TULLOW GHANA

INDEPENDENT EXTERNAL MONITORING GROUP

GHANA Site Visit: May 2016
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<td>Annual Monitoring Report</td>
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<td>Areas to be Avoided</td>
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<td>CAR</td>
<td>Corrective Actions Report</td>
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<td>CLO</td>
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<td>CHPS</td>
<td>Community-based Health Planning and Services</td>
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<td>COSHH</td>
<td>Control of Substances Hazardous to Health</td>
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<td>CTO</td>
<td>Case to Operate</td>
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<td>EHS</td>
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<td>Environmental Monitoring Plan</td>
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<td>Environmental Management System</td>
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<td>ESAP</td>
<td>Environmental Social Action Plan</td>
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<td>Environmental and Social Impact Assessment</td>
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<td>ESMS</td>
<td>Environmental and Social Management System</td>
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<td>EZ</td>
<td>Exclusion Zone</td>
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<td>FFDP</td>
<td>Full Field Development Plan</td>
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<td>FPSO</td>
<td>Floating Production, Storage and Offloading</td>
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<td>Gh EPA</td>
<td>Ghana Environmental Protection Agency</td>
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<td>Gas Turbine Generator</td>
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<td>ICB</td>
<td>Independent Competent Body</td>
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<td>Independent Environmental Consultant</td>
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<td>IFC</td>
<td>International Finance Corporation</td>
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<td>International Maritime Organization</td>
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<td>KPI</td>
<td>Key Performance Indicators</td>
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<td>LEED</td>
<td>Livelihood Enhancement and Enterprise Development</td>
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<td>MAH</td>
<td>Major Accident Hazard</td>
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<td>Marine Pollution: International Convention for the Prevention of Pollution From Ships</td>
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<td>M&amp;E</td>
<td>Monitoring and Evaluation</td>
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<td>Marine Fisheries Advisory Committee</td>
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<td>MMscfd</td>
<td>Million standard cubic feet per day</td>
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<td>Management Of Change</td>
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<td>NORM</td>
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<td>Oil On Cuttings</td>
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<td>OIW</td>
<td>Oil in Water</td>
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<td>OMF</td>
<td>Operational Management Framework</td>
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<td>Offshore Safety Case</td>
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<td>Oil Water Separator</td>
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<td>Description</td>
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<tr>
<td>PCDP</td>
<td>Public Consultation and Disclosure Plan</td>
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<td>Performance Standard</td>
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<td>Permit to Work</td>
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<td>TDU</td>
<td>Thermal Desorption Unit</td>
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<td>TEN</td>
<td>Tweneboa, Enyenra and Ntomme</td>
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<td>TGSS</td>
<td>Tullow Group Scholarship Scheme</td>
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<td>TGL</td>
<td>Tullow Ghana Limited</td>
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<td>TVET</td>
<td>Technical, Vocational Education and Training</td>
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<td>WHO</td>
<td>World Health Organisation</td>
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<td>Waste Management Plan</td>
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EXECUTIVE SUMMARY

The Jubilee Phase 1 Oil and Gas Development Project is an oil and gas extraction and production project located offshore Ghana, lying in deep waters at approximately 60 km from the shoreline. It 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 further Jubilee Phase 1A development was planned to exploit further reserves and extend oil production levels of the Jubilee field. The Jubilee Phase 1A development includes the drilling and completion of additional oil production and water injection wells, the tie-in to the existing FPSO unit Kwame Nkrumah and the installation of additional subsea equipment for water injection.

Within the project disbursement agreement, Tullow Ghana Ltd (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.

This report provides the findings and observations of the independent external consultant (IEC) as a result of the external independent monitoring group visit and review carried out in May 2016, relevant to the period of 2015 and up to the time of the site visit.

The IEC site visit included the TGL headquarters in Accra, the FPSO, the onshore TGL shore base in Takoradi, the TGL facilities at the Sekondi Naval Base, TGL area of the Takoradi Port, meetings with the National Ghana Canoe Fisherman council, and the Western Regional Coordinator of the Petroleum Commission, visits to the communities of Amenao and Shama Apo.

At the time of the 2016 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 IEC 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 IEC findings and suggestions, while additional details can be found in the respective sections of the report.

The TGL “Simplification Project” (which commenced in 2014) officially concluded in November 2015, with only minor adjustments foreseen for 2016. The process resulted in the identification of 68 positions which were made redundant. TGL report that the redundancy process was carried out according to Ghana national legislative requirements, and a termination package offered and accepted by those affected.

During the site visit, the IEC were provided with an update on the TGL Environmental and Social Management System (ESMS). Significant changes have been made and are being rolled out within 2016 relating to the amendment/upgrade of the TGL management system to fall in line with the Tullow Integrated Management System (IMS), and the Operational Management Framework (OMF). The IMS will outline the in-country EHS and operational aspects required at the Tullow Corporate level, while the OMF Aligns with the elements of the Tullow corporate operations framework (IMS) and comprises the operational EHS documentation for TGL operations (both Jubilee and TEN). The OMF will be operational within the coming months, which will then be followed by the upgrade of the IMS.

The TGL restructuring process undertaken in 2014 and 2015 has not had a significant impact on Environmental, Health and Safety (EHS) team roles, with the Safety, Sustainability and External Affairs (SSEA) structure remaining in place with minimal changes. The EHS Asset Protection (AP) structure has been amended to better fit with the current Tullow/TGL management approach (adoption of the IMS and OMF), and project developments (TEN Project). The position of the SP Manger, which was characterized by annual turnovers in past years, is now stable since 2015.

