# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>LIST OF TABLES</th>
<th>Pag.</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIST OF FIGURES</td>
<td>2</td>
</tr>
<tr>
<td>ACRONYMS</td>
<td>2</td>
</tr>
<tr>
<td>EXECUTIVE SUMMARY</td>
<td>3</td>
</tr>
<tr>
<td>EXECUTIVE SUMMARY</td>
<td>5</td>
</tr>
<tr>
<td>INTRODUCTION</td>
<td>9</td>
</tr>
<tr>
<td>1.1 JUBILEE AND TEN</td>
<td>9</td>
</tr>
<tr>
<td>1.2 MARITIME BOUNDARY UPDATE</td>
<td>10</td>
</tr>
<tr>
<td>1.3 REPORT ORGANIZATION</td>
<td>10</td>
</tr>
<tr>
<td>INDEPENDENT VERIFICATION SCOPE OF THE WORK AND ADOPTED METHODOLOGY</td>
<td>11</td>
</tr>
<tr>
<td>SITE VISIT DESCRIPTION</td>
<td>12</td>
</tr>
<tr>
<td>REVIEW OF ENVIRONMENTAL AND SOCIAL ACTION PLAN COMMITMENTS</td>
<td>14</td>
</tr>
<tr>
<td>REVIEW OF PROJECT MONITORING DATA AND SITE VISIT FINDINGS</td>
<td>28</td>
</tr>
<tr>
<td>5.1 ESMS ORGANIZATION AND REPORTING</td>
<td>28</td>
</tr>
<tr>
<td>5.1.1 Organization and Staffing</td>
<td>29</td>
</tr>
<tr>
<td>5.1.2 Training</td>
<td>30</td>
</tr>
<tr>
<td>5.1.3 Certification</td>
<td>30</td>
</tr>
<tr>
<td>5.1.4 Periodical Review of ESAP Related Plans</td>
<td>30</td>
</tr>
<tr>
<td>5.1.5 Management of Change</td>
<td>31</td>
</tr>
<tr>
<td>5.1.6 Reporting</td>
<td>31</td>
</tr>
<tr>
<td>5.2 BIOPHYSICAL COMPONENTS</td>
<td>31</td>
</tr>
<tr>
<td>5.2.1 Waste Management</td>
<td>32</td>
</tr>
<tr>
<td>5.2.2 Waste Water Management</td>
<td>34</td>
</tr>
<tr>
<td>5.2.3 Air Quality</td>
<td>36</td>
</tr>
<tr>
<td>5.2.4 Chemical Management</td>
<td>38</td>
</tr>
<tr>
<td>5.2.5 Noise</td>
<td>39</td>
</tr>
<tr>
<td>5.2.6 Ecology</td>
<td></td>
</tr>
<tr>
<td>5.3 HEALTH &amp; SAFETY COMPONENTS</td>
<td>39</td>
</tr>
<tr>
<td>5.3.1 H&amp;S Management</td>
<td>40</td>
</tr>
<tr>
<td>5.3.2 Process Safety Management</td>
<td>43</td>
</tr>
<tr>
<td>5.3.3 Incident Investigation &amp; Reporting</td>
<td>43</td>
</tr>
<tr>
<td>5.3.4 Competency Management &amp; Training Activities</td>
<td>45</td>
</tr>
<tr>
<td>5.3.5 Emergency Management</td>
<td>46</td>
</tr>
<tr>
<td>5.3.6 H&amp;S Performance Monitoring</td>
<td>47</td>
</tr>
<tr>
<td>5.3.7 SCEs/ECEs Management</td>
<td>48</td>
</tr>
<tr>
<td>5.4 SOCIAL COMPONENTS</td>
<td>49</td>
</tr>
<tr>
<td>5.4.1 TGL Social Performance Strategy</td>
<td>49</td>
</tr>
<tr>
<td>5.4.2 Community Engagement/Consultation and Disclosure</td>
<td>51</td>
</tr>
<tr>
<td>5.4.3 Grievance Management</td>
<td>52</td>
</tr>
<tr>
<td>5.4.4 Exclusion Zone Management</td>
<td>52</td>
</tr>
</tbody>
</table>
LIST OF TABLES
Table 5.1: Produced Water Annual Concentration for 2016 35
Table 5.2: Total GHG Emissions by Source from TGL Activities in 2016 36
Table 5.3: Budget allocation for SI Projects 54

LIST OF FIGURES
Figure 1.1: Location of the Jubilee and TEN Oil Fields 9
Figure 5.1: Jubilee Flaring Performance 2016 38
# ACRONYMS

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALARP</td>
<td>As Low As Reasonably Practicable</td>
</tr>
<tr>
<td>AMR</td>
<td>Annual Monitoring Report</td>
</tr>
<tr>
<td>AoI</td>
<td>Area of Influence</td>
</tr>
<tr>
<td>AZ</td>
<td>Advisory Zone</td>
</tr>
<tr>
<td>CCR</td>
<td>Central Control Room</td>
</tr>
<tr>
<td>CHPS</td>
<td>Community-based Health Planning and Services</td>
</tr>
<tr>
<td>CLO</td>
<td>Community Liaison Officer</td>
</tr>
<tr>
<td>CMMS</td>
<td>Computerized Maintenance Management System</td>
</tr>
<tr>
<td>COSHH</td>
<td>Control of Substances Hazardous to Health</td>
</tr>
<tr>
<td>CTO</td>
<td>Case to Operate</td>
</tr>
<tr>
<td>ECE</td>
<td>Environmental Critical Element</td>
</tr>
<tr>
<td>EHS</td>
<td>Environmental Health and Safety</td>
</tr>
<tr>
<td>EHSAP</td>
<td>Environmental Health and Safety Asset Protection</td>
</tr>
<tr>
<td>EMP</td>
<td>Environmental Monitoring Plan</td>
</tr>
<tr>
<td>EMS</td>
<td>Environmental Management System</td>
</tr>
<tr>
<td>ESAP</td>
<td>Environmental Social Action Plan</td>
</tr>
<tr>
<td>ESIA</td>
<td>Environmental and Social Impact Assessment</td>
</tr>
<tr>
<td>ESMS</td>
<td>Environmental and Social Management System</td>
</tr>
<tr>
<td>EZ</td>
<td>Exclusion Zone</td>
</tr>
<tr>
<td>FFDP</td>
<td>Full Field Development Plan</td>
</tr>
<tr>
<td>FPSO</td>
<td>Floating Production, Storage and Offloading</td>
</tr>
<tr>
<td>Gh EPA</td>
<td>Ghana Environmental Protection Agency</td>
</tr>
<tr>
<td>GHG</td>
<td>Greenhouse Gases</td>
</tr>
<tr>
<td>GNCFC</td>
<td>Ghana National Canoe Fishermen Council</td>
</tr>
<tr>
<td>GTG</td>
<td>Gas Turbine Generator</td>
</tr>
<tr>
<td>H&amp;S</td>
<td>Health and Safety</td>
</tr>
<tr>
<td>HIPO</td>
<td>High Potential</td>
</tr>
<tr>
<td>HLO</td>
<td>Helicopter Landing Officer</td>
</tr>
<tr>
<td>HR</td>
<td>Human Resources</td>
</tr>
<tr>
<td>HSE</td>
<td>Health, Safety and Environmental</td>
</tr>
<tr>
<td>IESC</td>
<td>Independent Environmental and Social Consultant</td>
</tr>
<tr>
<td>IFC</td>
<td>International Finance Corporation</td>
</tr>
<tr>
<td>IMO</td>
<td>International Maritime Organization</td>
</tr>
<tr>
<td>IPIECA</td>
<td>International Petroleum Industry Environmental Conservation Association</td>
</tr>
<tr>
<td>ITLOS</td>
<td>International Tribunal of the Law of the Sea</td>
</tr>
<tr>
<td>IVB</td>
<td>Independent Verification Body</td>
</tr>
<tr>
<td>JEAM</td>
<td>John Evans Atta Mills</td>
</tr>
<tr>
<td>KNK</td>
<td>Kwame Nkrumah</td>
</tr>
<tr>
<td>KPI</td>
<td>Key Performance Indicators</td>
</tr>
<tr>
<td>LDSP</td>
<td>Livelihood Diversification and Support Project</td>
</tr>
<tr>
<td>LIA</td>
<td>Livelihood Impact Assessment</td>
</tr>
<tr>
<td>LTI</td>
<td>Lost Time Injury</td>
</tr>
<tr>
<td>LTIF</td>
<td>Lost Time Injury Frequency</td>
</tr>
<tr>
<td>M&amp;E</td>
<td>Monitoring and Evaluation</td>
</tr>
<tr>
<td>MAH</td>
<td>Major Accident Hazard</td>
</tr>
<tr>
<td>MARPOL</td>
<td>Marine Pollution: International Convention for the Prevention of Pollution From Ships</td>
</tr>
<tr>
<td>MFAC</td>
<td>Marine Fisheries Advisory Committee</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Full Form</td>
</tr>
<tr>
<td>--------------</td>
<td>-----------</td>
</tr>
<tr>
<td>MMO</td>
<td>Marine Mammal Observer</td>
</tr>
<tr>
<td>MOC</td>
<td>Management Of Change</td>
</tr>
<tr>
<td>M&amp;E</td>
<td>Monitoring and Evaluation</td>
</tr>
<tr>
<td>MoFAD</td>
<td>Ministry for Fisheries and Aquaculture Development</td>
</tr>
<tr>
<td>MSDS</td>
<td>Material Safety Data Sheet</td>
</tr>
<tr>
<td>NADF</td>
<td>Non Aqueous Drilling Fluids</td>
</tr>
<tr>
<td>NGO</td>
<td>Non-governmental organization</td>
</tr>
<tr>
<td>NORM</td>
<td>Naturally Occurring Radioactive Material</td>
</tr>
<tr>
<td>NRA</td>
<td>Nuclear Regulatory Authority</td>
</tr>
<tr>
<td>NTS</td>
<td>Non-Technical Summary</td>
</tr>
<tr>
<td>O&amp;M</td>
<td>Operation &amp; Maintenance</td>
</tr>
<tr>
<td>OGP</td>
<td>International Association of Oil &amp; Gas Producers</td>
</tr>
<tr>
<td>OHS</td>
<td>Occupational Health Safety</td>
</tr>
<tr>
<td>OIM</td>
<td>Offshore Installation Manager</td>
</tr>
<tr>
<td>OIW</td>
<td>Oil in Water</td>
</tr>
<tr>
<td>OMF</td>
<td>Operational Management Framework</td>
</tr>
<tr>
<td>OOC</td>
<td>Oil On Cuttings</td>
</tr>
<tr>
<td>OSC</td>
<td>Operations Safety Case</td>
</tr>
<tr>
<td>OSCP</td>
<td>Oil Spill Contingency Plan</td>
</tr>
<tr>
<td>OSCR</td>
<td>Offshore Safety Case Regulation</td>
</tr>
<tr>
<td>OWS</td>
<td>Oil Water Separator</td>
</tr>
<tr>
<td>PCDP</td>
<td>Public Consultation and Disclosure Plan</td>
</tr>
<tr>
<td>POB</td>
<td>Personnel On-board</td>
</tr>
<tr>
<td>PPE</td>
<td>Personal Protective Equipment</td>
</tr>
<tr>
<td>PS</td>
<td>Performance Standard</td>
</tr>
<tr>
<td>PTW</td>
<td>Permit to Work</td>
</tr>
<tr>
<td>RCA</td>
<td>Root Cause Analysis</td>
</tr>
<tr>
<td>SSAF</td>
<td>Safe Sea Access Framework</td>
</tr>
<tr>
<td>SCEs</td>
<td>Safety Critical Elements</td>
</tr>
<tr>
<td>SI</td>
<td>Social Investment</td>
</tr>
<tr>
<td>SMS</td>
<td>Safety Management System</td>
</tr>
<tr>
<td>SP</td>
<td>Social Performance</td>
</tr>
<tr>
<td>SSEA</td>
<td>Safety, Sustainability and External Affairs</td>
</tr>
<tr>
<td>TEN</td>
<td>Tweneboa, Enyenra and Ntomme</td>
</tr>
<tr>
<td>TGL</td>
<td>Tullow Ghana Limited</td>
</tr>
<tr>
<td>TQ</td>
<td>Technical Query</td>
</tr>
<tr>
<td>TRIF</td>
<td>Total Recordable Injury Frequency</td>
</tr>
<tr>
<td>TVET</td>
<td>Technical, Vocational Education and Training</td>
</tr>
<tr>
<td>VPSHRs</td>
<td>Voluntary Principles on Security and Human Rights</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organisation</td>
</tr>
<tr>
<td>WMP</td>
<td>Waste Management Plan</td>
</tr>
</tbody>
</table>
INDEPENDENT EXTERNAL MONITORING
TULLOW OIL JUBILEE PROJECT
MAY 2017

EXECUTIVE SUMMARY

The Jubilee Phases 1, 1A and Tweneboa, Enyenra, Ntomme (TEN) Oil and Gas Development Project (or “the Project”) involves the extraction of hydrocarbons from the two oil fields located offshore Ghana.

The Jubilee oil field lies in deep waters, with depth ranging between 1,100 and 1,700 meters; it is located at approximately 60 km from the shoreline at the western edge of Ghana and covers an area of about 110 km². The TEN field is located approximately 20 km west of Jubilee field and some 45 km offshore from the Ghana mainland.

The Jubilee Phase 1 consists of drilling and development of 17 oil, gas and reinjection wells connected with a Floating Production, Storage and Offloading (FPSO) Vessel for commercialization of the produced oil.

The Jubilee Phase 1A development project, designed to increase production and recover additional reserves, was approved by the Government of Ghana in January 2012. Phase 1A included the drilling and completion of 8 additional oil production and water injection wells, the tie-in to the existing FPSO unit and the installation of additional subsea equipment for water injection.

On 29 May 2013, the Government of Ghana formally approved the TEN Project and Tullow Ghana Ltd (TGL) commenced with its second major operated deep water development project in Ghana. Similar to Jubilee, the development includes the use of an FPSO, named FPSO Prof. John Evans Atta Mills (JEAM). First oil was achieved in August 2016, three years after the Plan of Development was approved by the Government of Ghana. Following first oil, the oil production, gas compression/injection and water injection systems were commissioned and are now operational.

Within the project disbursement agreement, TGL, the designated Unit Operator, and the International Finance Corporation (IFC) have established a range of Environmental and Social management measures applicable for the Jubilee Phases 1 and 1A Project, which have been included in an Environmental and Social Action Plan (ESAP), developed in compliance with IFC’s Performance Standards and Guidelines.

For the TEN development, TGL requested approval from IFC (and the involved lenders) in order to add TEN assets into the Reserve Based Lending facility to finance its development. Therefore the TEN Project is being developed according to the same IFC Performance Standards (2006)

This report provides the findings and observations of the independent environmental and social consultant (IESC) as a result of the external independent monitoring group visit and review carried out in May 2017, relevant to the period of 2016 and up to the time of the site visit.

The IESC site visit included the TGL headquarters in Accra, the JEAM FPSO (TEN), the onshore TGL shore base in Takoradi, the TGL facilities at the Sekondi Naval Base, TGL area of the Takoradi Port, Zoil and Zeal waste contractors facilities, meetings with the National Ghana Canoe Fisherman council, and the Western Regional Coordinator of the Petroleum Commission, visits to the communities of Dixcove and Ahanta.

At the time of the 2017 independent external verification, all actions foreseen by the ESAP (dated December 2010) have been already implemented by TGL; nonetheless the external independent monitor has conducted a systematic review of all actions included in the ESAP in order to provide a follow up on the current status of their implementation.

Based on the conducted review, no non-compliance situations with respect to the implementation of the ESAP requirements were identified for the period in review. Some observations have been made by the IESC regarding specific ESAP items, however, these are suggestions for improvement and are not deemed to be non-compliances. The following provides an overview of the main IESC findings and suggestions, while additional details can be found in the respective sections of the report.

Doc. No. P0001643-H1 Rev. 0 – May 2017
During the site visit, the IESC were provided with the last amendment and upgrade of the TGL management system which is now the Tullow Integrated Management System (IMS), and the development and rollout of the Operational Management Framework (OMF), which is now referred to as the Operational Framework (OF).

The IMS has been embedded throughout the course of 2016 and is now fully operational and covers all the management aspects of Non-Technical Risks. The OF objective is to have all operational documents available online and accessible to all (TGL and contractors). The integration of the operational documents for TGL and MODEC, the O&M contractor for Jubilee FPSO (KNK FPSO) and owner/operator of for the TEN FPSO (JEAM FPSO), has been completed. The OF integration project commenced 2.5 years ago and it is an ongoing process. The system includes a shared portal divided in 10 elements where all relevant parties can access documents.

The TGL organizational structure remained stable following the internal restructuring which occurred in the “Simplification Project” in 2015. The Environmental, Health, Safety and Asset Protection (EHSAP) manager remains unchanged and continues to be supported by the Environment Team Lead, the Asset Protection Team Lead and the Health and Safety Team Leads. MODEC personnel have now been included into the TGL Structure. The EHSAP structure remains adequate for the current activities.

The Social team organizational structure is not captured under the EHSAP structure, and is kept separate under the organigram of Sustainability and External Affairs. At Takoradi, the position of the Social Performance (SP) Manager, has remained stable since 2015. A general stability has characterized the entire SP team including the six CLOs appointed to work as the linking focal points between TGL and the communities.

No other strikes on the FPSO have been reported since 2014 by MODEC employees. In order to prevent possible strikes, closer follow-up and monitoring by TGL of the MODEC grievances is reportedly now in place: regular coordination activities are organized between TGL and MODEC Human Resources (HR) departments and TGL receives copies of the MODEC grievance report. TGL is entitled to be involved, if necessary, in the resolution of MODEC grievances.

