2.0 OIL SPILL PLANNING AND RESPONSE

The prime focus of oil spill countermeasures activity is prevention. This will be achieved through well-designed equipment, good maintenance and operating procedures, sound training techniques, as well as a high degree of awareness and concern at all levels by employees and management. The project’s GOSRP will adopt principles from other existing oil spill documents and resources, such as the:

- **Exxon Oil Spill Response Field Manual** – This manual provides a condensed version of significant information on various techniques to be considered for oil spill response. The manual is organized by the sequence of events to be considered for oil spill response and provides flow diagrams, charts, and analyses designed to indicate potential solutions or approaches to commonly observed problems in oil spill response operations.

- **Tier 2/3 Response Team** – Additional layers of oil spill response are provided from mobilization of resources from regional to national organizations, if needed. Oil spill response cooperatives are also used as appropriate. National and Regional Cooperatives can be mobilized, two such candidate resources being considered are the Clean Nigeria Corporation and Oil Spill Response Limited. During the oil spill response plan development process, Tier 2/3 equipment needs will be assessed and an appropriate strategy that includes the use of national and regional cooperatives will be developed. If a spill occurs that cannot be adequately controlled by local resources, a designated On-Scene Commander has the authority to call upon and mobilize the described Tier 2/3 resources.

The philosophy regarding oil spill response is to handle the spill incident on an emergency basis. The response, containment and initial clean up of the spill take priority over other operational activities. Although the primary objective is oil spill prevention, it is recognized that prior planning will help in reducing the risk of pollution. Therefore, oil spill response plans are developed as a tool for training and responding to such events in an organized and timely manner.

As will be indicated in the project’s GOSRP, the primary objectives in responding to an oil spill will be protection of life, property, and the environment; reduction of economic loss, and provision of accurate and timely information. The policy will be to exercise diligence in preventing oil spills. If a spill occurs, action should be taken to promptly contain and clean up the oil.

The following sections provide information on oil spill planning and response activities which have been initiated and will be updated and tested before operations. Current information is provided on contamination incidents, analysis of spill trajectories for the Gulf of Guinea, and the potential for oil spills to affect international waterways.
2.1 OIL SPILL PLANNING

Prevention is the best response to an incident, followed by contingency planning. Oil spill response and contingency planning for the project will provide the background information and response planning guidelines necessary to implement an effective spill response. Oil spill prevention and minimization measures have been incorporated throughout the design. Proven technology, design, materials, and construction techniques will be used. To facilitate training and operations, standardized equipment and simple designs will be used. Additional prevention and mitigation measures planned for the project include: internal and external corrosion control measures, berms around oil storage tanks, burying flowlines, burying the pipeline, strategic placement of block valves or check valves to reduce spill potential, oily water collection systems at major facilities, 24-hour manned automation System Control and Data Acquisition (SCADA) monitoring, leak detection systems, visual monitoring, and emergency shut down systems (ESDs). Please refer to the Project Description (Volume 1 of the "Supporting Documentation") for further details regarding these prevention and mitigation measures. Table 2-1 presents an analysis of the crude oil properties at reservoir conditions associated with this project. However, because the cumulative characteristics of the crude oil properties shown in Table 2-1 behave similarly to that of Bunker C crude, Bunker C data was used to calculate the oil spill trajectories presented in Appendix B.

The GOSRP will adhere to international conventions and agreements such as the International Convention for the Safety of Life at Sea (SOLAS) and the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78). The project will also comply with a rigorous set of internal environmental management systems and standards for environmental, health and safety activities. This group of standards and their associated procedures is called the Operations Integrity Management System (OIMS). Although OIMS was developed independently by Exxon, it is similar to a widely accepted independent standard for environmental performance -- the ISO 14001 standard.

An audit by a recognized independent, third party company has concluded that OIMS meets the ISO 14001 standard. ISO, the International Organization for Standardization, adopted the ISO 14001 protocols for environmental management in 1996. As a point of reference, ISO is the same body that developed the ISO 9000 standards that have been almost universally adopted around the world as the benchmark for measuring quality control performance in manufacturing processes. ISO has certified several companies as independent auditors for the ISO 14001 standard. The auditor for OIMS compliance with ISO 14001 was Lloyd's Register Quality Assurance Ltd., a subsidiary of Lloyd's Register, which for 200 years has been a leading independent classification and inspection authority for marine, offshore and industrial activities. Upon completion of its review, Lloyd's attested that OIMS meets ISO 14001 requirements and
that the standard has been implemented throughout Exxon\(^1\), including the Exxon affiliates that are participating in this project. It is this standard for environmental, health and safety management that would be in force throughout the life of the project and it has been codified in the Environmental Management Plans (of which the GOSRP is a part of) for the two host countries.