TGL Social Performance (SP) Strategy continues to be based on the existing pillars. The future direction however of SP is not yet clear, especially considering the recent shift from mitigation projects and philanthropy towards...
livelihood enhancement and diversification schemes: the strategy and objectives TGL wants to achieve need to be defined, as a necessary step to plan future activities and budget. This reorientation should be foreseen within the reorganization of the existing reference SP documents into a structured Social Management System to be included within the IMS.

No other strikes on the FPSO have been reported since those of July/August 2014 by MODEC employees. The reinstatement/ labour dispute which followed the protest is now resolved. As a consequence, MODEC procedures have been reviewed and worker salaries and allowances increased. However, no monitoring of the process is foreseen by TGL, unless their intervention is directly required by MODEC. A closer follow-up and monitoring of the grievances by TGL is suggested, including a trigger mechanism as part of a procedure defining the level of seriousness for which the involvement of TGL is required to avoid possible escalations.

Extensive EHS training continued in 2015, covering a wide range of topics, including offshore safety and emergency response and oil spill management and response. Training on social topics has been provided to selected members of the SP team. The commissioning of the TEN project in the coming months and the application of IFC PS 2012 to the TEN project (as opposed to the 2006 PSs applied to the Jubilee Project) may justify additional training sessions for the EHSAP and SP team in IFC performance standards.

Environmental monitoring actions continue to be carried out by the Project. The IEC note while revisions of TGL Environmental Management Plans (EMPs) have improved since 2015, that some of the plans have not been reviewed within the nominated TGL time frame. The main plan that provides guidance on the environmental management framework (EMP) has been recently updated and will remain active in its current revision for 3 years. The IEC understand that the remaining supporting documents overdue for revision are being upgraded as part of the OMF rollout.

The TGL environmental certificate was renewed in May 2015, with the Gh EPA authorizing TGL to undertake abnormal flaring of up to 3% of production during upset and maintenance periods. This is an increase on the previous environmental permit of 2.5%. The IEC note that the flaring performance has regularly exceeded Gh EPA limits for a large part of 2015, and as flaring will remain a constant aspect of the Project, the IEC suggest that TGL identify potential practical solutions to reduce flaring rates and establish a realistic target limit. The Project is encouraged to undertake their best efforts in determining what GIIP approaches are implemented in similar projects and whether these can be adopted by TGL.

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

In general, the monitoring team continued to observe a strong Project health and safety (H&S) culture during the site visit, which is reflected in the health and safety findings of this report, and a proactive approach is evident at Project facilities both onshore and offshore.

The H&S management system remains adequate and effectively implemented and maintained to control and manage any unexpected incident scenario that could lead to threats to people and asset, as well as major oil spills that could result in severe environmental damage.

The IEC were informed of an ongoing critical HSE issue regarding the Turret on the FPSO, which has resulted in the FPSO inability to weather vane. This is a HSE risk for TGL, as it restricts tandem configuration crude oil offloading procedure and also requires an additional 3 vessels (tugboats) to be present 24 hours a day to secure the FPSO in a fixed position. TGL has developed a Case to Operate (CTO) while plausible and operationally feasible solutions to the situation are being investigated. There is no immediate fix available for this issue and careful planning is required. TGL is aware of the increased HSE risks and their approach remains “Safety before Production before Cost”. The IEC note that additional safety considerations are being evaluated on board the FPSO accordingly.

Due to a period of increased flaring in July 2015, TGL undertook a HAZID survey on the FPSO, which resulted in some additional temporary OHS noise mitigation measures being implemented by TGL throughout the increased flaring period.
Community engagement continues to progress and has reached a good standard, with combined activities for Jubilee and TEN projects. This effort should continue in the future and be based on shared responsibility among all Jubilee and TEN partners. The IEC have observed the lack of a structured approach for recording stakeholder engagement activities and related outcomes: the scheduled general alignment of the SI strategy should thus include the adoption of tracking procedures as well a system for the management of the copious socio-economic data gathered so far.

A community ambient air quality study was undertaken by TGL in 2015, resulting in no Project attributable impacts on the coastal districts: it is suggested to disclose these results on the TGL website to provide as much visibility as possible.

Grievance management is ongoing and is unchanged, following a similar trend to the previous year. Chief fishermen and Fisheries Commission are now involved in the process, specifically for the receipt of complaints from community members.

The issue of Sea Access is becoming more visible as TGL operations increase. The number of canoe incursions is still significant even though it has remained stable since 2014. The Project should seek to reduce these events rather than working towards their stabilization. For this purpose, TGL should involve all the different institutional stakeholders with the aim to define a new framework for the management of Sea Access, building on the experience of other similar projects. At the same time, TGL has to continue to ensure that training addressed to impacted fishermen communities (education programs on the Safety Zone and emergency response) and marine police (on the respect of human rights and on the management of intrusion) are not interrupted, specifically in view of the introduction of a new safety exclusion zone around the TEN FPSO aside the Jubilee one.

Community development projects continue to be implemented, funded either through TGL discretionary budget or Jubilee Partners. Due to the negative trends that the oil and gas market is facing, the SI budget for 2016 is expected to be reduced. 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: any revision of the budget should be carefully considered to avoid any imbalance with the investments undertaken in previous years. It is also recommended that affected communities’ expectations be carefully managed and any modification/restriction on promised benefit timely and appropriately communicated and discussed with stakeholders.
1 INTRODUCTION

The Jubilee Phases 1 and 1A Oil and Gas Development Project (the Project) involves the extraction of hydrocarbons from the Jubilee field 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 approximately 110 km².