TGL has no “worker organization” or “worker representatives” figure. There are Town Hall Meetings or Team Meetings through which Company objectives and initiatives, HR programmes and other issues are discussed. The Employee Engagement Forum occurs quarterly to discuss employee concerns and input into key business initiatives.

Extensive Environmental, Health and Safety (EHS) training continued in 2016 and is scheduled for 2017 covering a wide range of topics, including oil spill management and response (IMO level III), project-management, essentials of Oil and Gas (O&G) for non-technical personnel, and specific training required across different working environments. Training on social topics has been provided to selected members of the SP team in order to better understand the issue of canoe incursions, it was given the opportunity to spend two weeks on-board the survey vessels patrolling the Advisory Zone (AZ) during the seismic survey.

Environmental monitoring actions continue to be carried out by the Project. For the 2016 reporting period, the previously established EMPs remained in place and the monitoring requirements are still undertaken according to the TGL Monitoring Plan. Some of the TGL EMPs have not been reviewed within the nominated time frame (annually, or every 2 years depending on the document). The Environmental Management Plan, which is the main document providing guidance on the environmental management framework for both Jubilee and TEN, has been recently updated and will remain valid in its current revision for the next three years, until October 2018. The other main environmental plans that are subsidiary to the EMP, such as the Environmental Monitoring Plan, the Waste Management Plan, the Chemicals Management Guidelines, the OSCP and the Integrated Audit Plan have been modified and implemented to include management and monitoring requirements also for the TEN project.

TGL received a new permit issued on May 25th, 2015 with a validity of 3 years covering the ongoing FPSO production, operations logistical support including the chemical support facility operated by Baker Hughes.

The environmental certificate states that there will be no production flaring of associated gas, and that any flaring beyond the 3% limit will incur administrative charges, unless a waiver is submitted and approved by the Ghana Environmental Protection Agency (Gh EPA). Nevertheless, in 2016 flaring performance for the FPSO’s has regularly exceeded Gh EPA limits for several months due to numerous process upsets and maintenance activities. When flaring is associated with a planned maintenance activity previously anticipated, a pre-approval is sought.
from the Gh EPA ahead of the activity. Flaring remains a constant aspect of the Project, and the IESC understands that production flaring, while not specifically permitted by the Gh EPA permit, will remain a continuous Project necessity but at the same time presents environmental and OHS concerns. Therefore, the IESC suggested during previous and current visit, that the project assess and undertake their best efforts in the adoption of GIIP. As flaring rates continue to be high, and with the commissioning of the TEN project leading to increased flaring with both combined projects, the IESC requests to see evidence prior to or during the next site visit regarding potential and feasible solutions.

The IESC has been provided with environmental monitoring records for the period under review and notes that emission monitoring and record keeping is up to date. Waste management and housekeeping was observed to be good across all sites visited and the management approach found to be proactive.

In general, during the site visit, the monitoring team continued to observe a sound Health and Safety (H&S) culture across TGL’s Organization, which is reflected in the health and safety findings of this report, and TGL’s commitment towards safety is evident at Project facilities both onshore and offshore.

H&S Management Systems enforced on both FPSOs are considered adequate and effectively implemented and maintained to control and manage any unexpected hazardous scenario that could pose a threat to the health of the people or the integrity of the asset, as well as major oil spills that could result in severe environmental damage. It is highlighted that the EHS Management System on-board KNK FPSO (owned by TGL) reflects the structure of TGL Operations Framework whilst the one implemented for JEAM FPSO is based on MODEC corporate standards (being MODEC the owner) and TGL as field operator is responsible only for assuring that the arrangements are adequate and that they meet or exceed the Tullow Corporate EHS requirements. These management aspects along with a description of the various interfaces Project should be outlined in the next revision of the AMR to provide stakeholders and shareholders with a complete representation of the Project EHS Management.

The management of process safety is considered adequate and the risk level associated to major hazards is As Low As Reasonably Practicable (ALARP) as reported into the respective FPSO Operations Safety Cases. Moreover, to monitor, evaluate and manage process safety risks on the FPSOs, a software package called RiskPoynt, based on the Swiss Cheese Model, allows TGL to assess the level of risk by providing in real-time the impairment status (i.e. effectiveness/availability of the barrier in case of incident) of the safety barriers.

To ensure a comprehensive and cost-effective Asset Integrity Management System, TGL has adopted for both FPSOs a Computerized Maintenance Management System (CMMS - MAXIMO) allowing the maintenance/inspection team to effectively track the tasks to be carried out, keep records and plan future activities. The CMMS, rolled out for both FPSOs in 2016, covers inspection and maintenance activities of SCES/ECEs and for which specific Key Performance Indicators (KPIs) are produced.

In February 2016, an issue with the turret bearing of the Jubilee FPSO was identified. This resulted in the need to implement new operating and offtake procedures, utilising a dynamically positioned shuttle tanker and a storage vessel.

Tug boats engaged for the purposes of maintaining heading control as an immediate measure for the FPSO when the turret bearing failed have now been released with the installation of the interim spread mooring work completed end of February 2017. Long term mooring solution is now under discussion and a holistic stakeholder consultative process would be employed in the selection of the right solution.

Regarding social aspects, in 2016, Social Investment (SI) projects continued to be aligned to the standards and objectives launched in 2013, with Project beneficiaries mainly being the fishing communities of the six coastal districts of the Western Region. Since the last IESC visit, the SI Strategy has been re-drafted, starting from the redefinition of the Project Area of Influence (AoI), which now embraces only the coastal communities actually directly and indirectly impacted (replacing the former approach which generically identified the entire territory of the six coastal districts). The strategy is driven by the following objectives: “Corporate Citizenship/Local Philanthropy”, “Transactional Investments: Impact Mitigation, Mandatory Licence and Community Consent Agreements”, and “Socio-economic Investment”. The budget for SI in 2017 has been restructured to reflect the different project stages of both the TEN and Jubilee Projects, with a range of SI activities (including education and skill development, local economic activities, and infrastructure projects) identified (additional details can be found
in section 6.4.1.). In view of the revision of the SI, it is strongly advised to pay particular attention to the budget allocation for SI projects, which should be based on the idea that social performance is considered a business value and not a cost. In particular, a dedicated and sufficient budget should be set aside for the implementation of initiatives to mitigate Project impacts, which have to be considered a priority.

In terms of cumulative impact potential on sea access for fishermen, TGL is fully aware of the impacts considering that several FPSOs are now in place. TGL is now focused on ensuring safety in the management of sea access and refers to the Government for the identification of alternative solutions to face the shared problem. A “Sea Access Framework” is reportedly under development, and TGL has appointed an environmental consultant to assess the state of the art of sea access in the Area of Influence (AoI). The report, which should be issued by the end of 2017, should contain actions to improve the management of sea access.

Regarding stakeholder engagement, the IESC notes that community engagement continues to be of a good standard. It is evident that communities are well informed on TGL activities, engagement is continuous and developed using culturally appropriate tools. The 2016 community engagement focused on Seismic Survey, Turret Remediation, Jubilee and TEN Operational updates including SI Project Progress.

TGL has recently acquired stakeholder engagement software (Borealis) to improve the tracking system of all social activities as well as to manage data generated by stakeholder engagement activities. The software offers different work packages, which also includes analytical and mapping tools, which will likely be useful for future TGL engagement.

IESC note that the TGL website is still not used sufficiently by the Company to disclose Project information on social management. The IESC reiterate its suggestion to consider the disclosure on TGL website of the public consultation and disclosure plan, main Project milestones in the field of community engagement, and relevant Project related documents (including the Annual External Independent Monitoring Reports) in order to reach other possibly interested stakeholders and give more visibility to TGL efforts.

TGL plans to undertake a community air monitoring campaign in 2017, in order to compare results obtained during the 2015 campaign with the current situation which is characterized by the presence of the new JEAM FPSO. This approach is welcomed by the IESC, and suggests that TGL improve the visibility of the outcomes of the community ambient air quality study, by disclosing the results on the Company website. Moreover, affected communities should be addressed by a specific result disclosure campaign, which is particularly relevant considering that now there are new players that have entered the O&G sector in Ghana, and with the new FPSO present in the same AoI.

Regarding grievances, the grievance mechanism remains in place. The decreasing trend in the number of grievances submitted over the years has been maintained also during 2016, which is likely due to effective engagement procedures. The main change in the grievance mechanism from the past year is the regular involvement of chief fishermen and fisheries commission, specifically for the receipt of complaints from community members, as confirmed by the fishermen chiefs met by the IESC during the site visit. The grievances are then reported to the community liaison officers who record them and start the resolution process.

The management of the exclusion zone (EZ) and advisory zone (AZ) continues to remain the main issue that TGL has to face with regards to social performance. Despite the stabilization in the number of canoe incursions in 2014 and 2015, a new peak has been recorded in 2016. This expected increase is the effect of the arrival of the JEAM FPSO for which a new safety exclusion zone has been established. Continuous incursions into the AZ clearly show the need to identify alternative solutions to this problem. Fishermen met during the site visit re-affirmed that they are fully aware of the access restriction to the exclusion zone and confirming the usefulness of the informative campaigns regularly organized by TGL. However, fishermen perception is that fish are attracted by the FPSOs and, in a framework of general decline of the availability of fish stock, they do not see many other options. In situations where there has been a long-term and progressive decline in fisheries productivity, as in the case in Ghanaian waters, stakeholders often assign responsibility for the perceived decline to the incoming project, a risk that may impact TGL in particular, which would frustrate all the efforts done over the past years in engaging and working with the communities. The IESC therefore reiterates the recommendation to explore new options to reduce the number of canoe incursions building on the experience of other projects facing the same problem. The ongoing development of the “Sea Access Framework” (outlined further in section 5.4.1), should investigate possible solutions to be adopted at Company level to foster the adoption of a new approach to manage this issue.
1 INTRODUCTION

1.1 JUBILEE AND TEN

The Jubilee Phases 1, 1A and Tweneboa, Enyenra, Ntomme (TEN) Oil and Gas Development Project (or “the Project”) involves the extraction of hydrocarbons from the two oil fields located offshore Ghana.

The Jubilee oil field lies in deep waters, with depth ranging between 1,100 and 1,700 meters; it is located at approximately 60 km from the shoreline at the western edge of Ghana and covers an area of about 110 Km². The TEN field is located approximately 20 km west of Jubilee field and some 45 km offshore from the Ghana mainland.

Tullow Ghana Limited (TGL) has been designated as the Unit Operator under the Unitization and Unit Operator Agreement signed with the Ghanaian Ministry of Energy.

The Jubilee Phase 1 Project included the development of a total of 17 wells, construction and operation of the pipeline underwater network to collect the oil and gas to the Floating Production, Storage and Offloading (FPSO) Vessel, operation of the Kwame Nkrumah FPSO and related supporting vessels and operation of the onshore facilities (Tullow Logistic Shore Base, the adjacent pipe yard and chemicals storage area and the Takoradi port facilities). All the related drilling activities were concluded in 2011 with the completion of the last oil production well.

The Jubilee Phase 1A development project, designed to increase production and recover additional reserves, was approved by the Government of Ghana in January 2012. Phase 1A included the drilling and completion of 8 additional oil production and water injection wells, the tie-in to the existing FPSO unit and the installation of additional subsea equipment for water injection. The Jubilee Phase 1A development plan (“Phase 1A Addendum”) was subject to the condition that a Full Field Development Plan (FFDP) would be submitted to the Minister for Energy by 31 December 2012. The FFDP was submitted on 19th December 2012 but was rejected as it did not take into account resources outside of the Jubilee field (the West Cape Three Points area). As such, the Greater Jubilee Full Field Development (GJFFD) was developed and submitted (which included the included
Akasa, Mahogany & Teak reservoirs) for approval. During this period, the 1A application remained in place with TGL drilling activities undertaken falling under the 1A approval.

On 29 May 2013, the Government of Ghana formally approved the TEN Project and TGL commenced with its second major operated deep water development project in Ghana. Similar to Jubilee, the development includes the use of an FPSO, with a production capacity of 80,000 barrel oil per day (bopd), tied in to subsea infrastructure across the field. The vessel was converted in Singapore and in September 2015 was officially named FPSO Prof. John Evans Atta Mills (JEAM) after the late Ghanaian president who oversaw First Oil from Ghana’s Jubilee Field in 2010. First oil was achieved on time and on budget in August 2016, three years after the Plan of Development was approved by the Government of Ghana. Following first oil, the oil production, gas compression/injection and water injection systems were commissioned and are now operational. In January 2017, the capacity of the FPSO was successfully tested at an average rate of over 80,000 bopd during a 24 hour flow test.

TGL and the International Finance Corporation (IFC) have agreed a range of Environmental and Social management measures applicable for the Jubilee Phases 1 and 1A Project, which have been included in an Environmental and Social Action Plan (ESAP), developed in compliance with IFC’s Performance Standards and Guidelines. Prior to 2015, Jubilee was the only applicable project subject to IFC Performance Standards, nevertheless when TGL decided to develop the TEN project, it requested approval from IFC (and the involved lenders) in order to add TEN assets into the Reserve Based Lending facility to finance its development. Therefore, the TEN project has been developed according to the same IFC Performance Standards (2006) and TGL is required to deliver an Annual Monitoring Report (AMR), which includes reporting of TEN activities. TGL environmental and social monitoring performances are required to be verified on an annual basis by an external independent monitoring group. D’Appolonia S.p.A, Italy, as the Independent Environmental and Social Consultant (IESC) has been appointed by TGL to carry out the annual external independent monitoring of the implementation of the ESAP and related management measures for both Jubilee and TEN projects.

1.2 MARITIME BOUNDARY UPDATE

Ghana and the Côte d’Ivoire have been locked in maritime boundary disputes over the last few years. Whilst not impacting on the Jubilee Project, the TEN Project and the field’s precise location with regards to maritime borders, continues to be a contentious issue.

In April 2015, the Special Chamber of the International Tribunal of the Law of the Sea (ITLOS) in Hamburg rejected Côte d’Ivoire’s request that Ghana be ordered to suspend all oil exploration and exploitation in the disputed zone, which as stated by Côte d’Ivoire, is the western part of TEN field that supposedly falls into Côte d’Ivoire’s territorial waters. ITLOS ordered a number of provisional measures which both Ghana and Côte d’Ivoire are required to comply with; these include continued cooperation and ‘no new drilling’ until ITLOS gives its decision on the maritime boundary dispute which is expected in late 2017. Development drilling will not recommence until the ITLOS proceedings have concluded. TGL is managing the existing wells in a prudent and sustainable manner.

1.3 REPORT ORGANIZATION

This document is organized as follows:

- section 2: provides a general introduction to the Project;
- section 3: presents D’Appolonia scope of the work and adopted approach to conduct the independent external verification;
- section 4: outlines the agenda of the site visit, along with the list of documents collected and reviewed;
- section 5: provides the outcomes of the review of the ESAP commitments; and
- section 6: presents the team findings and observations from the site visit, and the outcomes of the review of the monitoring data collected in agreement with monitoring plans in place for the Project.
2 INDEPENDENT VERIFICATION SCOPE OF THE WORK AND ADOPTED METHODOLOGY

The scope of the external independent verification, as defined by the relevant Terms of Reference issued by TGL on March 9th, 2017 and revised in 2017 to include the TEN project is to:

1. identify instances where commitments or actions from ESAP have not been implemented (defined as “non-compliances” for the Project) or provide evidence of the implementation of each ESAP related component;
2. review and verify the environmental and social monitoring data collected for the Jubilee and TEN Project and reported within: the Annual Monitoring Report (AMR) issued to IFC, the statutory reports to the Ghana Environmental Protection Agency (Gh EPA), the TGL Corporate reporting requirements and social and community engagement and complaints management;
3. review and verify the effective implementation of H&S management system requirements for the safe management of all operations and potential occupational hazards, and the prevention and mitigation of loss of containment and, specifically, of any oil spill scenarios; and
4. conduct a visit of the Project facilities (including the TEN FPSO for the 2017 site visit) and interview TGL personnel in order to evaluate the implementation of ESAP related monitoring requirements.

In order to carry out the above scope of the work, D’Appolonia has involved a multidisciplinary team including one Environmental, one Health & Safety and one Social expert, with extensive experience in the Oil and Gas Sector.

The adopted methodology has included:

- the desk review of the ESAP and related implementation plans to understand Project commitments;
- the desk review of the latest issued 2016 AMR report (dated March 2017);
- the systematic spot check of the raw monitoring data, by collecting and reviewing, for each environmental and social component, the Project records and reports (including a sample of statutory reports to the Gh EPA and Gh EPA environmental audits undertaken in 2016);
- the evaluation of project performances through the visit of main operating facilities and the interview of TGL Environmental, Health and Safety (EHS) personnel;
- the evaluation of project social related components by conducting joint meetings with local communities and TGL representatives;
- the identification of gaps with respect to the ESAP commitments (non-compliances), or the verification of their implementation; and
- the identification of possible areas of improvement for the implementation of the ESAP commitments and related environmental and social monitoring requirements.
3 SITE VISIT DESCRIPTION

The site visit of the independent external monitoring group has been organized in order to reflect the different fields of expertise of the team members (biophysical environment, health & safety, social) and to cover as much as possible all Project related facilities and stakeholders.