The ASOSRPs will be developed by studying detailed project designs to determine the most likely and credible spill scenarios for different operating environments and geographical areas. Appendix A provides a table of contents for the GOSRP. Information describing ecological habitats and wildlife areas, as well as local towns and communities have been gathered from various sources, including government, academia, private agencies, and field studies. Aerial photographs of parts of the Cameroon coastline have been taken and Environmental Sensitivity Index (ESI) maps of the shoreline, between the southern Cameroon border and the entrance to the Wouri estuary, have been prepared and are presented in Appendix B. These ESI maps present shoreline types and characteristics, environmentally sensitive habitats, breeding areas, various land use areas (industrial, recreation, residential, parks and reserves, etc.), and shoreline access points. This information will be taken into account to design effective response strategies, staffing requirements, and equipment stockpiling requirements for the project.

Evidence of financial responsibility will be demonstrated by Esso Exploration and Production Chad, Inc. (EEPCI's) insurance coverage for the production operations in Chad and by Tchad Oil Transportation Company, S.A. (TOTCO's) and Cameroon Oil Transportation Company, S.A. (COTCO's) insurance coverage for the operation of their respective transportation systems. As part of the overall insurance coverage currently envisaged, there will be liability coverage in force for the onshore and offshore facilities and operations. The conditions of the coverage will meet regulatory, Consortium, and lender requirements.

The GOSRP developed for the Chad Export Project will include oil spill response scenarios at the following locations:

- A land spill 10 km from Pump Station No. 1 in the OFDA to illustrate EEPCI's land based oil spill response plan;
- A spill into the Nya River drainage located in the OFDA to illustrate EEPCI's oil spill response plan in a river drainage system;
- A spill into the Lim River, part of the Lake Chad drainage basin, to illustrate TOTCO's plan for oil spill response at a major river crossing that may have international waterway implications;

\(^1\) This opinion of Lloyd's Register Quality Assurance was published on January 31, 1998.
• A spill at the Mbéré River crossing along the border between Chad and Cameroon to illustrate both COTCO's and TOTCO's oil spill response plan at a major river crossing that would have international waterway implications;

• A spill on the north flank of the Mbéré Rift Valley where oil would flow into the Mbéré River. This will illustrate COTCO's oil spill response plan along a portion of the Mbéré River that forms the boundary between the Central African Republic (CAR) and Cameroon which would have international waterway implications;

• A spill at the Lom River crossing just upstream of the confluence of the Lom River with the Sanaga River in the Deng Deng region. This will illustrate COTCO's oil spill response plan at a major river crossing, which would be similar to other major river crossing in Cameroon;

• An offshore 500 barrel spill at the FSO location which may result from a gasket leak or from the rupture of a loading hose during offloading operations. This will illustrate COTCO's oil spill response plan for an offshore spill of this magnitude; and,

• An offshore 50,000 barrel spill at the FSO location as a result of a ship collision with the FSO. This volume represents the release of approximately half of a full wing tank on the FSO. This will illustrate COTCO's oil spill response plan for a major offshore oil spill.

The ASOSRPs will provide information regarding the notification process that will be implemented in the event that an oil spill occurred. This notification process will ensure that adjacent countries and other affected users who are dependent upon the affected waters are appropriately notified in a timely manner.

### 2.2 OIL SPILL RESPONSE (OSR)

If an incident occurs, the GOSRP will be implemented. Proper notifications will be made and the appropriate response actions will be implemented to reduce impacts of the incident. Dependent upon the nature and location of the spill, deployment and response strategies to be provided in the GOSRP will include:

• Recovery and protective booming;
• Mechanical recovery;
• Dispersant application;
• In-situ burning;
• Sorbents;
• Bioremediation;
• Chemical treatment/washing; and,
• Tilling and soil aeration.