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 the following activities:

- drilling and development of a total of 17 wells (among which 9 production wells, 5 water injection wells and 3 gas injection 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 FPSO and related supporting vessels (for sea patrolling and FPSO supply); and
- operation of the onshore facilities, including the Tullow Logistic Shore Base, the adjacent pipe yard and chemicals storage area and the Takoradi port facilities (used for storage of chemicals and raw materials and for the loading and offloading of supporting vessels).

All the related drilling activities were concluded in 2011 with the completion of the last oil production well.

Tullow determined that the Jubilee field’s reservoirs were somewhat different to the models initially envisaged in the Phase 1 Development Plan, and as such an addendum to the Jubilee Phase 1 Development Plan was developed. The further Jubilee Phase 1A development planned to exploit further reserves and extend oil production levels of the Jubilee field, including:

- 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 approved on January 9th 2012, 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 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.

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. Among the ESAP requirements, TGL environmental and social monitoring performances have to be verified on an annual basis by an external independent monitoring group. D’Appolonia S.p.A, Italy, as the independent environmental consultant (IEC) has been appointed by TGL to carry out the annual external independent monitoring of the implementation of the ESAP and related management measures.

On 29 May 2013, the Government of Ghana formally approved the Tullow T.E.N Project, which includes the development of the Tweneboa, Enyenra and Ntomme (TEN) fields, approximately 30km to the west of the Jubilee field. Development of the TEN Project requires the drilling and completion of up to 24 development wells which will be connected through subsea infrastructure to an FPSO. While not directly part of the Jubilee Project, the TEN project is referenced in this report with regards to potential cumulative impacts.

1.1 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 14th, 2016, 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 Phase 1 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 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 2015 AMR report (dated March 2016);
- 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 audit undertaken in 2015);
- 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 member (biophysical environment, health & safety, social) and to cover 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 team:

- kickoff meeting in Accra at TGL Headquarter (held on 3rd May) to discuss the site visit agenda, to discuss ESHS issues and collect additional documentation to be reviewed;
- Meeting in Accra with the Human Resources on 3rd May;
- visit to the FPSO (4th May) with the main purpose to verify TGL Environmental, Health and Safety 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 personnel (FPSO OIM, FPSO operation/Environment Team Lead, FPSO Safety Specialist), and verification of correct implementation of procedures and monitoring;
- meetings in the TGL Takoradi Office with the Social Performance (SP) team (on 4th and 5th May) to get an overview of the main progresses and changes in implementing activities with local communities through social engagement and investments;
- visit to Abuesi to carry out a meeting with fishermen, fishmongers and President of the Western Region Canoe Fishermen Council, with the support of the local Community Liaison Officer (CLO) (4th May);
- visit to TGL kindergarten built at Amenano, and to the Pilot Piggery Project supported by TGL in Shama Apo (4th May);
- meeting with Tullow Social Performance and Public Affairs Manager and the Western Regional Coordinator of the Petroleum Commission (5th May);
- visit to the Essikado Maternity Block and to the Jubilee Technical Training Centre (5th May);
- visit to the Sekondi Naval Base (Tullow facilities) and Takoradi Port facilities (May 5th) including the chemical storage facility run by Baker Hughes and the TGL berth to observe the implementation of HSE aspects on site, and discussions with Project staff;
- visit of the TGL Shore Base and annexed pipe yard and chemical storage area (May 5th) to evaluate Project performances in terms of chemical, material and waste handling and storage;
- Additional meetings in Accra with TGL (May 6th) in the morning and additional documentation requests, followed by the close out meeting with the TGL EHS&AP Manager, Operations Manager, Country Operations Manager and TGL Environment Team Lead 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:

1. EHS & MODEC Organisational charts;
2. Jubilee Field Environmental Monitoring FPSO Operations (November and December 2015);
3. TGL LTIF TRIF Summary 2015;
4. Environmental Management Plan Rev.5 reviewed in October 2015;
5. Environmental Monitoring Plan issued in August 2015;
6. TGL Waste Management Plan Rev.4 reviewed in July 2015;
8. Takoradi supply base operating guidelines manual Rev.3;
9. Waste tracking metrics for 2015;
10. Various EMEX reports for Incidents and Near Misses in 2015;
11. Jubilee environmental certificate issued by the Gh EPA in May 2015;
12. End of year Environmental emissions report for 2015;
14. MV21 External Training Records 31-12-2015;
15. Noise monitoring and Surveys undertaken in July and December 2015;
16. HIPO Investigation tracker for 2015;
17. 2016 EHSAP Assurance Plan – Audit schedule;
18. FPSO Kwame Nkrumah MV21 - Workplace Noise Survey 2015;
19. HIPO incident records 2015;
20. Selected CAR records for 2015;
21. EHS training matrix 2015 and plan for 2016;
23. January –April, 2016 Stakeholder and Community Engagement Report and Summary of Jan-date 2016 Community Consultation;
24. Communities Grievance Report (Jan-Dec., 2015), attached to the AMR 2015;
25. Tullow Ghana Limited Employee Handbook;
26. Project Briefs on the Essikado Maternity Block and the Livelihood Diversification and Support;
27. Redundancy Package documentation: Notice of Redundancy, redundancy selection criteria, Redundancy payment overview sheet;
28. Presentation of the Employee Engagement Forum (November 2015) and discussion topics;
29. Community Based Ambient Air Quality Monitoring Report (December 2015);
30. Livelihood Impact Assessment Inception Report (January 2016);
31. Final Report of Drama and Cultural Performance (June 2015);
32. Community Level Fisher Folks’ Engagement Meeting On Wave Glider Progress Report (December 2015);
33. Social Investment Mandatory Criteria (May 2013);
34. Community presentation for the arrival of the Stena Drill Max vessel;
35. Social Performance Plan (April 2016);
36. Sustainability and External Affairs Organization Chart; and
37. Wave Glider Campaign educational material.
4 REVIEW OF ENVIRONMENTAL AND SOCIAL ACTION PLAN COMMITMENTS