The following provides an outline of the site visit conducted along with the scope of each visit or activity carried out. Each visit or activity has been carried out jointly with the TGL EHS and Social Performance (SP) teams:

- kick-off meeting in Accra at TGL Headquarter (held on 9th May) with the IFC representative. Due to the flight cancellation, IESC could not take part to this meeting and arrived in Accra in the evening;
- visit to JEAM FPSO (10th and 11th May) with the main purpose to verify TGL EHS Management System requirements and their implementation. The visit included a kick-off meeting, followed by a walkthrough of the key topside facilities of the FPSO, meetings with TGL/MODEC personnel (FPSO OIM, FPSO Operations Team Lead, FPSO Superintendent, FPSO Safety Specialist, etc.), verification of correct implementation of EHS procedures and concluded with an informal close-out meeting, during which the IESC presented the main findings of the visit to the FPSO top management;
- meetings in the TGL Takoradi Office with the SP team (on 10th and 11th May) to receive an update of the main progress and changes in implementing activities with local communities through social engagement and investments;
- visit to Dixcove Fishing Community to carry out a meeting with the Paramount Chief, chief fishermen, fishermen, fishmongers; meeting with Ahanta Community Liaison Officer (CLO) at his office and meeting with the Regional Representative of the Petroleum Commission (10th May);
- meeting with the Executives of the Ghana National Canoe Fishermen Council (11th May);
- visit to the TGL shore base, Sekondi Naval Base, Commercial Port, Pipeyard and Warehouse facilities to observe the implementation of HSE aspects on site, and discussions with Project staff (10th May);
- visit to Zeal and Zoil Waste Management Subcontractors to evaluate Project performances in terms of waste handling and storage (11th May); and
- meetings in Accra (12th May) with TGL staff (Human Resources, Asset Protection Manager, Asset Integrity Manager, SP Manager, Technical Safety Specialist) and additional documentation request/review; close out meeting with TGL CEO, TGL EHS&AP Manager, SP Manager and TGL Environmental Team in order to present initial monitoring team findings and discuss any remaining queries.

Data collected and reviewed, relevant to the period under review included the following main documents:

3. Samples of daily reports for canoe incursions;
4. Coastal Community Based Ambient Air Quality Monitoring report;
5. Presentation “Socio-economic Investment - A More Strategic Approach”;
6. Livelihood Impact Assessment (2016);
7. TGL/MODEC EHSAP Organisational Chart;
8. Jubilee Operations Safety Case;
9. TEN Operations Safety Case;
10. TEN Field Oil Spill Contingency Plan;
11. Incident Management Team 2017 Drill Plan;
12. TGL Incident Management Plan;
13. JEAM FPSO Emergency Drill Records;
14. JEAM FPSO Incident Investigation Records;
15. JEAM FPSO EHS Statistics and KPIs Summary for 2016;
16. TGL Management of Change Procedure;
17. TGL/MODEC Incident Reporting and Investigation Procedure;
18. TGL/MODEC Permit to Work Procedure;
19. TGL/MODEC Task Assessment and Toolbox Talk Procedure;
20. TGL Training Records 2016;
21. JEAM FPSO 2017 Training Matrix;
22. TEN SCEs/ECEs Performance Standards;
23. Maintenance records of JEAM FPSO SCEs/ECEs;
24. TGL LTIF and TRIF Summary 2016;
25. TEN Project IVB Verification Schemes;
26. Environmental Management Plan Jubilee and TEN Development Rev.5 reviewed in October 2015;
27. Environmental Monitoring Plan issued in August 2015;
28. TGL Waste Management Plan Rev.4 reviewed in July 2015;
29. Jubilee and TEN Field Environmental Monitoring FPSO Operations – Monthly Environmental Reports (2016);
30. KNK FPSO Stack Emission Report May 2016;
32. TEN Field Oil Spill Contingency Plan;
33. Sekondi Yard Environmental Management Plan August 2016;
34. Environmental Management Plan and Procedure Register March 2017;
4 REVIEW OF ENVIRONMENTAL AND SOCIAL ACTION PLAN COMMITMENTS

The Jubilee and TEN ESAP represents the key reference document established within the loan agreement between IFC and TGL and defines the environmental and social management measures in place for the Project.

The document was last revised on 9th April 2014, and outlines the related actions to be implemented, the completion indicator for each Performance Standard (PS) applicable to the Project, and the timetable for completion in a tabular format. At the time of the present independent external verification, all actions foreseen by the ESAP have been implemented by TGL. However, as part of the scope of the work, D’Appolonia has conducted a systematic review of all actions included in the ESAP in order to provide a follow up on the current status of their implementation.

As the IESC scope now includes both the Jubilee and the TEN Project, in the event of non-compliance situations identified by IESC relevant to the TEN project, a new ESAP item will be included.

The relevant observations collected by the independent external monitoring team are reported, using the same table format in place for the existing ESAP, in the “May 2017 Status” column. Previous years tracking columns of ESAP items (IESC year on year status and feedback from 2011 to 2016) has been removed from the ESAP table for ease of readability. The “May 2017 Status” column outlines the IESC feedback and changes registered during the 2017 visit.

Some of the observations anticipated in the table and relevant to possible improvements for the implementation of the ESAP actions or related plans, along with the detailed description of the monitoring requirements in place, are presented in Section 5 of the present report.

Based on the observations reported in the table below, it is confirmed that no non-compliance situations, as defined in Section 4 of the present report, were observed with respect to ESAP commitments, neither for the Jubilee nor the TEN Projects. The IESC did identify some instances where ongoing obligations of TGL were inconsistent with ESAP requirements; however, based on discussions and TGL provision of documentation, these are not deemed to represent non compliances. Additional suggestions have been incorporated (as underlined text) in the relevant sections of this report to ensure the continued and effective implementation of ESAP items.
<table>
<thead>
<tr>
<th>Item</th>
<th>Action</th>
<th>Completion Indicator</th>
<th>TGL Update/Comments</th>
<th>May 2017 Status IESC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tullow Oil will revise the Risk Management Guidelines and EIA Recommended Practice to ensure that Applicable Projects are assessed and managed according to IFC’s Performance Standards.</td>
<td>(a) The Company has submitted draft revised guidelines and practice acceptable to IFC. (b) The Company has provided evidences that any Applicable Project is in compliance with IFC Performance Standards or has shown that the Applicable Project can come into compliance with the Performance Standards within a reasonable time period following the implementation of an action plan to be agreed upon between the Company and IFC.</td>
<td>(a) Completed. (b) Tullow’s operation demonstrate compliance with IFC performance standards 1, 2, 3, 4 and 6. Performance standards 5, 7 and 8 are currently not applicable to TGL operations.</td>
<td>No update or further action required</td>
</tr>
<tr>
<td>2</td>
<td>Tullow Oil will reconfigure the IMS to ensure that the Head of EHS reviews all Applicable Projects to</td>
<td>The Company has submitted a draft reconfigured IMS acceptable to IFC.</td>
<td>Completed.</td>
<td>The new TGL IMS was rolled out in 2016. TGL IMS reflects the Tullow IMS.</td>
</tr>
</tbody>
</table>
## JUBILEE FIELD DEVELOPMENT PROJECT - PHASE 1

### PS1: Social and Environmental Assessment and Management Systems

<table>
<thead>
<tr>
<th>Item</th>
<th>Action</th>
<th>Completion Indicator</th>
<th>TGL Update/Comments</th>
<th>May 2017 Status IESC</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>The Project will prepare the ESIA for Ghana EPA, incorporating the results of the Environmental Baseline Survey (EBS).</td>
<td>(a) A draft ESIA has been submitted to IFC for review and comments. &lt;br&gt; (b) The final ESIA has been disclosed in Tullow Oil website.</td>
<td>Completed.</td>
<td>No update or further action required</td>
</tr>
<tr>
<td>5</td>
<td>The Project will develop and implement a management of change procedure and Tullow Oil will use reasonable endeavours, by exercising its contractual rights pursuant to any</td>
<td>(a) Tullow Oil has submitted the procedure acceptable to IFC. &lt;br&gt; (b) The procedure is integrated in the Project</td>
<td>Completed.</td>
<td>No update reported or further action required. A new Management of Change (MOC) procedure (TGJ-OPS-PRC-12-0001) has been issued in May 2017 to account for the implementation of BEST (Brownfield Engineering System Toolkit). BEST is an online web-based system designed to manage MOC</td>
</tr>
<tr>
<td>Item</td>
<td>Action</td>
<td>Completion Indicator</td>
<td>TGL Update/Comments</td>
<td>May 2017 Status IESC</td>
</tr>
<tr>
<td>------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>6</td>
<td>relevant Project Agreements, to ensure that the procedure is part of the Project environmental and social management system (ESMS).</td>
<td>environmental and social management system (ESMS).</td>
<td>requests but also RCA, TQ, CTO, etc. via dedicated software modules.</td>
<td>At the time of the visit, BEST was operational only for the Jubilee project but it is expected to go on-line for TEN by the end of 2017. TGL shall issue a MOC or justification in case a commitment outlined in the EMP is not undertaken. The MOC or the justification shall indicate why the planned activities are not undertaken.</td>
</tr>
<tr>
<td>7</td>
<td>The Project will have an ESMS that periodically reviews the environmental and social aspects of the Project to determine whether the Environmental Management Plan (EMP) needs to be revised.</td>
<td>(a) The Project has developed an ESMS development schedule and submitted it to IFC. (b) The Project has developed the ESMS for the production, drilling and installation phase, acceptable to IFC. (c) The Project has developed the ESMS for production operations, acceptable to IFC.</td>
<td>Completed.</td>
<td>ISO 14001 has been successfully renewed in 2017. The EMP remains the main TGL plan providing guidance on the environmental management framework.</td>
</tr>
<tr>
<td></td>
<td>The Project will disclose the EMP, including this Action Plan, to local communities as it evolves and report on completion of its action items.</td>
<td>(a) Inclusion of a draft EMP disclosure and reporting procedure in the Project’s Public Consultation and Disclosure Plan.</td>
<td>Completed and ongoing. ESMS updates provided annually in AMR.</td>
<td>Disclosure and engagement activities on project progress for affected communities are regularly organized, as detailed in section 5.4.2.</td>
</tr>
</tbody>
</table>
# ENVIRONMENTAL AND SOCIAL ACTION PLAN
Tullow Oil (#27918 and 31483)
April 9, 2014

<table>
<thead>
<tr>
<th>Item</th>
<th>Action</th>
<th>Completion Indicator</th>
<th>TGL Update/Comments</th>
<th>May 2017 Status IESC</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>The Project will develop a staffing and training plan to ensure the ongoing management of the project according to the commitments in the ESIA and EMP.</td>
<td>The Project has developed and submitted a draft plan acceptable to IFC.</td>
<td>Completed.</td>
<td>Updated records on training sessions and EHS organization chart provided by the project and adequate for ESAP requirements. Training records provided for 2016 and plan for 2017 received. Training is detailed further in section 5.1.2</td>
</tr>
<tr>
<td>9</td>
<td>The Project will retain a qualified, independent external expert to verify its environmental and social monitoring information.</td>
<td>The Project has hired a qualified, independent external expert, acceptable to IFC, based on a term of reference agreed by IFC. The Project has publicly disclosed the report of the external expert annually.</td>
<td>Completed and ongoing.</td>
<td>External monitoring in place as per scope of work of the present site visit and report. Annual reporting ongoing.</td>
</tr>
</tbody>
</table>

**PS2: Labor and Working Conditions**

| 10   | The Company will have a Human Resources Policy that communicates to workers their rights under Ghanaian law and spells out terms of employment, including | The Company has developed and submitted the policy acceptable to IFC. | Completed. | In general, good management of Human Resources (HR) is acknowledged at TGL. TGL Employee Handbook was revised in 2016 in order to take into consideration the outcomes of the TGL Employee Engagement Forum launched in 2015. More detailed information is provided in section 6.1.1. |
### ENVIRONMENTAL AND SOCIAL ACTION PLAN

**Tullow Oil (#27918 and 31483)**  
**April 9, 2014**

<table>
<thead>
<tr>
<th>Item</th>
<th>Action</th>
<th>Completion Indicator</th>
<th>TGL Update/Comments</th>
<th>May 2017 Status IESC</th>
</tr>
</thead>
<tbody>
<tr>
<td>equal opportunity principles, benefits, and leave policies.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**PS3: Pollution Prevention and Abatement**

<table>
<thead>
<tr>
<th>Item</th>
<th>Action</th>
<th>Completion Indicator</th>
<th>TGL Update/Comments</th>
<th>May 2017 Status IESC</th>
</tr>
</thead>
</table>
| 11   | The Project will define routine inspection and maintenance of engines, generators, and other equipment, noise, and air emissions monitoring and use of low-sulfur diesel fuel, as part of the Project’s environmental monitoring program. | (a) Availability of the Project’s environmental monitoring program for the drilling and field installation and production phase acceptable to IFC.  
(b) Revised environmental monitoring program for the production operations phase, acceptable to IFC. | Completed. | Environmental monitoring ongoing in line with the EMP. Environmental monitoring results for 2016 have been provided to IESC, and results summarized in the AMR. Most of the monitoring requirements for the period under review have been met at the time of the site visit. Some comments and suggestions have been included in section 6.2 |
<p>| 12   | The Project will maintain a monitoring program for greenhouse gases (GHG). | Periodic public reporting of GHG emissions for the Jubilee Field production operations. | Completed and ongoing. | Ongoing. Data provided through AMR report to IFC and statutory reports to Gh EPA. The AMR 2016 reports an increase in GHG emissions compared to 2015, mostly due to elevated flaring from the TEN FPSO while undergoing commissioning. A pre-approval from Gh EPA is requested by TGL due to the incoming planned maintenance activities. Additional details can be found in section 6.2.3. |
| 13   | The Project will include drilled cuttings and fluid | Availability of the cuttings deposition | Completed. | Log of all drilling waste produced and disposed of are provided within the relevant |</p>
<table>
<thead>
<tr>
<th>Item</th>
<th>Action</th>
<th>Completion Indicator</th>
<th>TGL Update/Comments</th>
<th>May 2017 Status IESC</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>The Project will ensure that a Hydrotest Water Disposal Plan will be</td>
<td>Availability of the plan, acceptable to IFC.</td>
<td></td>
<td>No update reported or further action needed.</td>
</tr>
<tr>
<td></td>
<td>prepared.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>The Project will install a produced water discharge sampling point</td>
<td>Availability of the sampling point and procedures, acceptable to IFC.</td>
<td>Completed.</td>
<td>Produced water is continuously monitored through an analyser and off-spec water is automatically diverted to the Off-spec Water Tank for further treatment and/or additional retention time. Results of sampling are provided in the AMR and data presented to the monitoring team. No further action required.</td>
</tr>
<tr>
<td></td>
<td>in the FPSO and relevant procedures developed.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>The Project will develop tanker vetting procedures to ensure</td>
<td>Availability of tanker vetting and ballast water management procedures, acceptable to IFC.</td>
<td>Completed.</td>
<td>Both components are embedded within the EMP reviewed by TGL in 2015. Monitoring results of 2016 show ballast water used only by JEAM FPSO.</td>
</tr>
<tr>
<td></td>
<td>compliant management of ballast water. Ballast water management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>measures will be detailed and included in the environmental management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>system for operations.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>The Company will update the Drilling Waste</td>
<td>(a) Availability of a draft Project’s WMP</td>
<td>Completed.</td>
<td>The WMP has been reviewed in 2015. Monitoring requirements remain in place and</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item</td>
<td>Action</td>
<td>Completion Indicator</td>
<td>TGL Update/Comments</td>
<td>May 2017 Status IESC</td>
</tr>
<tr>
<td>------</td>
<td>------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>13</td>
<td>Management Plan (WMP) to include methods and procedures, adopted by the Project for the management of drilled cuttings and fluid disposal, and all planned activities during facility installation, as needed. An Operations Phase WMP will then be developed. Audits of the waste management facilities regularly conducted. The Chemical Handling (COSHH) Procedure will be implemented to handle all hazardous chemicals and the Company will ensure that it is adopted by its contractors.</td>
<td>and Chemical Handling (COSHH) Procedure for the drilling and installation phase, acceptable to IFC. (b) Waste Management Plan and Chemical Handling (COSHH) Procedure for the production operations phase, acceptable to IFC.</td>
<td>are regularly implemented by the Project. Monitoring results have been provided for 2016 and additional details incorporated in the AMR (see section 6.2.1 for details). Waste handling and management is ongoing with TGL expanding their waste management handlers to assist in the development of local providers. The existing chemical management guideline remains in place and is undergoing review (see section 6.1.4 and 6.2.4 for details).</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>The Project will update the existing Emergency Response Plan (ERP), to include response procedures to emergencies potentially associated to all construction and production operations activities planned,</td>
<td>(a) Availability of a draft Project’s ERP for the drilling and installation phase, acceptable to IFC. (b) ERP for the production operations phase, acceptable to IFC.</td>
<td>Completed.</td>
<td>ERP remains in place and is updated as necessary. No further update</td>
</tr>
</tbody>
</table>

