can also move to the shore coating beaches, rocks and land based flora and fauna. Hence all attempts must be made to contain the spill and prevent any further negative environmental impacts.

Water spill response techniques can be described as follows:

- Mechanical Containment;
- Chemical and biological methods;
- Physical containment;
- Scare Tactics.

4.2.1 **Mechanical Containment**

Mechanical containment consists of instruments such as booms, skimmers, weirs and barriers which form the first line of defense against spills into water bodies.

Fuel spilled into marine waters at the port will be contained by releasing containment booms. These function as floating containment devices with a below water skirt that has longitudinal support to provide strength against currents.

The booms are released from the shore if the spill is close to the shore line, or a boat to create a circle around the spill. As well as acting as physical containment devices, booms contain sorbent material that adsorbs the spilled fuel onto its surface further limiting spread of the spill, and aiding in collection and recovery. The boom thus acts to prevent dispersion and

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3 US EPA oil spill response techniques: [http://www.epa.gov/emergencies/content/learning/oiltech.htm](http://www.epa.gov/emergencies/content/learning/oiltech.htm) accessed on 19.08.2013
contain the spill into a localized area.

The contained fuel will then be recovered by skimmers and pumps for collection and later disposal. Booms work best in gentle waters and can be fixed to the pier should the spill occur at or near that location.

If the oil spill occurs on land and reaches a flowing stream, weirs or other barriers will be used to contain it and prevent further migration of the spill downstream. The collected fuel will then be removed using skimmers, sorbents, or pumps into barrels for later disposal. Barriers such as netting containing sorbent material can also be installed across the stream. These act by adsorbing the fuel while at the same time allowing water flow to continue downstream. The sorbents must be replaced as soon as they are saturated so as to continue to function effectively.

4.2.2 Chemical Methods

In conjunction with mechanical means, chemical dispersants consisting of surfactant and solvent components will be used to accelerate the process of natural dispersion of the remaining oil into the water column. Dispersants can be applied using boats, but should not be sprayed into shallow waters so as not to become a source of further environmental contamination.

4.2.3 Physical Methods

Physical methods, such as wiping with sorbent materials, pressure washing, and raking and bulldozing will be used to remove oil that has reach the shore and is affecting the shoreline.

4.2.4 Scare Tactics

Devices such as helium balloons and floating dummies will be used to scare birds and other animals away from the contaminated area.

4.3 MANAGING SPILL WASTES AFTER RECOVERY

Collected spilled petroleum products and contaminated materials such as sorbent pads and contaminated soils, will be placed into empty waste oil containers and sealed for disposal at an EPA approved hazardous waste disposal facility.
4.4 DOCUMENTATION

A spill report form is included as Appendix A of this document. All spills of any size will be reported to EPA in a form filed by the LEC Environment and Safety Manager. Supportive documentation such as photographs will also be submitted at that time. The report will also include documentation of clean-up methods used.

4.5 MONITORING AS A FOLLOW UP

A monitoring program shall be developed and implemented to confirm the effectiveness of any required clean-up.

4.6 ROOT CAUSE ASSESSMENT AND CORRECTIVE ACTION

An investigation will be undertaken to determine the root cause(s) of the incident and to identify, if feasible, corrective actions that can be undertaken to ensure that the incident does not recur.
5 SPILL KIT RESOURCE INVENTORY

Spill kits will be located at LEC’s Bushrod Island facility, the pump station area, HFO storage tank area, and on transport vehicles (if any).

The contents of the Spill Kits are as follows:

- 4 Tyvek splash suits
- 4 pairs of chemical master gloves
- 10 large bags with ties for temporary use
- 2 oil only booms (5”x 10”)
- 50 oil only mats (16”x20”)
- sorbent socks
- 10 sorbent pads
- 2 large tarps
- 1 roll duct tape
- 1 utility knife
- 1 field note book and pencil
- 1 rake
- 1 pick axe
- 3 aluminum scoop shovels
- 1 instruction binder
6 DESCRIPTION OF TRAINING PROGRAMS

The LEC Environment and Safety Manager will develop an employee and contractor training program which includes the following:

- Orientation to all new employees including location of Oil Spill Response Plan and Spill Kits

- Regular training sessions including mock spill drills to ensure that the employees and contractors are familiar with the equipment and the steps to be undertaken in the event of an oil spill including the correct procedures of using the spill kits.

- First Aid Training to all employees and contractors.

- Records of training undertaken which include the next training date requirements.
Appendix

A. Spill Report Form

Material Safety Data Sheet for HFO