The 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 10th December 2010, and outlines the related actions to be implemented, the completion indicator for each Performance Standard applicable to the Project, and the timetable 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.

The relevant observations collected by the independent external monitoring team are reported, using the same table format in place for the ESAP, in the “May 2016 Status” column. Previous year tracking columns of ESAP items (from 2011 to 2014) has been removed from the ESAP table, and a summary has been provided for 2015 only. The May 2016 summary outlines the changes registered during the May 2016 visit, and a continuation of ESAP status where no change has been registered in 2015/2016.

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 this report, were observed with respect to ESAP commitments. The IEC 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>
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<tr>
<th>Item</th>
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| **1** | 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. | (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. | No update or further action required | |
| **2** | Tullow Oil will reconfigure the IMS to ensure that the Head of EHS reviews all Applicable Projects to ensure that they are evaluated and managed according to the IFC Performance Standards. | The Company has submitted a draft reconfigured IMS acceptable to IFC. | The TGL IMS is being developed in 2016 to fall in line with the Tullow IMS. TGL IMS will reflect the Tullow IMS. No update required, however, suggestions for the integration of TGL social strategy and objectives are provided in section 6.4.1. | |
| **3** | Training in the IFC’s Performance Standards and the applicable IFC EHS Guidelines will be provided to those involved with the risk management of Applicable Projects. | The Company has provided evidence of training and developed a specific training procedure to be included in the Corporate training plan. | The high turnover of staff in 2014 and 2015 (now complete) has resulted in positions being removed and previous roles combined. This combined with the TEN Project commencement in the coming months, and the adoption of the latest IFC PS in the TEN project, may justify additional training sessions in IFC PSs. | |