Doc. No. P0001643-H1 Rev. 0 – May 2017
<table>
<thead>
<tr>
<th>Item</th>
<th>Action</th>
<th>Completion Indicator</th>
<th>TGL Update/Comments</th>
<th>May 2017 Status IESC</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>Including fire prevention and protection, environmental emergencies, and other incident responses.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Quantitative modeling of defined potential surface and subsurface oil spill release scenarios will be conducted and an assessment of potential for oil spill related impacts to offshore and coastal environmental resources, including turtle nesting beaches, will be conducted for both the drilling/installation phase and the production operations phase, and incorporated in the Oil Spill Contingency Plan (OSCP). The OSCP will define specific measures for protecting turtle habitat and other protected and sensitive coastal habitats. The Project will develop spill scenarios for the operations phase Oil Spill Contingency Plan (OSCP).</td>
<td>(a) Availability of the Project’s OSCP for the drilling and installation phase, including the spill trajectory model, acceptable to IFC.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(b) OSCP for the production operations phase, acceptable to IFC.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Completed.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Current OSCP for the production and operations phase remains in place. Review is currently underway as part of the development of the Operational Framework (OF). The Jubilee OSCP is set to be expanded in scope to cover TEN Operations, with response resources and equipment to be shared with TEN. As outlined in section 6.1, the OF will include high level and Project specific plans.
<table>
<thead>
<tr>
<th>Item</th>
<th>Action</th>
<th>Completion Indicator</th>
<th>TGL Update/Comments</th>
<th>May 2017 Status IESC</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>The Project will develop and adopt a H2S Program and ensure that it is also adopted by its contractors, as needed.</td>
<td>Availability of the Project’s H2S Program, acceptable to IFC</td>
<td>Not applicable.</td>
<td>No further update reported or action needed.</td>
</tr>
</tbody>
</table>

**PS4: Community Health, Safety and Security**

<table>
<thead>
<tr>
<th>Item</th>
<th>Action</th>
<th>Completion Indicator</th>
<th>TGL Update/Comments</th>
<th>May 2017 Status IESC</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>(a) The Project will develop a program to avoid intrusion into the safety zones around the drilling rigs and FPSO to include: Education program for the nearby villages and other fishers known to use the project area.</td>
<td>(a) Education program information and schedule for meeting with villages.</td>
<td>Completed and ongoing.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(b) Procedure for boat traffic management and for warning boats away from the safety zone, including rules of engagement</td>
<td>(b) Procedures provided to and accepted by IFC.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(c) Security Plan provided to and accepted by IFC.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Awareness program with fishermen strengthened as per additional activities related with the TEN project and seismic surveys. The Ghana National Canoe and Fishermen Council is fully involved and able to take the lead in training fishermen. Procedures for offshore facilities and managing traffic along with the Security Plan consistently implemented. TGL should focus its effort not only in enforcing the access prohibition to the AZ and EZ but also in preventing canoe incursions. Section 6.4.4.1 provides some suggestions for the management of canoe incursions.</td>
<td></td>
</tr>
<tr>
<td>Item</td>
<td>Action</td>
<td>Completion Indicator</td>
<td>TGL Update/Comments</td>
<td>May 2017 Status IESC</td>
</tr>
<tr>
<td>------</td>
<td>--------</td>
<td>----------------------</td>
<td>---------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>22</td>
<td>(c) The Project will develop a security plan, based on a security risk assessment, which may include, among other things, the adaptation of the US-UK Voluntary Principles on Security.</td>
<td>for use of physical intervention.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**PS6: Biodiversity Conservation and Sustainable Natural Resource Management**

- The Project will develop and implement a program for training vessel’s and helicopter’s operators in marine mammal observation and monitoring at and in the vicinity of the proposed Jubilee Field development. The program will be included in the final Jubilee ESIA and developed in
  - (a) Availability of the program, acceptable to IFC.
  - (b) Observations analyzed by an experienced marine mammal biologist and reported in the annual monitoring report to IFC.

  Completed and ongoing. Program in place and consistently implemented. MMO trained Offshore EHSS Coordinators spotters continue to collect data and report on a monthly basis. Overview incorporated in the AMR. Annual MMO report once completed will be delivered to Gh EPA. No issues to report.
<table>
<thead>
<tr>
<th>Item</th>
<th>Action</th>
<th>Completion Indicator</th>
<th>TGL Update/Comments</th>
<th>May 2017 Status IESC</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>The Project will develop and enforce a specific policy and procedures to ensure that traffic and operations of drilling vessels, support vessels and helicopters will minimize disturbance to marine mammals.</td>
<td>Availability of the policy and procedures, acceptable to IFC</td>
<td>Completed.</td>
<td>Procedure remains in place. No update for 2016</td>
</tr>
<tr>
<td>24</td>
<td>The Project will ensure that support helicopters will routinely avoid flying over the Amansuri wetland and that, if avoidance is not feasible due to weather conditions, a minimum altitude will be specified, according to international good practice, when flying over this area to minimize disturbance to wildlife.</td>
<td>Availability of the policy and procedures, acceptable to IFC</td>
<td>Completed.</td>
<td>Procedure in place. No further update reported or action needed.</td>
</tr>
</tbody>
</table>

**TEN Project**

<table>
<thead>
<tr>
<th>Item</th>
<th>Action</th>
<th>Completion Indicator</th>
<th>TGL Update/Comments</th>
<th>May 2017 Status IESC</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>TGL will develop a Safety Case for the TEN Project, including definition of environmental and</td>
<td>Availability of the Safety Case and closeout of all mitigation measures</td>
<td>Completed TEN Safety case in place.</td>
<td>TGL has developed a specific safety case for each of the two FPSOs both being revised and issued in 2016. For both FPSOs, the risk was assessed as ALARP through a series of risk assessment studies concluded by ALARP</td>
</tr>
<tr>
<td>Item</td>
<td>Action</td>
<td>Completion Indicator</td>
<td>TGL Update/Comments</td>
<td>May 2017 Status IESC</td>
</tr>
<tr>
<td>------</td>
<td>------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>societal hazards, and demonstrating ALARP levels for all relevant risks, including risks to coastal resources.</td>
<td>identified to demonstrate ALARP levels, acceptable to IFC</td>
<td></td>
<td>demonstration workshops developed during the design phase and revised, where required, for the operation phase. The IESC positively observed TGL commitment to adopt the Safety Case as a learning document for the engineering and operations workforce through dedicated awareness and familiarization training sessions and preparation of web-based version of the safety cases to be rolled-out in 2017</td>
</tr>
<tr>
<td>26</td>
<td>TGL will develop an updated integrated OSCP for both Jubilee and TEN, which will include:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Blowout Prevention and Control Plan (including measures identified by the relief well feasibility study).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>b) Well Control Emergency Response Plans for the TEN field.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>TGL will include the TEN Project to the scope of work of the independent external expert.</td>
<td>The Project has reviewed and updated the terms of reference of the independent external</td>
<td>Completed (2017)</td>
<td>The Jubilee OSCP is set to be expanded in scope to cover TEN Operations, with response resources and equipment to be shared with TEN. As outlined in section 6.1, the OF will include high level and Project specific plans.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## ENVIRONMENTAL AND SOCIAL ACTION PLAN

**Tullow Oil (#27918 and 31483)**  
**April 9, 2014**

<table>
<thead>
<tr>
<th>Item</th>
<th>Action</th>
<th>Completion Indicator</th>
<th>TGL Update/Comments</th>
<th>May 2017 Status IESC</th>
</tr>
</thead>
<tbody>
<tr>
<td>28</td>
<td>TGL will review and update all plans and procedures agreed and developed for Jubilee field as part of the ESAP, for implementation at the TEN Project.</td>
<td>Availability of the relevant updated plans and procedures.</td>
<td>All relevant environmental and social management plans have been updated to cover TEN operations. Environmental Management Plan, Waste Management Plan, Environmental Monitoring Plan, Ghana Incident Management Plan, TEN Oil Spill Contingency Plan, Public Consultation and Disclosure Plan</td>
<td>Relevant environmental management plans have been updated to cover TEN operations. The Public Consultation and Disclosure Plan (PCDP) should be updated to include formal reference to the TEN Project.</td>
</tr>
</tbody>
</table>
5 REVIEW OF PROJECT MONITORING DATA AND SITE VISIT FINDINGS

Consistently with the scope of work, as defined in Section 2 of the present report, during the visit the IESC group has undertaken an extensive review of the project environmental, health & safety and social monitoring data as reported in the TGL corporate documents, statutory reports to Ghana EPA and AMR to the IFC. This review has been supplemented with the visit to the Project facilities, as described in Section 3, in order to evaluate the TGL EHS team performances with respect to the ESAP and related plans requirements.

The relevant findings of the review of the Project Monitoring data and site visits conducted are presented in the following sections and structured in order to reflect the different monitoring components applicable to the Project.

Along with the check of consistency between required, collected and reported data, some observations relevant to possible improvements of current Project practice in implementing monitoring requirements are provided.

5.1 ESMS ORGANIZATION AND REPORTING

A key factor for the successful implementation of a project ESMS is the availability of adequate staff resources, training programs and reporting standards, consistent with ESAP requirements.

During the last IESC visit TGL announced the imminent amendment/upgrade of the TGL management system into the Tullow Integrated Management System (IMS), and the development and rollout of the Operational Management Framework (OMF), which is now referred to as the Operational Framework (OF):

- IMS – Company (Tullow) wide focus, outlining the overarching requirements and expectations for all Tullow activities. The IMS at TGL level outlines the in-country EHS and operational aspects required at the Tullow Corporate level;
- OF – Aligns with the elements of the Tullow corporate operations framework and comprises the operational EHS documentation for TGL operations (both Jubilee and TEN).

As reported, the IMS has been embedded throughout the course of 2016 and is now fully operational and covers all the management aspects of Non-Technical Risks. The OF objective is to have all operational documents available online and accessible to all (TGL and contractors). The integration of the operational documents for TGL and MODEC has been completed. The OF integration project commenced 2.5 years ago and it is an ongoing process. The system includes a shared portal divided in 10 elements where all relevant parties can access documents.

It should be highlighted that the Jubilee FPSO (KNK FPSO) is owned by TGL whilst MODEC act as O&M contractor, and as such the EHS Management System reflects the structure of TGL Operations Framework. The TEN FPSO (JEAM FPSO) is owned and operated by MODEC and therefore implements an EHS Management System based on MODEC corporate standards.

In the case of JEAM FPSO, TGL as field operator is responsible only for assuring that the arrangements are adequate and that MODEC procedures and processes meet or exceed the Tullow Corporate EHS requirements. In addition, where support or interfaces are required with TGL, interface/bridging procedures are developed and integrated into the overall TEN EHS Management System.

Further to the above, other facilities which form part of the Jubilee and TEN projects have different ownership. For instance, subsea installations (wells, manifolds, etc.) of the TEN field are owned by TGL whilst the JEAM FPSO installations are owned by MODEC. To allow stakeholders and shareholders to better understand the various Project interfaces (e.g. TGL/MODEC), the IESC suggests to include in the next issue of the AMR a thorough description of all Project interfaces (both Jubilee and TEN field) including details relevant to their management.
5.1.1 Organization and Staffing

The TGL organizational structure remained stable following the internal restructuring which occurred in 2015 (the “Simplification Project”).

IESC received the TGL EHS and Asset Protection (EHSAP) Organisation Chart for 2016, which has largely retained the same structure from 2015. The EHSAP manager remains unchanged and continues to be supported by the Environmental Team Lead, Asset Protection Team Lead and the Health and Safety Team Leads. MODEC personnel have now been included into the TGL Structure. The EHSAP structure remains adequate for the current activities.

The Social team organizational structure is not captured under the EHSAP structure, and is kept separate under the organigram of Sustainability and External Affairs. At Takoradi, the position of the Social Performance (SP) Manager, which was characterized by annual turnover in past years, has remained stable since 2015. A general stability has characterized the entire SP team including the six CLOs appointed to work as the linking focal points between TGL and the communities.

IESC acknowledges the improvement in the working conditions of the CLOs, who in the past years reported general discontent related to their salary, increased workload and inadequate tools. CLOs received a salary adjustment, new mobile phones and notebooks, and office furniture. Two CLOs have been moved from their former locations to the Kosmos Energy CLOs offices (a Jubilee Joint Venture Partner) with the purpose of sharing this cost and facilitate collaboration. Nonetheless, CLOs still report difficulties in covering transport expenses within the provided allowance and for the need to pay out-of-pocket for small daily expenses. TGL informed that no private means of transportation can be provided to CLOs due to internal safety procedures and the solution to this problem remains under a refund system. Being a longstanding issue, TGL should solve, as soon as possible, the problem related to transportation (i.e. refund of expenses without a cap) and provide a small budget for daily activities. Special attention should be given to the solution adopted for transportation as it might negatively impact CLOs capacity/ willingness to move in the communities, thus reducing the effectiveness of their important role.

TGL Employee Handbook was revised in 2016 in order to take into consideration the outcomes of the TGL Employee Engagement Forum launched in 2015. The main modifications included relate to maternity and other forms of assistance.

The “Simplification Project” concluded at the beginning of 2016 with 68 positions made redundant, as reported in the 2016 IESC monitoring report. No changes have been made to the redundancy package discussed during the past site visit. The package included additional forms of assistance to facilitate personnel re-entry into the labour market. Nonetheless, TGL did not officially monitor if the redundant personnel were able to find new employment (including timeframes and type of employment), which would have been a useful test of the effectiveness of the support package offered.

An Employee Relations Procedure document guides the workers internal grievance mechanism. The AMR reports that one grievance was raised by an employee in 2016 and positively resolved, related to verbal aggression from a colleague.

In order to prevent possible workers’ strikes (which have occurred in the past), closer follow-up and monitoring by TGL of the MODEC grievances is reportedly now in place: regular coordination activities are organized between TGL and MODEC Human Resources (HR) departments and TGL receives copies of the MODEC grievance report. TGL is entitled to be involved, if necessary, in the resolution of MODEC grievances. Reportedly, only one grievance has been submitted from MODEC personnel so far.

TGL has no “worker organization” or “worker representatives” figure. There are Town Hall Meetings or Team Meetings through which Company objectives and initiatives, HR programmes and other issues are discussed. The Employee Engagement Forum occurs quarterly to discuss employee concerns and input into key business initiatives. In 2016, out of the nine issues raised at the forum, seven of them were resolved positively.
5.1.2 Training

According to the records provided and information included in the 2016 AMR, the TGL training program continued to be carried out in 2016 and is scheduled to be implemented for 2017. A wide range of topics have been covered, including oil spill management and response (IMO level III), project-management, essentials of O&G for non-technical personnel, and specific training required across different working environments.

It is IESC understanding that TGL training programs are limited to TGL’s employees with the exclusion of specific topics (e.g. Oil Spill Response, Process Safety, etc.) that are extended to MODEC’s employees, subcontractors and concerned authorities. TGL ensure competency of MODEC or other contractor employees by auditing contractors training programs and through the collection of specific KPIs (additional details are provided in section 5.3.4).

In order to better understand the issue of canoe incursions, CLOs were given the opportunity to spend two weeks on-board the service vessels patrolling the Advisory Zone (AZ) during a seismic exercise. IESC acknowledges the importance of this initiative which provided CLOs with the necessary direct experience to deal with fishermen complaints and concerns.

Considering that IFC PS Version 2006 applies to both TEN and Jubilee Projects, and that the personnel working on the two projects have basically remained unchanged, the past IESC suggestion to organize EHSAP and SP team refresher training on PS is now no longer deemed necessary.

5.1.3 Certification

Regarding offshore operations in the Jubilee and TEN oil fields, TGL operates under a range of permits for drilling, workover and production. TGL received a new permit issued on May 25th, 2015 with a validity of 3 years covering the ongoing FPSO production and operations logistical support including the chemical support facility operated by Baker Hughes. As discussed during the last year monitoring visit, IESC noted that the new certificate includes a flaring allowance of 3%, during upsets and periods of maintenance which is an increase on the previous EPA allowance of 2.5%. The environmental certificate states that there will be no production flaring of associated gas, and that any flaring beyond the 3% limit will incur administrative charges, unless a waiver is submitted and approved by the Gh EPA. Additional details on flaring can be found in section 6.2.3.1.

TGL obtained its first standalone ISO 14001:2004 Certification for the EMS on 31st October 2012, applicable to the activities including and associated with exploration and production of oil and gas from their Jubilee Field and their management through partnership agreements and contract. In 2016 TGL undertook a series of internal assessments and included the TEN Project with the Jubilee ISO 14001 certification. The external independent ISO 14001 annual surveillance audit was conducted in April 2017 by ABS Quality Evaluations.

TGL aims to obtain OHAS 18001 certification for Jubilee and TEN projects: currently Jubilee is in an alignment process while TEN project is fully certified. The FPSOs are provided with all required marine certifications and hold the relevant MARPOL certifications including compliance with annex I - relevant to “Crude Oil Washing Manual”, and annex VI - relevant to “Ship board oil pollution emergency plan (SOPEP)”.

5.1.4 Periodical Review of ESAP Related Plans

ESAP requirement #6 refers to regular TGL review and amendment of the EMPs. For the 2016 reporting period, the previously established EMPs remained in place and the monitoring requirements are still undertaken according to the TGL Monitoring Plan (TGL-EHS-PLN-04-0006). During the 2017 site visit, IESC noted that some of the TGL EMPs have not been reviewed within the nominated time frame (annually, or every 2 years depending on the document). The Environmental Management Plan, which is the main document providing guidance on the environmental management framework for Jubilee and now extended to TEN, has been recently updated and will remain valid in its current revision for the next three years, until October 2018. The other main environmental plans, that are subsidiary to the EMP, are the Environmental Monitoring Plan, the Waste Management Plan, the Chemicals Management Guidelines, the OSCP and the Integrated Audit Plan. All these
plans which were originally developed for Jubilee only, have been modified and implemented to include management and monitoring requirements for the TEN project.

Considering that TEN is now into operation and some management plans have been integrated and updated, the IESC suggests that TGL provide an updated list of the key TGL environmental management documents, outlining the document review cycle and the most recent review undertaken. The IESC was informed and appreciates that revisions of documents will likely not involve significant changes; however, these need to be reviewed within the predetermined period as established by TGL. The IESC is also aware that should any significant change be required to the plans, these are covered under the Management of Change (MOC) process.