### 2.2.1 Oil Spill Response Objectives

Prevention of spills will be the focus of the project. Prevention can be achieved through:

• Management commitment;
• Well designed equipment systems and facilities;
• Preventative maintenance;
• Systematic training; and,
• Employee awareness.

It is recognized that despite best management practices, a spill may occur. In this event, the objective of the oil spill response is to assure that actions are compatible with the balanced environmental, social, and economic needs of the community. The response strategy will include viable techniques to reduce damage from a spill. Notification will be given to appropriate government agency(s) and local residents in an affected area.

### 2.2.2 Response Organization

A three-tiered organizational response structure will be used to respond to an incident. The tiered response system is designed to expand as the situation, magnitude of the incident, and environmental conditions require. The initial response, Tier 1, is a local response to a spill of limited volume occurring at or near a facility and typically resulting from routine operations. Examples of Tier 1 response include a valve leak, pipeline leak, tank overflow, or a small on-water spill. Sufficient equipment and manpower is available locally to protect local resources, mitigate damage, and clean up the spill.

A Tier 2 response will be initiated when the incident escalates to a level which requires the participation of resources not involved in local operations, including other area affiliate/industry operators. The entire regional Tier 2 response team may be requested to respond. In addition, local industry cooperative organizations may be activated. In many cases, these incidents may be further complicated by bad weather or other circumstances. An example of a Tier 2 response would involve a major land spill utilizing mutual aid or cooperative support.

A Tier 3 response is for the most serious type of spill incident, such as rupture of a large storage tank or a pipeline incident resulting in a sizable environmental impact. In many cases, these incidents may be further complicated by bad weather or other circumstances. A Tier 3 response would include support from regional and/or worldwide cooperatives.
Readiness to respond to an incident will be tested through exercises and drills on a routine basis to ensure personnel demonstrate knowledge of oil spill response procedures for the facilities. Equipment may be deployed, communications tested, and response needs evaluated during drills and exercises. As a result of an exercise or drill, the GOSRP may be revised.
### TABLE 2-1
**UPPER CRETACEOUS CRUDE PROPERTIES**

<table>
<thead>
<tr>
<th></th>
<th>Komé</th>
<th>Miandoum</th>
<th>Bolobo</th>
</tr>
</thead>
<tbody>
<tr>
<td>API Gravity (°API)</td>
<td>18-20</td>
<td>24</td>
<td>17-22</td>
</tr>
<tr>
<td>Pour Point (°F)</td>
<td>15-40</td>
<td>20</td>
<td>13-37</td>
</tr>
<tr>
<td>Gas/Oil Ratio (scf/STB)</td>
<td>15</td>
<td>47</td>
<td>15-32</td>
</tr>
<tr>
<td>Sulfur (weight %)</td>
<td>0.1-0.14</td>
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<td>0.10-0.12</td>
</tr>
<tr>
<td>Vanadium (weight ppm)</td>
<td>0.21-0.39</td>
<td>&lt;1</td>
<td>0.19-0.31</td>
</tr>
<tr>
<td>Nickel (weight ppm)</td>
<td>12.2-13.6</td>
<td>5.4</td>
<td>9.01-12.6</td>
</tr>
<tr>
<td>Iron (weight ppm)</td>
<td>30.5-32.8</td>
<td>20</td>
<td>7.21-16.3</td>
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<tr>
<td>Sodium (weight ppm)</td>
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<td>9.29-10.6</td>
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<tr>
<td>H₂S (ppm)</td>
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<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Nitrogen (mol %)</td>
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<td>0.21</td>
<td>0.19-0.99</td>
</tr>
<tr>
<td>CO₂ (mol %)</td>
<td>0.14</td>
<td>0.07</td>
<td>0.06-0.51</td>
</tr>
<tr>
<td>Total Acid Number (mg KOH/g crude)</td>
<td>5.4-7.4</td>
<td>1.0</td>
<td>4.4-7.3</td>
</tr>
</tbody>
</table>

1 Table 2-1 presents an analysis of the crude oil properties associated with this project. However, because the cumulative characteristics of the crude properties shown in Table 2-1 behave similarly to that of Bunker C crude, Bunker C data was used to calculate the oil spill trajectories presented in Appendix B.