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1 Items #1, 2 and 3 of the table are reported separately since they were supposed to cover the overall TGL activities. For the purpose of the present verification however they are considered applicable to Jubilee Phase 1 development project only.
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<tr>
<td>PS1: Social and Environmental Assessment and Management Systems</td>
<td><strong>Jubilee Field Development Project – Phase 1</strong></td>
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<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. (b) The final ESIA has been disclosed in Tullow Oil website.</td>
<td>(a) Completed (b) 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 relevant Project Agreements, to ensure that the procedure is part of the Project environmental and social management system (ESMS).</td>
<td>(a) Tullow Oil has submitted the procedure acceptable to IFC. (b) The procedure is integrated in the Project environmental and social management system (ESMS).</td>
<td>(a) Completed. (b) Completed. Integrated into the Project EMP.</td>
<td>No update reported or further action required. The MOC procedure remains in the TGL ESMS and now sits under the Operational Management Framework (OMF). While numerous Technical MOCs have been raised in 2015, no environmental MOC has been implemented for the period under review.</td>
</tr>
<tr>
<td>6</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 drilling and installation phase, acceptable to IFC. (c) The Project has developed the ESMS for production operations, acceptable to IFC.</td>
<td>(a) Completed. (b) Completed (c) Ongoing, as per agreed timeline.</td>
<td>ISO 14001 has been successfully renewed in 2015. The EMP remains the main TGL plan providing guidance on the environmental management framework. The EMP is supported by a range of key environmental documents (outlined in section 6.1.4. The majority of EMPs have been reviewed by TGL within the Project determined timeframe. Some documents remain under review in anticipation of their integration in the OMF. Existing TGL Operations monitoring commitments remain as part of the EMS and additional details will be included in the OMF where necessary, which was being rolled out at the time of the site visit.</td>
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<td>7</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. (b) Disclosure of EMP updates, including this Action Plan, and public disclosure of EMP completion reporting.</td>
<td>(a) Completed. (b) Ongoing. Reporting at least twice per year or per PCDP once it is disclosed.</td>
<td>A NTS of the PCDP has been prepared as a guideline document for community consultations and made available for consultation at CLOs offices. Suggestions for future consultations and disclosure activities combined with the TEN Project are</td>
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<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 2015 and plan for 2016 received. Training is detailed further in section 6.1.2.</td>
</tr>
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</table>
| 9    | The Project will retain a qualified, independent external expert to verify its environmental and social monitoring information. | 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. | (a) Independent expert appointed.  
(b) First visit January 2010.  
(c) Subsequent annual independent verification visits. | External monitoring in place as per scope of work of the present site visit and report. Annual reporting ongoing. |
| 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 equal opportunity principles, benefits, and leave policies. | (a) The Company has developed and submitted the policy with reference to its own employees, acceptable to IFC.  
(b) The Company has developed and submitted the policy with reference to non-employee workers, acceptable to IFC. | (a) Completed.  
(b) Completed. | TGL Employee Handbook constantly undergoing revisions to address eventual implementation challenges. The update of 2015 has been postponed to mid 2016. An Employee Relations Procedure exists to guide internal grievances. An Employee Engagement Forum has been set up in November 2015. |
| 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 installation phase, acceptable to IFC.  
(b) Revised environmental monitoring program for the production operations phase, acceptable to IFC. | (a) Completed.  
(b) Completed. | Environmental monitoring ongoing in line with the Environmental Monitoring Plan. Environmental monitoring results for 2015 have been provided to the IEC, and results summarized in the AMR. Most of the monitoring requirements for the period under review had been completed at the time of... |
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<tr>
<td>12</td>
<td>The Project will maintain a monitoring program for greenhouse gases (GHG).</td>
<td>Periodic public reporting of GHG emissions for the Jubilee Field production operations.</td>
<td>At least yearly reporting.</td>
<td>Ongoing. Data provided through AMR report to IFC and statutory reports to Gh EPA. The AMR 2015 details a decrease in GHG emissions compared to 2014, due to the abnormal flaring undertaken in 2014. Project has received the GH EPA certificate to increase flaring to 3% of production rates. Additional details can be found in section 6.2.3.</td>
</tr>
<tr>
<td>13</td>
<td>The Project will include drilled cuttings and fluid disposal methods and procedures in the Project’s Waste Management Plan. A cuttings deposition model will be developed and included in the Jubilee Field ESIA.</td>
<td>Availability of the cuttings deposition model and the drilled cuttings and fluid disposal methods and procedures, acceptable to IFC.</td>
<td>Completed.</td>
<td>Log of all drilling waste produced and disposed of are provided within the relevant Well Terminal Reports, and provided to the Gh EPA. Drilling activities and resulting waste pertaining to the period under review have been provided detailed in the AMR. Waste management plan has been revised and updated in July 2015. Detailed description of drilling cuttings and fluids disposal methods, results and outcomes of studies carried out are reported in Section 6.</td>
</tr>
<tr>
<td>14</td>
<td>The Project will ensure that a Hydrotest Water Disposal Plan will be prepared.</td>
<td>Availability of the plan, acceptable to IFC.</td>
<td>Completed.</td>
<td>No update reported or further action needed.</td>
</tr>
<tr>
<td>15</td>
<td>The Project will install a produced water discharge sampling point in the FPSO and relevant procedures developed.</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</td>
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<tr>
<td>16</td>
<td>The Project will develop tanker vetting procedures to ensure compliant management of ballast water. Ballast water management measures will be detailed and included in the environmental management system for operations.</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 Environmental Monitoring Plan reviewed by TGL in 2015. Monitoring results show no ballast water was used by FPSO during 2015.</td>
</tr>
<tr>
<td>17</td>
<td>The Company will update the Drilling Waste 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>(a) Availability of a draft Project’s WMP (b) Availability of a draft Project’s management plan for drilled cuttings (c) Chemical Handling (COSHH) Procedure for the drilling and installation phase, acceptable to IFC. (d) Waste Management Plan and Chemical Handling (COSHH) Procedure for the production operations phase, acceptable to IFC.</td>
<td>(a) Completed. (b) Completed. (c) Completed. (d) Received Revision 0 for Ghana EPA submission, June 2010. Ongoing review of Revision 1.</td>
<td>WMP has been reviewed in 2015. Monitoring requirements remain in place and are continually implemented by the Project. Monitoring results have been provided for 2015 and additional details incorporated in the AMR (see section 6.2.1 for additional 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 additional details).</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, including fire prevention and protection, environmental emergencies, and other incident responses.</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>(a) Completed. (b) Ghana Incident Management Plan (IMP) Revision 7 received, acceptable to IFC.</td>
<td>ERP remains in place and is updated as necessary. No further update</td>
</tr>
<tr>
<td>19</td>
<td>Quantitative modelling 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</td>
<td>(a) Availability of the Project’s OSCP for the drilling and installation phase, including the spill trajectory model, acceptable to IFC. (b) OSCP for the production operations phase, acceptable to IFC.</td>
<td>(a) Completed. (b) OSCP Revision 1 received, acceptable to IFC.</td>
<td>Current OSCP for the production and operations phase remains in place. Review is currently underway as part of the development of the OMF. 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</td>
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<td>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>Availability of the Project’s H2S Program, acceptable to IFC</td>
<td>N/A</td>
<td>No further update reported or action needed.</td>
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<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>(a) Education program information and schedule for meeting with villages. (b) Procedures for offshore facilities provided to and accepted by IFC. (c) Procedures for managing traffic into and out of Takoradi Harbour (d) Security Plan provided to and accepted by IFC.</td>
<td>(a) Program ongoing. (b) Completed. (c) Tullow follows Africa Pilot for Takoradi Harbour, acceptable to IFC. (d) Completed.</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 are 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. No information provided in the 2015 AMR regarding the organization of training sections addressed to the Ghanaian marine police on the respect of human rights and ways to manage intrusions, as done in the past years. New strategies are being developed for “Sea Access”: section 6.4.4.1 provides some suggestions for the management of canoe incursions.</td>
</tr>
<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. (b) Procedure for boat traffic management and for warning boats away from the safety zone, including rules of engagement for use of physical intervention. (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>(a) Availability of the program, acceptable to IFC.</td>
<td>(a) Completed.</td>
<td>Program in place and consistently implemented.</td>
</tr>
<tr>
<td>22</td>
<td>The Project will develop and implement a program for</td>
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<td>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 consultation with the Ghana EPA.</td>
<td>(b) Observations analyzed by an experienced marine mammal biologist and reported in the annual monitoring report to IFC.</td>
<td>(b) At least yearly reporting.</td>
<td>Marine 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.</td>
</tr>
<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 2015</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>
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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 external independent monitoring 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. The following paragraphs report the relevant data and information collected during the interviews with the EHS team representatives in Takoradi, offshore on board the FPSO and in Accra.