5.1.5 Management of Change

The Management of Change (MOC) procedure is required within the ESMS, in order to effectively manage changes that may be needed with respect to the recommended practice or standards and in order to meet and reflect the operational issues encountered by the Project. In compliance with ESAP requirement #5, the Project continues to adopt a MOC system. A new MOC procedure (TGG-OPS-PRC-12-0001) has been issued in May 2017 to account for the implementation of BEST (Brownfield Engineering System Toolkit). BEST is an online web-based system designed to manage MOC requests but also Root Cause Analyses (RCA), Technical Queries (TQ), Case To Operate (CTO), etc. via dedicated software modules.

At the time of the visit, BEST was operational only for the Jubilee project but it is expected to go on-line for TEN by the end of 2017.

IESC consider the proposed MOC procedure to be adequate for ensuring that engineering and operational changes are properly documented, approved and affordable and that the risks associated are carefully assessed to avoid potential hazardous conditions.

5.1.6 Reporting

The TGL EHS team provides updates on performed monitoring activities within a number of different reports, including statutory reports to Ghana EPA (provided monthly and annually) and the AMR to the IFC.

In agreement with the scope of work, a verification of consistency of the data reported with respect to the monitoring requirements has been carried out by the IESC. In addition, a review of the report formatting and organization (including the recommendations made to TGL as part of the site visit carried out by the IESC over the last couple of years) has been carried out in order to identify possible areas for improvement.

For what concerns the 2016 AMR, the IESC noticed a general deterioration of the information provided concerning TGL social performance. Dates reported are noted to be sometimes incorrect or inconsistent, showing that in some sections information has been reported from old reports without any re-elaboration or are incomplete. For example, the dates provided for the awareness raising activities related to seismic exercises refer to a future period while the activity refer to a past campaign. When presenting data on canoe incursions, section 7.4 does not report figures related to JEAM FPSO but only to Jubilee. Moreover, when discussing the community investment projects, it is not clear which initiative has newly started and the title used for the different projects sometimes changes. Finally, the recommendation provided last year to detail training activities carried out for impacted communities was not taken into account and only qualitative data are reported. For this reason, it is recommended to improve the quality of the social information provided in the AMR in order to make it a reliable source of data.

5.2 BIOPHYSICAL COMPONENTS

The following paragraphs present the outcomes of the conducted review of the biophysical environmental monitoring data and Project practice with respect to TGL procedural requirements (the EMPs and the Environmental Monitoring Plan). For each component, the data and information provided by TGL along with the observations, recommendations and suggestions for improvement are reported.
5.2.1 Waste Management

Waste management produced at the Project facilities continues to include the following main streams:

1. solid waste from FPSOs;
2. drill cuttings and fluids;
3. barite waste;
4. produced sand;
5. natural occurring radioactive materials; and
6. other wastes as defined in the WMP

All the above components are managed according to the provisions of the WMP (TGL-EHS-PLN-04-0008) revised in July 2015.

5.2.1.1 Disposal of Solid Waste from FPSO

In accordance with MARPOL requirements, environmental monitoring records and information provided by TGL covering both FPSOs outlines that discharge into the sea consists of treated sewage and food waste. Quantities of waste disposal to sea and shipped to shore are included in monthly reports provided to the Ghana EPA and tracked in a monthly waste tracking spreadsheet. Reporting of quantities discharged continue to be consistent with TGL EMP requirements, and are presented and summarized in the AMR.

During last year’s (2016) IESC monitoring visit offshore to the KNK FPSO, TGL indicated a breach of project standards regarding the disposal of food waste to sea, due to faulty equipment not macerating food to <25mm in line with MARPOL requirements. During the 2017 site visit, it was reported that the food macerator had been put back in service over the last year, but that it failed again twice during 2016 and it is currently not in operation. TGL reported that the macerator failure was related to undersize issues and it was replaced with a bigger unit. The discharge pipework has however not been substituted and therefore it repeatedly blocked because it is undersized. Reportedly at the moment plumbing work is required to enable the macerator system properly functioning on the KNK FPSO.

This is the second year in a row that the IESC has reported TGLs failure to comply with MARPOL and Project requirements. While the IESC appreciate that the Project attempted on more than one occasion to rectify this issue after the 2016 IESC site visit, should this situation not be resolved as a matter of priority, and prior to the next IESC visit, this issue will be reported as a non-compliance and the Lenders group informed accordingly. TGL need to provide evidence to IESC demonstrating that MODEC has found and implemented a permanent solution and continue to operate in line with applicable regulations (in this case MARPOL regulations that food waste macerated to <25mm).

5.2.1.2 Drill Cuttings and Fluids

The relevant data concerning well features and the quantities of chemicals employed and lost/discharged to sea are provided in the Rig Environmental Monitoring Reports which are submitted on a monthly basis to the Gh EPA.

The main requirement set for this waste category concerns the maximum allowable Oil on Cuttings (OOC) concentration for the Non Aqueous Drilling Fluids (NADF) discharged to sea, which must not exceed 2% by weight on dry cuttings. According to Gh EPA requirements, in case of failure to meet the above level of OOC, TGL pays a surcharge of USD 20,000.00 per well if OOC falls within the 2-5% range.

No drilling activities were undertaken in 2016, therefore no cuttings and drilling fluids have been discharged.
5.2.1.3 Barite Waste

Barite is used as the weighting agent for drilling fluids by the Project. Barite quality testing is performed before its use, as per the EMP, by checking the concentration levels for Mercury (maximum acceptable concentration 1 mg/kg) and Cadmium (max 3 mg/kg) for each stock delivered to the Takoradi port.

No barite waste was produced for the period under review.

5.2.1.4 Produced Sand

Produced sand is derived from gravimetric separation of oil collected and treated at the FPSOs. The EMP requires the control of oil concentration in sand before discharging: residual concentration must be less than 1% as per IFC and Gh EPA requirements.

According with the 2016 AMR no sand was produced or discharged from the FPSOs. Data are consistently reported to the Gh EPA and tracked on a monthly basis in the FPSOs environmental monitoring spreadsheets.

5.2.1.5 Naturally Occurring Radioactive Materials

The presence of Natural Occurring Radioactive Materials (NORM) possibly embedded in the drill cuttings recovered and within tubulars or casing and equipment used, must be monitored by the Project. Measurements are conducted on-board the FPSO using a Geiger meter. Since a NORM test positive result occurred on-board the FPSO in 2015, TGL developed the NORM procedure aimed at applying the correct management of naturally occurring radioactive material within the Project.

According to the TGL procedure, potentially NORM contaminated equipment is temporarily stored in a demarcated area on-board the FPSO as per the implemented TGL procedure. During the May 2017 site visit, no NORM material onsite was reported. IESC verified that the procedure is now implemented and well understood on the JEAM FPSO, with no additional inconsistencies with the procedure reported.

5.2.1.6 Other Wastes

Beside the above listed and described waste categories, the Project generates a large number of wastes which are managed in agreement with the WMP provisions. Waste categories include paper and plastic, metal scraps, wood, food and hazardous wastes, including chemicals, tank slops, oily sediments, oils, fluorescent lights and batteries. TGL continues to segregate waste into five waste categories (i.e. metal, wood, plastic, general and hazardous) both onshore and offshore. During the site visit all the Project Facilities showed an adequate waste segregation. These wastes are collected and disposed onshore through the appointed Waste Management Contractors, Zeal and Zoil, both based in Takoradi. The updated Waste Manifest Form to improve the waste tracking system (and observed by the IESC during the visit) is still in place; it incorporates six duplicate (carbon) pages in different colors (as presented in Appendix 1 of the WMP) and must be completed and accompanies transfer of any waste between TGL facilities and/or all waste handlers.

In the 2016 AMR, the quantities and the final disposal of both hazardous and non-hazardous wastes generated by TGL are clearly described.
general waste produced by TGL. Overall, Zoil facilities were founded to be well managed with adequate level of housekeeping and pollution prevention measures. A thermal desorption unit, currently out of order, will be in operation starting June/July 2017 and will allow Zoil to treat additional TGL waste from drilling (cuttings, sediments, used oil, etc.). An incinerator unit is designated for oily rags and also for other types of waste generated by other enterprises (L’Oreal cosmetics) but no TGL waste stream. Additionally, Zoil has permission to use the municipal landfill for non-recycled waste.

Monitoring results of stack emission, ambient air, stormwater, waste water and groundwater quality campaigns are regularly conducted by Zoil and sent to the Gh EPA. Additionally, TGL audits the facilities with respect to EMP and WMP requirements annually. An observation from the IESC concerns minor EHS improvements in the waste stabilization area (secondary containment for barrels temporary filled with oily mud).

Regarding the visit to Zeal, all the facilities are still well managed with a high level of housekeeping and pollution prevention measures. IESC has visited the Zeal site over several years and shares the positive TGL assessment. Zeal continue to provide the following services:

- treatment of oily water;
- cleaning and compacting of used drums;
- recycling of plastic, metal and wood wastes;
- collection of hazardous waste (currently stored in drums in a covered and protected area below a newly constructed shelter);
- incineration of hazardous waste;
- recycling of drilling cuttings and ash through stabilization with cement and lime and production of construction bricks; and
- several other waste segregation and processing activities.

The facility has been upgraded with an additional area dedicated to soil bioremediation which is believed to increase the amount of soil treated and slowly replace the stabilization of mud with cement and lime for production of construction bricks.

TGL continues to undertake annual audits of Zeal facilities to determine the level of compliance with Company’s procedures and to follow up on Audit recommendations from the previous year.

5.2.2 Waste Water Management

Several waste water streams are monitored by the Project in accordance with EMP requirements. These include:

- produced water (from crude oil treatment at FPSOs);
- sewage water;
- deck drainage, bilge water and ballast water;
- FPSOs’ ballast water;
- desalination Plant Brine Discharge;
- desulphation water (associated with the Desalination Plant);
- well completion and work over fluids;
- spills; and
- shore base liquid discharges.
5.2.2.1  Produced Water

Produced water is derived from gravity separation of crude oil collected and treated on the FPSOs. It is discharged to sea prior to verification of oil in water content that has to meet EMP reference limits (IFC guideline limits of <42 mg/L daily maximum and <29 mg/L daily average over a one-month period). Prior to being sent overboard, after being cooled to 40°C in the Produced Water Coolers, water quality is continuously monitored through an analyser and off-spec (oil concentration > 20 mg/L) water is automatically diverted to the Off-spec Water Tank for further treatment and/or additional retention time.

The data collected are consistently reported in the AMRs and in monthly reports to the Gh EPA. Data are monitored directly on both FPSOs throughout the day at the laboratory located on-board. TGL takes quarterly control samples and sends them to certified labs to attest validity of on-board analysis.

Oil in water (OIW) content recorded on both FPSOs did not exceed monthly average EPA and IFC discharge limits from produced water throughout 2016.

<table>
<thead>
<tr>
<th>Table 5.1: Produced Water Annual Concentration for 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Liquid Effluent Parameters</strong></td>
</tr>
<tr>
<td>--------------------------------------------------------</td>
</tr>
<tr>
<td>Produced Water – Oil and Grease (maximum daily)</td>
</tr>
<tr>
<td>Produced Water – Oil and Grease (30 days average)</td>
</tr>
</tbody>
</table>

5.2.2.2  Sewage Water

Sewage water on the FPSOs continues to be treated on-board and checked for residual chlorine content before discharge (Cl < 1 mg/L). Chlorine content is analysed on-board, while presence of floating solids and discoloration is conducted visually by the on-board personnel. No exceedances were reported to the IESC.

5.2.2.3  Deck Drainage, Bilge Water and Ballast Water

All three waste water streams are collected on-board and conveyed to a retention tank, connected with an Oil Water Separator (OWS) unit. Monitoring of effluent wastewater quality is conducted through an automatic online analyser to check for presence of oil in water (maximum allowable discharge limit set at 15 mg/L). Daily records on concentration measured and quantity discharged are recorded and presented in monthly reports to the Gh EPA. No exceedances were reported.

5.2.2.4  Well Completion and Work over Fluids

These waste water streams mainly consist of oily water with Calcium Chloride used for well testing and clean up. According to EMP requirements oil in water content has to be checked prior to discharge (maximum allowable discharge limit set at 15 mg/L, plus pH in the 6-9 range). This stream is continually analyzed on-board the FPSOs through an automatic online analyzer prior to discharge. In the event of exceedances, it is collected and disposed of at the Zeal waste facility where it is treated through the oily water treatment unit. Logs of quantities and chemical tests are correctly collected by the Project. The annual average oil content in the well completion fluids for the two FPSOs is well below the discharge limit.
5.2.2.5 Spills

The AMR (2016), lists 18 environmental incidents including 3 minor gas leaks and 15 contained low volume spills, classified as negligible incidents. The IESC suggests in the next AMR’s a clear distinction between environmental release and environmental harm incidents to better understand TGL rationale behind the incidents detailed in the AMR. The IESC are aware that environmental harm refers to any leak or spill that has impacted on the environment, while spills/flares/leaks refer to environmental incidents that have not had an impact on the environment (near misses or confined leaks). The IESC would like to see this suggestion implemented in the AMR.

5.2.2.6 Shore Base Liquid Discharge

The IESC inspected the Tokoradi pipeyard, the Baker Hughes chemical storage area at Takoradi seaport and the Sekondi naval base. At the first two sites it was noted that the stormwater drainage system is unchanged (incorporating a closed drain system with a security valve, sufficient secondary containment, and an OWS which is periodically purged). At the Baker Hughes storage area, the stormwater collected from the drainage system is periodically analysed prior to its discharge into the sea. At the Sekondi base, stormwater drainage is organized with a drainage field system that empties into the Port. No issues are reported.

5.2.3 Air Quality

Two main components are required to be assessed under the EMP Air Quality monitoring requirements:

- emission testing, including: point emission sources from combustion devices on-board the FPSOs, point emission sources from onshore activities, fugitive emissions and flaring; and
- ambient air quality monitoring at FPSOs and shore bases.

5.2.3.1 Emission Testing

The Project consistently reports Green House Gases (GHG) emissions data within the yearly AMR and other Statutory reports. The GHG quantification is based on the use of empirical formulas starting from the fuel type and quantities used at each combustion source. GHG emissions from various sources within TGL offshore operations for 2016 are illustrated in Table 6.2. The GHG emissions are quantified taking into consideration FPSOs production operations, well engineering operations and Aviation and Marine Transportation activities (including fixed wing and helicopter aviation and marine supply vessels). TGL activities resulted in a total of 1,004,324 tonnes of CO\textsubscript{2} equivalent (tCO\textsubscript{2} eq) in 2016.

<table>
<thead>
<tr>
<th>Table 5.2: Total GHG Emissions by Source from TGL Activities in 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Well Engineering Operations – West Leo</strong></td>
</tr>
<tr>
<td>Total tCO\textsubscript{2} eq</td>
</tr>
<tr>
<td>GHG Emissions 2016</td>
</tr>
</tbody>
</table>

Comparing to the total GHG emission in 2015 (approximately 576,539 tCO\textsubscript{2} eq) the total amount of emissions in the period under review, has increased nearly twofold. The increase in GHG emission is mostly due to the high rate of flaring from the TEN FPSO during the commissioning phase with the introduction of hydrocarbons in the facility process plant. Production Operation on the two FPSOs accounted for the larger percentage. Reportedly, reliability and improvement projects that have involved the gas turbine generators and compressors will eventually result in low flaring levels and hence reduced ghgs.
The annual fugitive emission campaign was performed on the KNK FPSO in 2016. The campaign was conducted with an infrared camera and 8 episodes of minor gas leaks from Pressure Safety Valves (PSVs) were identified and promptly repaired by the maintenance crew. The annual stack emission monitoring on the KNK FPSO, not performed in 2015 because of scheduled maintenance conflicts and unplanned upgrades, was carried out in May 2016. The stack emission testing was done to quantify emission from the following sources:

- Gas Turbine Generators (GTG) A, B and C;
- Auxiliary Boiler; and
- Port Side Crane and Starboard Crane.

The sampling included the measurement of O₂, CO, NO, NO₂, NOₓ, CO₂, SO₂, CH₄ and Volatile Organic Carbons (VOCs). Based on the results provided, the concentrations of NOₓ measured at the GTG A, GTG B and GTG C, respectively 213.38 mg/Nm³, 354.75 mg/Nm³, and 311.79 mg/Nm³, exceeded IFC Guideline Level applicable to gas fired turbines (51 mg/Nm³). Exceedances of NOₓ have been regularly detected at the GTGs over the last few years of monitoring. In past visits the IESC verified manufacturer design specification to determine normal operating emission levels of the generators, with no irregularities found. Although emission levels of NOₓ continue to exceed the IFC levels, TGL concluded that NOₓ was not an EHS problem on the FPSO as supported by the results of the 2014 ambient air survey undertaken on-board which did not show any exceedances against World Health Organization (WHO) and Gh EPA limits.

The stack emission monitoring at the JEAM FPSO has not been conducted yet because the operation phase has not officially started; monitoring is scheduled for later in 2017.

IESC suggests that TGL extend the stack emission and the ambient air quality campaigns to the JEAM FPSO in order to ensure that NOₓ exceedances do not represent an EHS issue.

5.2.3.2 Flaring

Based on TGL EMPs and agreements defined by the Gh EPA, flare use is limited to discharges in case of process upsets and maintenance operations of equipment/tanks. Reportedly, whenever monthly flaring exceeds 3% of total gas production a flaring justification note clarifying the reason for increased flaring is submitted to the EPA for review and approval. According to TGL no additional justifications have been requested by the EPA in the event of increased flaring. As reported in the 2016 AMR, when flaring is associated with a planned maintenance activity previously anticipated, a pre-approval is sought from the EPA ahead of the activity. Upcoming activities include a planned shutdown for the KNK FPSO in the coming months. The Jubilee Operational Environmental Certificate was renewed without any issue raised by EPA and allows flaring production up to 3%. Nevertheless, in 2016 flaring performance for the KNK FPSO has regularly exceeded Gh EPA limits for several months (Figure 6.1). The flaring associated with the KNK FPSO in 2016 is due to several process upsets and maintenance activities. On the TEN FPSO the flaring was related to the commissioning phase of the FPSO, while additional flaring was also necessary when a percentage of gas could not be reinjected into the wells as a result of a damaged LP compressor.

Flaring therefore remains a constant aspect of the Project, and IESC understands that purge/base load flaring, while not specifically permitted by the EPA permit, will remain a continuous Project necessity. Ongoing regular maintenance, breakdown and shutdown periods result in high flaring rates which represent environmental and OHS concerns. As outlined in the 2016 monitoring visit, the IESC expects the Project to amend the relevant EMPs, procedures and monitoring plans and implement EHS mitigations as appropriate. Additionally, it is suggested to identify potential practical solutions and implement those already identified to reduce flaring rates and establish a realistic target limit. The IESC requests to see prior to or during the next site visit evidence of Project GIIP approaches assessed in the event that flaring rates continue to exceed the 3% of gas production.
5.2.3.3 Ambient Air Quality Monitoring

Ambient Air Quality Monitoring is a requirement outlined in the EMP for both FPSOs and onshore facilities in order to evaluate the levels of NO\textsubscript{x}, NO\textsubscript{2}, SO\textsubscript{2} and VOCs. From the 7\textsuperscript{th} October to the 25\textsuperscript{th} November 2016 TGL undertook an ambient air quality monitoring for Sulphur Dioxide (SO\textsubscript{2}), Nitrogen Dioxide (NO\textsubscript{2}) and Ozone (O\textsubscript{3}) only on-board the JEAM FPSO, at two preselected location: the accommodation unit (indoor) and the Gas Processing Unit Mod 3P (outdoor). The results showed all concentration were well below the WHO and Gh EPA limits. TGL reported that the Local Community Ambient Air Quality Study is currently ongoing (see section 5.4.2.1).

However, TGL need to ensure that monitoring commitments are undertaken in accordance with TGL procedures and for year on year comparison of air quality, additionally the AMR needs to clearly explain the reason why committed surveys have not been undertaken (as was the case with KNK FPSO in 2016).

5.2.4 Chemical Management

During the visits conducted at the JEAM FPSO, chemicals were correctly stored, Material Safety Data Sheets (MSDS) presence observed and adequate secondary containment noted. However, as discussed in section 5.3.1, several secondary containments were found to be full of condensed water significantly reducing and, in some cases, completely impairing the capability of containment to prevent leakages of hazardous fluids on deck or overboard. The on-board laboratory appeared to be well organized and functional. The IESC observed that no spills were evident on the FPSO and secondary containment and spill response material were located in the immediate vicinity.

The Shore Base pipe yard and chemical storage areas were observed to be well organized; however, as also observed in the 2016 monitoring visit, a temporary oil storage area was still not provided with adequate secondary containment. IESC is aware that the oil storage is temporary and depends on the scarce space at the chemical storage area at the pipe yard. Within 2017 a new area will be available at the commercial port where chemicals will also be stored; however, the Project needs to ensure that even temporary storage areas are fit for purpose and include spill containment measures.

The Baker Hughes chemical storage area at Takoradi port was observed to be well managed; hazardous material was clearly labelled and MSDS available. The storage area incorporates a closed drainage system and is provided with spill response equipment. As noted during last year visit, when cargo ships normally operate at the shared wharf unloading lime, the amount of dust released poses a potential OH&S issue for the contractor; however, the Baker Hughes employee wear correctly personal protective equipment and suspend their activities when...
lime unloading operations occur. Furthermore, the development of the new TGL area (planned to be ready by end of 2017) within the commercial port, with a new chemical storage area should effectively address this issue.

5.2.5 Noise

For the period under review no noise surveys were conducted. OHS noise monitoring was not conducted on either FPSOs in 2016 due to equipment damage. TGL shall issue a MOC or a justification informing why the annual noise monitoring campaign on-board the FPSOs and within the shore base in Takoradi were not undertaken as outlined in their EMPs.

5.2.6 Ecology

The TGL annual Marine Mammal Observation (MMO) programme remains in place. The trained crew of TGL’s EHSS vessels (Seacor Merchant, Seacor Master, Pacific Porpoise, Pacific Retriever and Pacific Raider) perform daily observations and record their sightings. Reportedly, in 2016 no unusual behavioural trends of marine mammals around the offshore facilities have been recorded. No seismic surveys, which is one of the main types of activities with impacts to marine mammals, have been conducted within the field in 2016.

Regarding the marine avifauna sighting performed by the EHSS vessels, no unusual large congregation of birds at the FPSO’s have been observed. During the 2017 site visit, the 2016 MMO report was currently under preparation and was yet to be submitted to the Gh EPA. TGL informed that the report does not contain any significant findings or issues. IESC will review the document during the next site visit.

5.3 HEALTH & SAFETY COMPONENTS

The main scope of the IESC review was to verify whether TGL and MODEC Safety Management Systems, enforced on TEN and Jubilee projects, comply with the requirements set by the IFC Ps (2006). Due to the regular visits of the IESC to the KNK FPSO in recent years, and considering the recent commissioning of the TEN FPSO, the 2017 site visit included only an offshore visit to the TEN Project and did not include a physical inspection of the KNK FPSO. Nonetheless, the main aspects of the Jubilee Management System were also reviewed during the IESC visit, and are discussed in the following paragraphs.

The IESC review has been carried out by checking relevant H&S requirement related records collected for the period under review, including:

- H&S Management;
- Process Safety Management;
- Incident and near miss recording, investigation and implementation of corrective actions;
- Competency Management and H&S Training activities;
- Emergency Management including relevant drills and related training provisions;
- H&S Performance Monitoring; and
- Management and Inspection of Safety and Environmental Critical Elements.

As outlined in the 2016 AMR, in February 2016 the KNK FPSO turret was found to be damaged resulting in the inability of the FPSO to weather vane as originally designed. The issue was initially tackled by adopting the following measures:

- tug boats were deployed to hold the FPSO on a fixed heading;
- alternative offloading arrangements were established; and
- production and gas export continued under a Case to Operate (CTO 64) with a reduced weather envelope.

Additional risk mitigation measures were then implemented, including a bearing lock, installed in September 2016, to prevent further degradation of the bearing and, setting the FPSO on a temporarily spread moored, in
March 2017, to avoid the continuous presence of tug boats. In addition, TGL has started a Turret Remediation Project aiming at identifying a feasible long term solution to address the bearing damage.

Three options for a permanent solution were initially identified:

1. convert the FPSO to spread mooring in situ;
2. take the FPSO off station and replace the bearing;
3. in situ remediation of the existing bearing.

It is IESC understanding that Option 2 has been discarded since it required a prolonged outage of oil production and gas export. Base case of in-field remediation is being assessed through a comprehensive concept selection methodology. TGL plans to identify a permanent solution by the end of 2017, which shall be agreed by all Joint JV Partners and the Government of Ghana.

5.3.1 H&S Management

The EHS Management Systems adopted for both TEN and Jubilee Development Projects remain adequate and effectively maintained for the control of all H&S risks; however, a significant difference needs to be noted. Whilst the KNK FPSO is owned by TGL and MODEC act as O&M Contractor and therefore the EHS Management System reflects the structure of TGL Operations Framework, the JEAM FPSO is owned by MODEC which has implemented an EHS Management System based on MODEC corporate standards. TGL, as the TEN field operator is responsible only for assuring that the MODEC arrangements are adequate and that they meet or exceed the Tullow Corporate EHS requirements. Therefore, where identified gaps and/or support interfaces are required, TGL ensures that interface/bridging procedures are developed and integrated into the overall TEN EHS Management System. Examples of these include emergency response, incident management/reporting, aviation and marine logistics support.

Both FPSOs crews (which include MODEC and sub-contractors personnel) continues to be managed directly by MODEC. There are only a few TGL staff constantly on-board. For the KNK FPSO, TGL personnel is limited to the Offshore Installation Manager (OIM) and a couple of other key positions. On-board the JEAM FPSO, at the time of the visit, the TEN Offshore Field Manager was the only TGL employee, acting as field operator representative.

TGL management commitment towards safety continues to be observed by IESC during the annual site visit and via discussions with TGL employees and their main contractors.

5.3.1.1 Safety Inductions

All TGL employees (including recently hired), contractors and visitors arriving at Tullow facilities are duly informed about health and safety precautions on site. Comprehensive induction slides are available and are clearly explained by skilled personnel.

Before boarding the helicopters, employees are required to attend a specific safety induction to raise awareness on the hazards they might encounter during the trip offshore. People arriving on-board JEAM FPSO are informed about the ship characteristics and associated risk by means of an induction video, which is quite comprehensive and clearly addressing both occupational and major hazards, emergency situations, means of evacuation and all safety rules to which all personnel must comply to.

The above basic inductions are effectively provided to all personnel (with no exclusion) upon arrival on-board the FPSOs and prior to any helicopter trip. The induction material has been modified over the years in favour of an improved completeness and takes into account relevant changes to the covered facilities.
5.3.1.2 JEAM FPSO Permit to Work and Isolation System

A Permit to Work (PTW) and Isolation System is in place on-board JEAM FPSO and it is considered to be an effective measure to ensure that hazardous operations (i.e. non-routine activities) are carried out in a safe, controlled and coordinated manner.

The system reflects the structure represented in the PTW procedure part of MODEC Management System. Such procedure clearly defines:

- roles and responsibilities;
- scope and applicability of the PTW and Isolation System;
- PTW issuing process (from hazard identification to final authorization);
- permits validity and handover;
- PTW Issuers required qualifications; and
- review and monitoring of PTW System, etc.

Mainly three types of work permits and two types of certificates are adopted: Hot Work Permit, Spark Potential Work Permit, Cold Work Permit, Confined Space Entry Certificate and Isolation Certificate. Additional certificates are issued in case of specific operations such as the override of safety and emergency systems. The permits are produced in triplicate copies to be kept at the permit office, central control room and at the worksite.

The Isolation Certificate is required when activities are to be performed on energized/pressurize equipment. It prescribes the use of specific tags, blinds and locks which have been found effectively adopted.

The system is periodically reviewed and audited by MODEC via a dedicated checklist to establish whether all aspect associated to the PTW are properly addressed (e.g. hazard identification, risk assessment, prescribed precautions, worksite preparation, etc.).

The IESC reviewed the established PTW process on-board the JEAM FPSO, and confirm that the PTW incorporates a detailed description of the work to be carried out, including the identification of the hazards related to the operation and of safeguards to be implemented in order to minimise related risks.

During the JEAM FPSO walkthrough, the IESC observed a range of barrier job boards outlining the PTW numbers and the job details/hazards related to particular ongoing activities. The IESC interviewed an operator preparing the worksite for a confined space entry and reviewed the associated certificate. No gaps in the operator competency and in the certificate were identified.

5.3.1.3 JEAM FPSO Housekeeping

The walkthrough on the JEAM FPSO also enabled the IESC to verify the standards of housekeeping and hygiene enforced on-board.

IESC observed that both site working and accommodation areas are in general kept clean and are well maintained. Most of the materials were found to be stored and stacked safely with sound packing and pallets. During the visit, an excessive accumulation of cargo waste and material on the upper deck was observed; however, it was found to be piled properly. Such uncommon accumulation was caused by the temporary unavailability of the port side crane due to technical issues.

During the walk around, a couple of working areas were found to be not properly cleaned after job completion and tools and parts of equipment were left unattended (e.g. wrenches and bolts). Moreover, in two instances, hot surfaces were not properly insulated (i.e. protective grating was not reinstalled around hot pipework after job completion, hot surface in close proximity of ladder handrail inside engine room). Whilst the first case appears to be caused by worker inattention/negligence, the latter requires a prompt remedial action by MODEC/TGL to avoid potential injuries.
A dedicated procedure for ensuring proper management, control and approval of hazardous substances is adopted by MODEC and found to be fairly effective. In fact, hazardous substances were observed suitably contained and appropriate hazard warning signs were clearly displayed where hazardous, harmful or toxic substances were present. Drums, barrels and tote-tanks on the upper deck were found to be equipped with secondary containment. However, several secondary containments were found full of condensed water significantly reducing, and in some cases completely impairing, the capability of containment to prevent leakages of hazardous fluids on deck or overboard. To tackle this issue, TGL and MODEC should implement a practice/method to frequently drain the secondary containments in order to avoid excessive accumulation of condensed water. MSDS are generally available for the chemicals currently stored or used. Specifically, MSDS are available at the place of storage such that immediate emergency advice is at hand and appropriate action can be taken. One exception was observed, a tote-take containing hazardous chemical was found without MSDS.

The medical facility was found to be adequate and fully stocked with the necessary equipment and medicine to enable immediate first aid treatment in the event of injuries or minor medical problems. It is constantly staffed by a contracted medic (SOS International) who is also in charge of managing the drugs inventory and the employee medical records. Controlled drugs are kept in a dedicated locker accessible only to the medic. Since the arrival of JEAM FPSO in Ghana, only one serious medical incident has occurred, which required the person to be evacuated via helicopter as the injury could not be treated on-board.

Newco Catering & Logistics is the contractor for catering and housekeeping services. Galley and food storage were found in a proper status, clean and well organized. Samples of clean water and of each meal are regularly taken and sent onshore to be analysed. No events of food poisoning have been recorded so far. Records and cleaning schedules were provided. Temperature of fridges is regularly monitored (four times per day) and records are regularly kept. Food supplies are delivered once a week via supply vessel and were found properly stored and labelled.

5.3.1.4 Personnel Protective Equipment

IESC observed that appropriate Personal Protective Equipment (PPE) was correctly worn by all operators on-board the JEAM FPSO and the quality of PPE received by the survey team was in line with offshore standards. When outside the accommodation areas, all personnel are required to wear:

- safety helmet;
- steel toed safety shoes;
- long sleeved fire retardant coveralls;
- eye and ear protections; and
- gloves.

Additional PPE are prescribed for specific tasks such as grinding, welding or works over water, etc.

TGL continues to have a dedicated area of the jetty at Takoradi Harbour for cargo operations. IESC noted that all those involved in loading and unloading operations have the necessary safety equipment and follow TGL HSE procedures, including Takoradi Harbour stevedores contracted directly by TGL.

The Baker Hughes warehouse (located close to the TGL jetty area) continues to be used by the Project. IESC again confirmed that all personnel are provided with suitable PPE, and that fire-fighting equipment and other H&S equipment, such as eye wash basins, are located in close proximity to hazardous storage areas.

As previously discussed, the IESC observation is related to the quantity of dust and wind-blown materials at the facility as a result of non TGL vessel offloading. The HSE procedures and PPE are in place and are effective when they are required to be implemented. With the development of the new TGL area (by the end of 2017) within the commercial port, this issue will be resolved.
5.3.2 Process Safety Management

Management of process safety risks involves managing a number of technical (plant), managerial (processes) and human factor (people) activities which, if not managed effectively, could lead to a major incident.

The main aspect of process safety and management of major hazards are provided in the FPSOs Operations Safety Case. TGL has developed a specific safety case for each of the two FPSOs both being revised and issued in 2016.

One of the main purposes of the safety case is to assess the risk associated to major accident events and to demonstrate that risk reduction measures implemented are sufficient to bring the risk to “As Low As Reasonably Practicable” (ALARP, i.e. further risk reduction is impractical or the cost is grossly disproportionate to the improvement gained). For both FPSOs, the risk was assessed as ALARP through a series of risk assessment studies concluded by ALARP demonstration workshops developed during the design phase and revised, where required, for the operation phase. The IESC positively observed TGL commitment to adopt the Safety Case as a learning document for the engineering and operations workforce through dedicated awareness and familiarization training sessions and preparation of web-based version of the safety cases to be rolled-out in 2017.

It is to be noted that the revised Jubilee Safety Case does not address the ongoing turret issue and the vessel is still described as a turret moored FPSO. TGL might want to consider including in the next revision of the safety case, the new adopted mooring configuration detailing all modifications resulting from the Turret Remediation Project and any change in the risk level.

To monitor, evaluate and manage process safety risks on the FPSOs, TGL has developed a software package called RiskPoynt which is based on the Swiss Cheese Model (or Barrier Model). The software allows TGL to assess the facility level of risk by providing in real-time the impairment status (i.e. effectiveness/availability of the barrier in case of incident) of the safety barriers.

Another key aspect for the management of process safety related risks is the identification, management and performance assurance of SCEs/ECEs. Details relevant to SCEs/ECEs are provided in section 5.3.7.

5.3.3 Incident Investigation & Reporting

The IESC observed that incidents and near misses are promptly recorded and analysed, on the basis of Tullow Incident Reporting, Investigation and Analysis (IRIA) Procedure which requires that all incidents are reported within the TGL web based incident reporting system (EMEX) within 24 hours of any incident.

It is worth mentioning that TGL classifies the incidents into three categories:

- incidents occurred in Controlled Activity or Site - these incidents are reported in EMEX and contribute to Tullow’s EHS Statistics;
- incidents occurred in Monitored Activity or Site - these incidents might be reported in EMEX only when they provide learning for TGL but do contribute to Tullow’s EHS Statistics;
- incidents occurred in Uncontrolled Activity or Site - these incidents are not reported and do not contribute to Tullow’s EHS Statistics.