The most significant change to the TGL ESMS over the period in review relates to the amendment/upgrade of the TGL management system to fall in line with the Tullow Integrated Management System (IMS), and the development and rollout of the Operational Management Framework (OMF):

- **IMS – Company (Tullow) wide focus**, outlining the overarching requirements and expectations for all Tullow activities. The IMS at TGL level will outline the in-country EHS and operational aspects required at the Tullow Corporate level. TGL are looking to be fully compliant with Tullow IMS by end 2016;
- **OMF – Aligns with the elements of the Tullow corporate operations framework (IMS) and comprises the operational EHS documentation for TGL operations (both Jubilee and TEN).** The OMF is currently in the final testing phase before going live in the coming months.

The OMF objective is to have all operational documents available online and accessible to all (TGL and contractors). The OMF integration project commenced 1.5 years ago and involved a 3 phase assessment process, where procedures were determined as being either:

- fit for purpose and ready to be revised and implemented;
- a duplication of existing plans/procedures, where the duplicated documents were consolidated into 1;
- missing or not available, in which case additional documents were/are being developed.

Once the assessment phase was complete, document review numbers were assigned and compliance review/checks were undertaken. The system includes a share portal divided in 10 elements where all relevant parties can access documents. The rollout phase of the OMF commenced in January, and has been trailed in the field over the last few months. Prior to the rollout, a full list of documents were sent to the Tullow management team for signoff before being uploaded to the system (in total more than 600 documents).

Regarding the review and monitoring of documentation on the OMF, the system incorporates an automated review system that flags a number of steps when the document is set to be revised. Each document goes through this process on a regular basis. With specific regard to ensuring the implementation of the latest TGL requirements on board the FPSO, the system generates notifications for the OIM on the FPSO detailing that the document has been reviewed.
Once the OMF is in place, the IMS will be rolled out (with the current goal within 2016).

5.1.1 Organization and Staffing

A major internal organizational restructuring referred to by TGL as a ‘simplification project’ concluded in 2015. TGL restructured its approach to the management of Health, Safety, Environment and External Affairs by bringing together the two separate functions into one group; Safety, Sustainability and External Affairs (SSEA). The structure incorporates a Social Performance Team at corporate level, while EHS functions are separated from social and external affairs functions to reflect a stronger EHS focus in the field.

During the IEC visit in 2016, the IEC received the final TGL EHS and Asset Protection (AP) Organisation Chart, which has largely retained the same structure from 2015. The EHSAP structure has been amended to better fit with the current Tullow/TGL management approach (adoption of the IMS and OMF), and project developments (TEN Project). The EHSAP manager remains unchanged and continues to be supported by the Environmental Team Lead, Asset Protection Team Lead (which also includes oil spill response) and the Health and Safety Team Leads. MODEC operations, engineering and EHS have now been included into the TGL Structure. The EHSAP structure remains adequate for the current activities, however, considering the merging of roles and adoption of additional responsibilities, those involved in risk assessment of Project activities may benefit from IFC PS and guidelines training (especially considering the TEN Project adopting the revised PSs while the Jubilee field refers to the 2006 PSs).

The Social Performance (SP) Team organizational structure is not captured under the EHSAP structure, and is kept separate under the organogram of Sustainability and External Affairs. At Takoradi, the position of the Social Performance Manager, which was characterized by annual turnover in past years has remained stable since 2015. The structure of the Sustainability and External Affairs Department, which includes the SP Team, is presented in Figure 5.1. The SP team members are skilled and experienced professionals, with a good relationship with local community members.

![Sustainability and External Affairs organizational Chart](image-url)
As in the past years, no turnover was incurred among the six CLOs within 2015. The last IEC monitoring report presented a general discontent of the CLOs relating to their salary. Despite the improvement in working conditions, CLOs reported an increase in workload (deriving from the TEN Project), and affirmed that the salary increase does not fully reflect this additional workload. Moreover, they still report that suitable offices are not available as well as difficulties in covering transport expenses with the allowance provided. TGL reported that three out of six CLOs will be moved in the coming months from their current locations to the Kosmos Energy CLOs offices with the purpose of sharing this cost and facilitate collaboration. The other three CLOs will remain in their current offices at the district assemblies, which are in most cases difficult to reach by some community members or are far from fishermen communities. Consideration should be constantly given to these CLO issues, as the stable presence of CLOs is extremely important for TGL operations and for maintaining the trust of communities. TLG should address CLOs dissatisfaction towards their working conditions and provide them with the appropriate means to carry out their important jobs (i.e. representative office, transportation).

TGL stated that the Tullow Ghana Employee Handbook, operational since 2009, is planned to be revised in mid 2016 to include the outcomes of the forthcoming TGL Employee Engagement Forum. The latter was launched in 2015 to bring together representatives nominated by each department to discuss and provide input into key business initiatives, to be then further presented to the attention of Company management.