During the site visit, IESC noted that there is a misalignment between the LTI events reported by TGL in the AMR and the actual LTI events occurred during the review period. In particular, whilst the AMR reports a zero Lost Time Injury Frequency (LTIF), two LTI events occurred on the JEAM FPSO in 2016. TGL has clarified that such events where not accounted for as they occurred before fist oil, prior to the FPSO becoming a controlled site (August 2016, i.e. when the JEAM FPSO was still a Monitored Site).

After first oil, JEAM FPSO became a Controlled Site and since then no incidents have occurred and at the time of the offshore site visit the FPSO has experience 298 days LTI free.
During 2016, MODEC continued to record incidents and injuries which were then uploaded in the EMEX EHS system. As outlined in the AMR, and verified by IESC, a total of 142 work related incidents were reported for the 2016 reporting period (relating to all TGL Controlled Activities/Sites). Out of the 142 incidents recorded, 107 were near misses, 12 were Injuries, 18 were environmental incidents, 1 was occupational illness, and 4 were security cases. No LTI event or Tier 1 Process Safety Incidents occurred.

A Tier 1 Process Safety Incident is an unplanned or uncontrolled release of any material from a process that results in one or more of the consequences listed below:

- harm to people;
- impact upon the community;
- damage to equipment; or
- a release of a threshold quantity.

IESC is pleased to note that all incidents are investigated regardless of their severity level. Incidents that could have realistically resulted in a major or catastrophic outcome are classified as High Potential Incidents (HIPO). A detailed investigation is required for these incidents in order to identify appropriate measures to prevent their recurrence. For the reporting period, a total of 6 HIPO incidents were recorded.

Of the HIPOs registered for the Project, only one was related to offshore activities (KNK FPSO). It involved a loose metal flake (~1.5 kg, generated by the thermal degradation of the flare tip) that came down from the tower structure hitting the deck. After careful evaluation, TGL has decided to replace the flare tip (operation planned for 2017). It is to be noted that this is the second event involving the KNK FPSO flare. TGL reported that a crack was identified on the flare tower and a root cause analysis concluded poor weld control at the construction stage. At the time, a case to operate (CTO) was developed while the issue was addressed, with the repair undertaken in December 2015. TGL confirm that the two events are not connected, in which case, the IESC question whether the flare is designed to sustain continuous flaring and if so the cause for thermal degradation of the flare tip.

Investigation of incidents occurring on-board JEAM FPSO is carried out according to MODEC specific procedure which has been demonstrated to be in compliance with Tullow Corporate and TGL Business Policies & Standards through TEN SMS bridging document. During the offshore visit, the IESC received and reviewed few incident investigation reports prepared by MODEC, which are considered adequate and well structured. The report provides (among others):

- incident Description, Classification & Severity Rating;
- composition of Investigation Team;
- investigation Findings and Sequence of Events;
- incidents immediate and root causes;
- supporting documentation such as photographs, drawings and evidence collected; and
- corrective action with Responsible Person and Deadline for implementation.

The IESC reviewed the proposed actions and consider them as adequate to address the observed issues to avoid incident recurrence.

Following IESC observations made during the 2016 site visit, TGL has revised the Incident Reporting, Investigation and Analysis Procedure (July 2016) prescribing that all major incidents (actual level 4 and 5 incidents according to TGL classification) shall be communicated to IFC within 3 days by e-mail and annually as part of annual IFC report. The above prescription is valid for controlled sites/ activities, monitored and uncontrolled activities or sites.

It is to be noted that according to the revised procedure, HIPOs (potential level 4 and 5 incidents according to TGL classification) will not be immediately communicated but they will be included in the annual report issued
to IFC. IESC suggest to review the aforementioned procedure prescribing a prompt communication of HIPOs to IFC.

5.3.4 Competency Management & Training Activities

As outlined in section 6.1.2 above, in the period under review TGL has carried out extensive training across a range of H&S topics, for both onshore and offshore personnel, including:

- process safety awareness training, delivered to delegates from the Ministry of Petroleum, the Petroleum Commission, AMEC and Tullow employees (Ghana and Kenya);
- awareness and familiarisation training for the new revision of TEN and Jubilee Safety Cases;
- extension for 2016 of Hazard Awareness, Task Risk Assessment, Permit to Work and Control of hazardous substances (COSHH) trainings (provided by an external third party) for both JEAM and KNK FPSOs personnel;
- dropped object prevention training was organised for employees and contractors in Takoradi;
- additional trainings have been provided to key employees working on JEAM FPSO (e.g. Offshore emergency Response team members, Helideck Emergency response team members) to ensure adequate competency prior to first oil;
- advanced First Aid Training was undertaken for 34 employees from the Accra office. This training was carried out by West African Rescue Association (WARA) Training Academy. This is part of the medical emergency response plan for all TGL offices. All TGL employees in Takoradi are similarly trained in first aid and undertake annual refresher training;
- malaria awareness, IMO Level 3 Oil Spill response, working at height trainings for employees working on Takoradi Logistics Supply Base and Sekondi Fabrication Yard.

Further details are clearly reported in the 2016 AMR.

To maximize the effectiveness of the learning efforts, TGL have adopted the 70:20:10 Learning and Development Model in which the acquisition of knowledge is achieved by:

- 70% through training on the job;
- 20% via mentoring, interaction with peers, etc.;
- 10% from traditional classroom training and other educational events.

To assess the competency of its employees, TGL has developed a tool called “Tullow Competency Tool”. Each employee is periodically asked to fill out as self-assessment section (job position specific) which is then verified by the line manager. In case gaps are identified, a development program is drafted with the support of the HR function.

It is IESC understanding that TGL training programs are limited to TGL’s employees with the exclusion of specific topics such as Oil Spill Response or Process Safety which are extended to MODEC’s employees, subcontractors and concerned authorities. TGL ensure competency of MODEC or other contractor employees, via specific audits that include contractors training programs. In addition, for both FPSOs, safety critical roles are identified (OIM, HLO, etc.). MODEC have to provide evidence to TGL of the competency of those safety critical employees through specific KPIs.

The IESC was provided with the JEAM FPSO training matrix for 2017, which outlines a comprehensive H&S training program to be undertaken which includes PTW, Task Risk Assessment, Confined Space Entry, Advanced Firefighting, COSHH, Risk Assessment, etc..
5.3.5 Emergency Management

IESC continues to note strong emergency procedures on-board JEAM FPSO, including clearly identified emergency escape routes and muster points. These are kept free of obstructions at all times, limits of PPE free areas are clearly marked outside the accommodation areas.

In case of emergency, the JEAM FPSO accommodation has been designated as the Temporary Refuge (TR) with the Central Control Room (CCR) and Mess Room designated as the location where personnel muster and incident response is coordinated from. The TR is sized for a maximum Personel On Board (POB) of 120.

Generally firefighting systems (e.g. water deluge systems, inergen system, etc.), fire & gas detection systems and emergency evacuation systems (escape routes, PAGA system, TEMPSC, Fast Rescue Craft, lifeboats and life rafts, etc.) on-board the JEAM FPSO were found in good status, well maintained and regularly inspected. IESC found that some fire extinguishers were not inspected according to schedule. It appears that the inspection activities are not carried out in a structured way as for a given unit (FPSO area) some fire extinguishers were inspected according to schedule whilst others were not. IESC suggests revising the current inspection process by adopting a more structured method.

Lifejackets for at least 100% lifeboat capacity are provided and stored in glass fibre boxes near the lifeboat/liferaft embarkation areas. Additional lifejackets are stowed in cabins and additional designated locations.

On-board JEAM FPSO, emergency drills are regularly performed according to a planned schedule. Some drills were skipped or postponed to cope with operations constraints due to the high number of commissioning activities ongoing. IESC has received and reviewed some emergency drill records developed by MODEC. These are considered adequate and well-structured providing (among others):

- simulated emergency scenario (fire, spill, man overboard, etc.);
- type of alarm activated (either general of abandon ship);
- date and time of the drill;
- POB list with indication of missing persons (if any);
- sequence of events;
- muster time and evacuation response;
- main findings/observation; and
- action to be taken and responsible party for implementation.

TGL provided IESC with a list of the top emergency response drills set to be carried out in 2017 (twelve in total consisting of both drills and exercises). IESC notes that the drills are scheduled on a monthly basis throughout the year and cover a range of topics across all TGL activities (both offshore, onshore, logistics, transport etc.). The emergency exercises address a variety of potential EHS emergency situations including infectious diseases, emergency flight landings, illegal occupation on-board the FPSO, large scale casualty incidents and major incidents offshore amongst others. The IESC were informed that in the past TGL involved local authorities and support facilities in their drills, however, no involvement has been sought in recent years as TGL strive to be self-sufficient and prepared to respond (in the event of a major incident/catastrophe) using their own resources and response capabilities. In the TGL offices, WARA is involved in drills as necessary.

With regard to Oil Spill Response, TGL has developed comprehensive Oil Spill Contingency Plans for TEN and Jubilee Fields also covering oil spills occurring in Takoradi Commercial Port and Sekondi Naval Base. The plans will also be activated to respond to spills within Ghanaian waters in the event that export oil tankers contracted by the purchasing agent for the TEN and Jubilee Fields. OSCP are based on a spill risk assessment, defining expected frequency of occurrence and magnitude of spills from different release sources and oil spill trajectory modelling with oil fate and environmental prediction for a number of spill simulations, using a computer model with the ability to input local current and wind data.
During the site visit, the IESC has received and reviewed the latest revision of the TEN Field OSCP, which is dated March 2016. It has been developed according to internationally best practices (e.g. ISO 15544, IMO Manual on Assessment of Oil Spill Risk and Preparedness, IPIECA and OGP guidelines) and follows the International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC ’90).

In April 2016, TGL in collaboration with the Gh EPA and other Government Agencies carried out a major oil spill exercise (Tier 3) to test TGL Tier 1 & 2 level of response and preparedness until arrival of international support. The exercise was successfully carried out, with TGL vessels that deployed oil containment and recovery equipment assisted by the Ghana Navy. No major gaps were identified. All relevant details are reported in the 2016 Annual Monitoring Report.

IMO Level III Oil Spill Response and Environmental Impact Assessment trainings are periodically provided for a range of TGL employees and contractors. Moreover, TGL undertook a series of offshore oil spill response training exercises through the external contractor Oil Spill Response Limited (OSRL), for both in house and external 3rd party contractors.

As outlined in the AMR, TGL collaborated with EPA, US Navy and Ghana Navy in an ECOWAS regional exercise focussed on key maritime threats and illegal activities such as piracy, drug trafficking, human trafficking, illegal fishing and marine pollution. Simulation exercises will be conducted periodically to assess operational capability to combat maritime threats. Moreover, IESC have been informed that TGL is working on a mutual aid agreement with ENI for the provision of resources for the management of emergency situations.

5.3.6 H&S Performance Monitoring

As outlined in the AMR, a total of 142 work related incidents have been recorded for the 2016 reporting period in TGL “controlled” site or activities. No LTI or Tier 1 Process Safety Incidents have occurred. Given the above, 2016 TGL Lost Time Injury Frequency stood at 0.00, below the overall 2015 OGP LTIF average of 0.29 and significantly lower than 2015 TGL LTIF of 0.54. TGL Total Recordable Injury Frequency (TRIF) slightly decreased when compared to 2015 figures and stood at 1.09. Even though it falls below the overall 2015 OGP TRIF average (used as the TGL benchmark), it did not meet the TGL target (0.89).

On-board JEAM FPSO, a series of leading and lagging indicators are monitored. These include (among others):

- HSE meetings;
- senior leadership walkthroughs;
- HSE Action Items Opened and Closed;
- security, environmental and asset damage incidents;
- safety observations; and
- HSE Audits as per schedule, etc.

According to the provided statistical data, IESC observe that all the performance targets were met in 2016.

The TGL H&S auditing program continues to be effectively implemented in accordance with Company procedures at TGL and MODEC levels. During 2016, a range of internal and external EHS audits were undertaken on the both onshore and offshore facilities covering a wide range of topics such as:

- Health & Hygiene audits;
- Environmental Management System Audits;
- Assurance audit of HIPO action closure;
- Pre Shutdown readiness review audit;
- Chemical Handling and Lab Safety audit;
- Flexible Hose Management audit;
Environmental audit; and
 Periodic Senior leadership walkthroughs, etc.

5.3.7 SCEs/ECEs Management

Management Systems implemented on both FPSOs include the identification and management of Safety and Environmental Critical Elements (SCEs/ECEs), which are defined as any part of the installation, plant or equipment or computer programmes whose failure will either cause or contribute to a major accident hazard, or the purpose of which is to prevent or limit the effect or occurrence of a major accident.

SCEs/ECEs identification and management is performed according to the OSCR (Offshore Safety Case Regulation 2005), which includes the following key features:

- concept of duty holder;
- safety case;
- identification of major accident hazards;
- identification of SCEs/ECEs;
- setting of performance standards for SCEs/ECEs;
- written schemes of verification and examination; and
- independent verification requirements.

The OSCR is not only a UK legal standard, but now used worldwide serving as a good practice example.

In June 2016, TGL has issued an updated revision of the Jubilee Operations Safety Case (TGI-OPS-SFC-00-0001 Rev. 3) to address the changes made on-board KNK FPSO whereas TEN Operations Safety Case (00002-E80-ES-0002 Rev. 1) was issued in March 2017. Both new revisions have been made accessible to relevant personnel and the roll-out process was supported by awareness and familiarization training.

The OSCR requires that a Duty Holder (i.e. TGL) ensures that a record of the SCEs/ECEs is made and maintained. The regulation further requires the duty holder to ensure that this record be commented on by an Independent Verification Body (IVB), and that a verification scheme is drawn up by, or in consultation with, the IVB. The purpose of the scheme is to ensure that the identified SCEs/ECEs are suitable throughout the entire life cycle of the installation. Verification is achieved by developing a scheme detailing verification activities, including design review, witness of testing, examination and audit which demonstrate that SCEs/ECEs parts of the asset are suitable.

With regard to the TEN FPSO and subsea facilities, the initial suitability of SCEs/ECEs has been verified by Bureau Veritas UK Limited, which has developed initial suitability schemes and recorded in Detailed Work Instructions (DWIs) of the tasks to be performed by the IVB to confirm the SCEs/ECEs are initially suitable in terms of Functionality, Availability, Reliability or Survivability.

With regard to Jubilee FPSO, the initial suitability verification of the SCEs/ECEs did not include an Independent Verification. TGL plans on appointing, by the end of 2017, an IVB for the verification of SCEs/ECEs suitability throughout the life cycle of both TEN and Jubilee Development Projects.

To ensure the integrity of its assets, TGL has implemented an inspection/maintenance program and adopted, for both FPSOs, a Computerized Maintenance Management System (MAXIMO) allowing the maintenance/inspection team to effectively track the tasks to be carried out, keep records and plan future activities.

The IESC observed that the CMMS covers inspection and maintenance activities of SCEs/ECEs and specific KPIs (e.g. Safety Critical Planned Maintenance deferral factor) for monitoring maintenance activities on critical elements are produced. MAXIMO system became operational for both TEN and Jubilee in 2016.
5.4  SOCIAL COMPONENTS

5.4.1  TGL Social Performance Strategy

In 2016, Social Investment (SI) projects continued to be aligned to the standards and objectives launched in 2013 and based on the following key initiatives:

- continuing with the quarterly stakeholder engagement that involves the traditional and religious leaders, local government and regulators, fishermen and fishmongers as well as youth and civil society groups;
- collaboration with local NGOs;
- completion of the legacy projects which derived from earlier commitments made to stakeholders; and
- continuing with the quarterly oversight review of the Jubilee funded projects by the SI Subcommittee of the Jubilee JV as a means of providing routine quality assurance for SI interventions.

Project beneficiaries were mainly the fishing communities of the six coastal districts of the Western Region (Jomor, Ellembele, Nzema East, Ahanta West, Sekondi Takoradi and Shama).

Since the last site visit in 2016, the reference documents for TGL social activities have not undergone changes (2013-2014 Social Investment Strategy, the Monitoring & Evaluation - M&E - Plan and the Public Consultation and Disclosure Plan - PCDP - including the Non-Technical Summary).

Following the completion and handover of the legacy projects in 2016, TGL has started a process of reorientation of the SI Strategy which led to the abandonment of the former four SP pillars on which it was based (namely Social/ socio-economic impact assessment and management, Stakeholder Engagement - Grassroots, and Sea Access, Social Investment). The SI Strategy replaces the former SP Strategy and is in compliance with the SP Policy and Plan, the latter issued in 2016. Also, the strategy is aligned with the TGL IMS and it is an integral part of the component “Environment, Social Performance and Human Rights (ESP)”. The process of full integration of social management within the IMS is still ongoing and will be monitored during next site visit.

The review of the SI Strategy started from the redefinition of the Project Area of Influence (AoI), which now embraces only the coastal communities actually directly and indirectly impacted, replacing the former approach which generically identified the entire territory of the six coastal districts. Specifically, TGL now considers the following as part of the AoI:

- the coastal region in 6 districts;
- 115 fishing communities;
- 2,700 canoe owners (often women);
- 6,000 canoes;
- the settlements close to the landing beaches and land-based operations (warehousing, transport, marine terminal, etc); and
- the Advisory Zone (AZ) and Exclusion Zone (EZ) and the sea section between the FPSOs and shoreline.

The main direct and indirect impacts identified as being generated by the Project are:

- offshore: disruption of fishing during seismic and other activities within the EZ, AZ and beyond and potential economic displacement; avoidance of EZ increases distance, time, resources for the canoe journey; disruption by supply vessel; potential damage to equipment; potential risk to human life;
- onshore: impacts on infrastructure, in particular roads, traffic congestion and safety, workers influx.

Based on these new premises, the SI Strategy has been re-drafted and is now driven by the following objectives/pillars:
corporate Citizenship/Local Philanthropy: the purpose is to promote good corporate citizenship in operating locations. It is characterized by short term and ad hoc activities with small budget;

transactional Investments: Impact Mitigation, Mandatory Licence and Community Consent Agreements: the purpose of this pillar is to comply with the ESIA requirements and mandatory licence commitments as well as to mitigate project impacts. Projects have a short term duration and are funded by JV partners;

socio-economic Investment: projects supported under this pillar are aimed at creating a legacy and at “moving the needle” over time in a meaningful and measureable way. They are financed through Tullow voluntary contributions, with optimized funding by multiple partners, and are long term investment. They are executed by implementing partners and are governed at a senior-level in the Company (an Advisory Board could be established as required).

The budget allocated for SI is aligned to the project life cycle, as shown in the figure below.

Three focus areas have been identified for the pillar “Socio-economic Investment”:

- capacity building through education & skills development in Science, Technology, Engineering, and Mathematics (STEM) to prepare people for jobs in the economy (i.e. Technical/vocational training programme in trades skills that builds capacity for the Oil & Gas sector and others);
- strengthening the local economy by helping to build the private sector/expand economic growth through local economic activity (i.e. Support to local Micro, Small, Medium Enterprises through enterprise development and/or local business incubation centres); and
- shared infrastructure and logistics by adapting/leveraging existing Tullow and jointly funded infrastructure plans/projects for the business to benefit host communities (i.e. water facilities used for business purposes are extended to the community).

The Projects to be realized under the different pillars are currently under development and their outline will be completed by the end of 2017.

Considering that the Jubilee Project is already in the operation phase while TEN Project is in commissioning phase, the budget for SI in 2017 has already been restructured to reflect the allocation of “Mature Asset/Producing” presented in the figure above. About 53% of SI budget is dedicated to socio-economic investments. Details on the SI budget are discussed in section 0.

TGL is fully aware of the relevance in terms of cumulative impact potential on fishermen sea access, in particular now that three (3) FPSOs are in place (2 for Tullow, 1 for ENI). TGL is now focused on ensuring safety in the management of sea access and refers to the Government for the identification of alternative solutions to face the problem, as better explained in Section 5.4.4. Nonetheless, a “Sea Access Framework” is reportedly under development: TGL appointed an environmental consultant to assess the state of the art of sea access in the AoI.
The report, which should be issued by the end of 2017, should contain actions to improve the management of sea access.

Livelihood Diversification and Support projects (LDSP), which address fishing communities affected by the general decline of fish catch, are still ongoing but reportedly do not have the backing from the other JV partners who perceive them as less effective interventions. For this reason, TGL will measure the results achieved by these projects based on a cost-benefits analysis and will then decide about their possible continuation once completed (planned in about 2 years).

The collaboration with other JV partners in the field of SI, in particular Kosmos, appears to have improved: quarterly meetings (at least) are held to coordinate social investments (in particular on the topics of intervention and possible partnerships) to avoid the competition that IESC noticed during the past site visit.

5.4.2 Community Engagement/Consultation and Disclosure

No further update has been done to the PCDP following the 2015 revision.

Community engagement continues at a good standard. It is evident that communities are well informed on TGL activities, engagement is continuous and developed using culturally appropriate tools. Community Liaison Officer (CLOs), selected among members of the communities of the covered districts, have remained stable in their posts allowing a trusting relationship to grow.

In 2016, community engagement continued to center on the six coastal communities and to interact and dialogue with the Chiefs and Elders, NGOs, Community Based Organizations, District Assemblies, Regulatory Agencies, Fishermen Associations, Fishmongers, queen mothers, and individual opinion leaders on health, education, environmental, and enterprise development activities. In addition, considerable effort was made to engage with deep-sea fishermen and the canoe council executives to continue to educate them on the FPSOs EZ and AZ and on the Jubilee Seismic Exercise held in the first quarter of 2017. Specifically, engagement activities focused on:

- continuous engagement for completion and decommissioning of Wave Glider survey;
- community sensitization on the arrival of FPSO Mills;
- engagement on Turret Remediation Exercise;
- jubilee and TEN Operation Update including SI Project Progress; and
- Jubilee Seismic Exercise.

TGL continued to use the Drama Series to spread messages among local fishermen communities related to the grievance mechanism and the commissioning of the JEAM FPSO. According to the Ghana National Canoe Fishermen Council (GNCFC) this method is very effective in engaging in engaging community members.

Reportedly, TGL recently acquired a stakeholder engagement software (Borealis) to improve the tracking system of all social activities as well as to manage data generated by stakeholder engagement activities. The software offers different work packages, which also includes analytical and mapping tools: TGL is still working on the selection of the functions to be included in the software which should become operational in the forthcoming months. User trainings will be delivered to the SP team and CLOs.

The IESC note that the TGL website is still not used sufficiently by the Company to disclose Project updated information on social management. Therefore, IESC reiterate its suggestion to consider the disclosure on TGL website of PCDP, NTS, main Project milestones in the field of community engagement in order to reach other possibly interested stakeholders and give more visibility to TGL efforts.

5.4.2.1 Local Community Ambient Air Quality Study

In 2015 TGL undertook a community ambient air quality study for eight communities (New Town, Half Assini, Ankobra, Atuabo, Cape Three Points, Upper Dixcove, Lower Axim, and Upper Axim) located in four frontline districts along the Ghana western coastline. The decision to conduct the study was taken by TGL in response to
the concerns expressed by coastal communities that offshore flaring emissions were impacting coastline ambient air quality and as a requirement of the Ministry of Energy and Gh EPA consequent to the approval to flare excess produced gas. The results indicated that the ambient air quality of the coastal districts is not being impacted by offshore flaring. Reportedly, the outcomes of the study have been disclosed to affected communities.

As a voluntary commitment, TGL decided to follow up the monitoring with a new campaign in June 2017 in order to compare 2015 results with the current situation which is characterized by the presence of the new JEAM FPSO. IESC suggests improving the visibility of the outcomes of the community ambient air quality study: specifically, it is suggested to disclose the results on the Company website. Moreover, affected communities should be addressed by a specific result disclosure campaign. These actions are particularly important not only to ensure transparency towards stakeholders but also to demonstrate the sustainability of TGL operations concerning air quality. This is particular relevant now that new players have entered Ghana O&G sector and a new FPSO is present in the same AoI: coastal communities and other stakeholders should be fully aware that in the case of reoccurrence of new skins rashes/eye infections, these are not linked to TGL offshore operations.

5.4.3 Grievance Management

A single grievance mechanism is in place to collect and deal with stakeholder concerns and complaints. The decreasing trend in the number of grievances submitted over the years has been maintained also during 2016, which is likely due to effective engagement procedures.

In 2016 three complaints have been submitted, resolved and closed. In the first quarter of 2017 four complaints have been registered, all referring to damages to fishing vessels or equipment that occurred during Jubilee seismic activities. These grievances are still open due to the fact that investigations in these cases require more time, which generally exceeds the timeline defined by the grievance process. Reportedly, the approach used by TGL to resolve these cases is compensation with a “no-admission” of culpability.

The main change in the grievance mechanism from the past year is the regular involvement of chief fishermen and the fisheries commission, specifically for the receipt of complaints from community members, as confirmed by the fishermen chiefs met by the IESC during the site visit. Grievances are then reported to the CLOs who record them and start the resolution process.

5.4.4 Exclusion Zone Management

The management of the EZ and AZ continues to remain the main issue that TGL Project has to face with regards to social performance. Despite the stabilization in the number of canoe incursions in 2014 and 2015, with an average of about 800 cases per year, a new peak has been recorded in 2016. This expected increase is the effect of the arrival of the JEAM FPSO for which a new security zone has been established.

Incursions are mainly recorded in the AZ: once intercepted in this area, canoes are deterred from entering the EZ (the latter recognized by law as a no-access zone). Service vessels constantly watch over the security zone of both FPSOs to prevent incursions. This patrolling activity seems to be successful as only very few cases of EZ incursions have been recorded. Nonetheless, from a broader point of view, continuous incursions into the AZ clearly show the need to identify alternative solutions to this problem, focusing more on creating alternatives rather than just enforcing the prohibition. Fishermen met during the site visit re-affirmed that they are fully aware of the ban to access the security zone, confirming the usefulness of the informative campaigns regularly organized by TGL. However, fishermen perception is that fish are attracted by the FPSOs and, in a framework of general decline of the availability of fish stock, they do not see any other options than fishing in that area besides getting some form of compensation or support. In situations where there has been a long-term and progressive decline in fisheries productivity, as in the case in Ghanaian waters, stakeholders often assign responsibility for all of the perceived decline to the incoming project, as the presence of the project promotes both greater awareness of impacts and potential new opportunities for compensation. Thus, considering the recent opening of the Ghanaian offshore O&G & gas sector to new players, the risk for oil companies being blamed for causing the
In fishing will likely increase. This risk will particularly impact TGL, frustrating all the efforts done over the past years in engaging and working with the communities.

IESC believed is that TGL abandoned the past commitment to find new solutions for the management of canoe incursions based on a multi-stakeholder approach, to focus its efforts on ensuring safety and enforcing law in the security zone. TGL should bear in mind that the mitigation of the impacts on fishermen generated by Project are an ESIA commitment and thus the Company needs to ensure that they are actively involved in finding a solution to the problem, working together with national authorities, which generally need longer time to elaborate and adopt intervention measures. A demonstration is given by the Marine Fisheries Advisory Committee (MFAC) which was established in 2015 to advise the Ministry for Fisheries and Aquaculture Development (MoFAD) on matters related to the impact of O&G & gas activities on marine resources, to promote inter-sectoral management of marine resources information sharing, and coordinate decisions. The MFAC is coordinating the development and implementation of the Marine and Fisheries Action Plans and commissioned the Safe Sea Access Framework (SSAF) development. Nonetheless, MFAC actual achievements are still limited and are expected mostly in the medium long term.

Therefore, IESC reiterates the recommendation to explore new options to reduce the number of canoe incursions building on the experience of other project facing the same problem. IESC 2015 Monitoring Report gave some suggestions in this sense, namely the creation of an artificial reef, controlled fishing accesses to the EZ and the adoption of technologies to better exploit oceanic upwelling. The ongoing development of the “Sea Access Framework”, presented in section 5.4.1, should investigate possible solutions to be adopted at Company level to foster the adoption of a new approach to manage this problem. In 2016 the Centre for Environment and Health Research and Training issued the Livelihood Impact Assessment (LIA) requested by TGL for the six coastal districts of the Western Region of Ghana. The general objective was to undertake a baseline livelihoods study and collect the necessary data to help analyse the possible cumulative livelihoods impact of the operations of the TEN Project. The key deliverables of the LIA processes included:

- stakeholder engagement activities (carried out between March and May, 2016);
- a Livelihoods Baseline Report on the six coastal districts (submitted in June, 2016);
- a Livelihood Management Plan (October, 2016); and
- a LIA report (November, 2016).

The LIA report includes interesting suggestions for fishermen livelihood restoration and improvement. Nevertheless, it is not clear how the outcomes of this report have been taken into account by TGL and incorporated in the Company Si activities; the overall impression is that the LIA was a stand-alone initiative.

According to the AMR, TGL delivered training on Human Rights and on the Voluntary Principles on Security and Human Rights (VPshRs) to private and public security supporting operations in Ghana. No allegations of human rights abuse by public/private security forces have been reported by fishermen during the meeting with IESC and no specific grievances on this issue have been submitted.

5.4.4.1 Training

Education and engagement programs for fishermen on the Safety Zone continued throughout 2016, mostly following the same modalities of the past years.

Efforts in 2016 have been focused mostly on disclosing information on the arrival of the JEAM FPSO and on the seismic survey held at the beginning of 2017. A two phase strategic engagement plan was drawn to sensitize impacted stakeholders from the 115 communities in the zone of influence. The engagement included a multi-stakeholder forum, one-on-one interactions, the Annual Fishermen Regatta and a series of community meetings. Engagement activities started in the Sekondi Takoradi Metropolis, before being replicated in the Nzema East
Municipality, the Shama, Ahanta West and Jomoro Districts. This activity was implemented in collaboration with the Western Regional branch of the Ghana National Canoe Fishermen Council (GNCFC).

The GNCFC continues to be fully involved in the process of training fishermen on the dangers present and on the need to keep away from the FPSO Safety Zone.

The AMR provides only limited information (mostly qualitative) regarding the education programs delivered to impacted communities. For this reason, IESC reiterated the past recommendation to integrate the AMR with a summary of the trainings activities carried out (including location, data, topics and number of participants) to guarantee their monitoring over time.

**Community Development Projects**

Since 2010, SI projects have been focused on the development of human capital through Technical, Vocational, Education and Training (TVET, i.e. the Jubilee Technical Training Centre), Capacity building of local businesses through Enterprise Development (ED, i.e. TLG Group Scholarship Scheme; Enterprise Development) and mitigation projects identified through the ESIA.

In 2016, SI projects continued to be funded either through TGL discretionary budget or Jubilee and TEN Partners (of which 35.47% and 47.17 % contributed by TGL respectively). As anticipated last year, the SI budget for 2016 has been reduced while a major increment has been scheduled for 2017. In view of the revision of the SI, it is strongly advised to pay particular attention to the budget allocation for SI projects, which should be based on the idea that social performance is considered a business value and not a cost. In particular, a dedicated and sufficient budget should be set aside for the implementation of initiatives to mitigate Project impacts, which have to be considered a priority.

**Table 5.3:** Budget allocation for SI Projects

<table>
<thead>
<tr>
<th>Year</th>
<th>TGL standalone projects</th>
<th>Jubilee Partners funded projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>US$ 2,180,000</td>
<td>US$ 7,000,000</td>
</tr>
<tr>
<td>2012</td>
<td>US$ 260,000</td>
<td>US$ 10,300,000</td>
</tr>
<tr>
<td>2013</td>
<td>US$ 2,370,000</td>
<td>US$ 6,130,000</td>
</tr>
<tr>
<td>2014</td>
<td>US$ 4,000,000</td>
<td>US$ 5,900,000</td>
</tr>
<tr>
<td>2015</td>
<td>US$ 3,600,000</td>
<td>US$ 5,500,000</td>
</tr>
<tr>
<td>2017</td>
<td>US$ 2,024,691</td>
<td>US$ 1,715,000</td>
</tr>
</tbody>
</table>

As already anticipated in previous paragraphs, the following legacy projects were concluded in 2016 and have been handed over to the different implementing partners/ institutions (except Half Assini which will be handed over in mid-2017):

- Essikado Maternity Block (TGL 100% funded);
- Clean Water Project - Borehole Rehabilitation (Tullow 100% funded), which provided 39 boreholes for 39 communities;
- science in School Projects (funded by Jubilee Partners), specifically Asuansi Technical Institute Science Laboratory and Mfantsipim Secondary School Science Laboratory; and
- construction of Assembly Hall for Half Assini Sec. Sch. and Hostel for Axim Girls’ S (TGL 100% funded).

The following list presents the updates related to the main SI projects supported by TGL: many of them concluded in 2016 and have been handed over to local authorities/ institutions. A thorough description of each initiative is provided in the AMR:

- Tullow Group Scholarships Scheme (TGL 100% funded): with effect from 2016, recipients of Tullow Scholarship will be trained in Ghanaian Universities/Institutions in line with the reshaped SI Strategy which focuses on building capacity in country rather than sending scholars overseas, as it was originally planned;
Tullow Technical Training Scholarships (TGL 100% funded): to date, the total number of beneficiaries who received a bursary to attend the Jubilee Technical Training Centre at Takoradi stands at 17. The project will be reviewed throughout 2017 as part of the new SI strategy before a decision is taken to roll it out further;

Jubilee Technical Training Centre (funded by Jubilee Partners): in 2016 the Centre was transitioned fully and integrated into Takoradi Technical University’s (formerly Takoradi Polytechnic Institute) academic and training facilities, with the Rector of the University having an overall accountability of the Centre. A Centre Manager has been appointed by the University to run the day to day affairs of the Centre;

LDSP (funded by Jubilee Partners): the project entails working with selected fishermen and their families, in cassava and sweet potato farming, vegetable growing using greenhouse technology and piggery with its associated value chain. As mentioned, the project has gone through a successful pilot phase but the programmes and working agreement for the next phase are currently being discussed with the implementing partners for the additional two years of the remaining life cycle;

Enterprise Development Center (funded by Jubilee Partners): the project was handed over in 2016 to the Ministry of Petroleum;

Annual Fishermen Regatta (funded by Jubilee Partners): in 2016 the GNCFC used the Regatta platform to educate fishermen on the Jubilee Seismic exercise;

Star Community-based Health Planning and Services (CHPS, Jubilee Funded): the project was handed over in 2016 to the Ghana Health Service.

The following two projects are understood to be new initiatives started in 2016 (related information on the AMR is not clear):

TEN Water Sanitation and Health in Schools project (TEN-Wins, funded by TEN partners). The project seeks to improve the health, sanitation and hygiene status of pupils and students with the aim of positively contributing to the overall health and well-being of local communities;

TEN Science and Oil and Gas Quiz (funded by TEN partners), which was introduced as part of broader effort by the joint venture partners to support science education.

5.4.4.2 Monitoring

Monitoring is provided through project officers and CLOs. A Monitoring and Evaluation (M&E) Plan was prepared in 2014 and no changes have been made to date. The alignment of the M&E Plan is expected at the completion of the SI strategy (see section 5.4.1).