In the last reporting period, the “Simplification Project” was implemented to deal with the difficulties in the Oil & Gas (O&G) Industry through the identification of positions/functions for downsizing. The process officially concluded in November 2015 and only minor adjustments are foreseen for the current year. At present, 68 positions have been made redundant (55% held by national staff, 45% held by expats), accounting for about 15-20% of TGL staff. From the information provided, the released staff were provided with a redundancy package (national remuneration requirements supplemented by an additional three months’ salary payment, share payment and partial share payment prorated to total years worked and outplacement support), which has been clearly presented to the affected employees through notices of redundancy, redundancy payment overview sheets and direct discussions with the HR department. In addition, workers were assisted by TGL in various ways to overcome the change occurring in his/her life (i.e., support in CV preparation, two day event focused on retrenchment issues).

An Employee Relations Procedure document guides the workers internal grievance mechanism. The AMR reports that two grievances were raised in 2015 by employees related to fair treatment and capability management. Both cases have been investigated and resolved.

No other strikes on the FPSO have been reported since those of July/August 2014 by MODEC employees. The reinstatement/ labour dispute which followed the protest is now resolved, with the involvement of the Labour Commission of Ghana and of the High Court of Justice. As a consequence, MODEC procedures have been reviewed and worker salaries and allowances increased. Regular contact is maintained between TGL HR and MODEC HR and a grievance system has been set up by MODEC. However, no monitoring is foreseen by TGL on the process, unless its intervention is directly requested by MODEC. Closer follow-up and monitoring of the grievances by TGL is suggested through the development of a procedure/process, including a trigger mechanism defining the level of seriousness for which the involvement of TGL is required to avoid possible escalations.

5.1.2 Training

According to the records provided and 2015 AMR, the TGL training program continued to be carried out in 2015 and is scheduled for 2016. A wide range of topics have been covered, including oil spill management and response (IMO level III), OSPAR Environmental training, project-management, essentials of O&G for non-technical personnel, and specific training required across different working environments. Training sections on social topics (i.e. management of community benefits and partnerships, context, situation and community planning) have been provided to selected members of the SP team.

Various training courses were run for TGL employees, contractors and other Jubilee partners’ employees.
Training requirements are being carried out satisfactorily and in line with ESAP item 8. TGL should ensure that additional training is carried out for staff once the IMS has been rolled out across the organization. Moreover, it is suggested to organize for the EHSAP and SP team refresher training on IFC Performance Standard Version 2012. In fact, while the Jubilee project was subject to IFC PS Version 2006, the TEN Project is subject to the last IFC PS revision (2012): considering that the personnel working on the two projects have basically remained unchanged, this difference could lead to confusion or misunderstanding. This situation could be easily overcome by delivering a training presenting the main differences between the two frameworks.

5.1.3 Certification

Regarding offshore operations in the Jubilee oil field, TGL operates under a range of permits for drilling, workover and production, including the Jubilee field environmental certificate issued by the Gh EPA. The existing 3 year environmental certificate expired in May 2015. TGL have received a new permit covering the ongoing FPSO production, operations logistical support including the chemical support facility operated by Baker Hughes issued on May 26th, 2015 with a validity of 3 years. The IEC note that the new certificate includes a flaring allowance during upsets and periods of maintenance of 3%, 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. For episodes of exceedances, Tullow is required to submit a justification note for each instance for review by EPA. Upon review, if reason for flaring is deemed justifiable by EPA, no administrative charges will be levied. To date, all submitted justification notes have been deemed acceptable and no levies have been paid in respect of flare level exceedance. The IEC were informed in 2015 that TGL intended to request an increase in flaring percentage to 6% for the new EPA certificate, however, during the 2016 site visit, the IEC were informed that TGL did not specifically request an increase in the previous flaring allowance. Additional details on flaring can be found in section 6.2.3.1.

TGL obtained its first standalone ISO 14001:2004 Certification for the Environmental Management System 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. TGL undertook a series of internal assessments and an external independent ISO 14001 annual surveillance audit in 2015 by Lloyds Register Quality Assurance. Two minor non-conformances were raised as a result of the audit, however, the conclusion drawn was that the TGL environmental management system (EMS) still met the requirements of the ISO 14001 standard and the certification was maintained. The 2 minor non-conformances (relating to environmental training and waste quantity discrepancies on the FPSO) have since been addressed by TGL.

The FPSO is provided with all required marine certifications and holds the relevant MARPOL certifications including the MARPOL certification compliance with annex I - relevant to “Crude Oil Washing Manual”, and MARPOL certification compliance with annex VI - relevant to “Ship board oil pollution emergency plan (SOPEP)”.

5.1.4 Periodical Review of ESAP Related Plans

ESAP requirement #6 requires TGL to regularly review and amend EMPs. For the 2015 reporting period, the ESMS was being reviewed and plans/procedures amended in line with the roll out of the OMF. Essentially, 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 2016 site visit, the IEC 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 main plan that provides guidance on the environmental management framework (the Environmental Management Plan) has been recently updated and will remain active in its current revision for 3 years. 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. Of these plans, the majority have been revised recently, while the IEC were informed that the review of the OSCP and the Audit Plans were ongoing in accordance with the review of documentation to be uploaded in
the OMF. The review process has improved from the 2015 site visit, and the revision of the remaining plans and the rollout of the OMF should result in an end to previous IEC findings, that being the timely review of documentation by the responsible person/s.

An updated table of the Environmental related plan status is included below.

**Table 5.1: ESAP Related Plans and Review Milestones**

<table>
<thead>
<tr>
<th>Doc.No</th>
<th>Description /Title</th>
<th>Rev.</th>
<th>Type</th>
<th>Issue Date</th>
<th>Doc.Live Cycle (Minimum) / status</th>
</tr>
</thead>
<tbody>
<tr>
<td>TGL-EHS-PLN-04-0004</td>
<td>TGL Environmental Management Plan</td>
<td>5</td>
<td>Plan</td>
<td>Ott-2015</td>
<td>3 years as per environmental certificate duration. Updated</td>
</tr>
<tr>
<td>TGL-EHS-PLN-04-0013</td>
<td>Integrated EHSS Audit Plan</td>
<td>5</td>
<td>Plan</td>
<td>March-2015</td>
<td>Reissued annually based on drawn up audit schedule. Document to be reviewed.</td>
</tr>
<tr>
<td>TGL-EHS-PRC-04-0045</td>
<td>EHSS Legal Compliance &amp; Evaluation</td>
<td>3</td>
<td>Procedure</td>
<td>Aug-15</td>
<td>Annually. Will be re-issued for use</td>
</tr>
<tr>
<td>TGL-EHS-PRC-04-0047</td>
<td>EHS Communications Procedure</td>
<td>1</td>
<td>Procedure</td>
<td>Oct-12</td>
<td>Annually. Document to be reviewed.</td>
</tr>
<tr>
<td>TGL-EHS-PRC-04-0049</td>
<td>Aspects O&amp;T EMP Procedure</td>
<td>2</td>
<td>Procedure</td>
<td>Aug-15</td>
<td>Annually. No change reported. Will be re-issued for use</td>
</tr>
<tr>
<td>TGL-EHS-REG-04-0001</td>
<td>Environmental Aspects Register</td>
<td>3</td>
<td>Procedure</td>
<td>Dec-2014</td>
<td>Annually. Document to be reviewed.</td>
</tr>
<tr>
<td>TGL-EHS-REG-04-001</td>
<td>Environmental Legal Register</td>
<td>0</td>
<td>Register</td>
<td>Aug-2015</td>
<td>Annually.</td>
</tr>
<tr>
<td>TGL-EHS-PRC-04-0059</td>
<td>Radiation Management System Procedure</td>
<td>1</td>
<td>Procedure</td>
<td>Jul-12</td>
<td>Annually. Currently under review</td>
</tr>
<tr>
<td>TGL-EHS-PRC-04-0060</td>
<td>Chemical Management Guidelines</td>
<td>1</td>
<td>Plan</td>
<td>Sep-14</td>
<td>Annually. Document to be reviewed.</td>
</tr>
</tbody>
</table>
Apart from the main EMPs requiring revision outlined in the previous paragraph, the IEC note that some of the supporting environmental documents still need to be reviewed within the agreed document review cycle. The IEC were informed that revisions of documents will likely not involve significant changes to the documents, however, these need to be reviewed within the predetermined period as established by TGL. The IEC are also aware that should any significant change be required to the plans, these are covered under the MOC process.

As mentioned previously, the OMF is being finalized and it is currently in the final testing phase. The OMF includes the elements of the Tullow corporate operations framework and the operational documentation for TGL operations.

5.1.5 Management Of Change

In compliance with ESAP requirement #5, the Project continues to implement their MOC procedure, issued in January 2011. The 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. For the period under review, a number of technical MOCs were issued, with the majority of MOCs issued involving the sea water system, power generation system and utilities. No environmental MOCs were actioned by TGL for the period under review.

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 IEC. 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 IEC in 2015) has been carried out in order to identify possible areas for improvement.

The IEC note that, in general, the 2015 AMR has been improved when compared to the previous AMRs of 2013 and 2014, with additional information incorporated, an improved structure and improvements in consistency. The 2015 AMR in particular incorporates additional environmental reporting data (a suggestion of the IEC during the 2015 site visit) including greater data provided and clearer definitions (i.e. offshore chemical usage and discharge figures, waste management including final destination and recycling of waste).

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 Environmental Management Plans 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 FPSO;
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

A verification of the records on garbage collected and sewage water discharged to sea was conducted on board the FPSO during the site visit. The main EMP requirements applicable to this component are defined by the MARPOL convention.

Based on the FPSO environmental monitoring records and information provided, only sewage and food waste is discharged to sea in line with MARPOL requirements. Quantities of waste disposal to sea and shipped to shore are included in monthly reports provided to the Gh EPA and tracked in a monthly waste tracking spreadsheet. Reporting of quantities discharged continue to be consistent with TGL EMP requirements, and are recorded as appropriate. One exception relates to food waste disposed to sea for the 2016 FPSO visit.

During the offshore visit the IEC were informed that the food macerator was currently out of order, and that FPSO staff manually chopped food waste prior to disposal overboard. The IEC observed that there is no netting or filtration for the food waste on the current food waste disposal chute, so it is highly unlikely that the measures being taken by MODEC (manual chopping) can obtain the maceration size required by MARPOL.

While the IEC note that this situation is temporary while the food macerator is repaired and put back into service, TGL needs to ensure that MODEC continue to operate in line with applicable regulations (in this case MARPOL regulations that food waste are 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.

According to both Ghana EPA and EMP requirements in place, low contaminated cuttings and fluids are discharged, via a caisson from the drilling rig, directly to the seabed (depth ranging between 1,100 and 1,700 meters), while high contaminated materials are collected and disposed of through the Waste Management Contractor Zeal in Takoradi. In general, no discharge to sea is allowed except where:

- OOC concentration does not exceed 2% by weight on dry cuttings; and
- discharge is via a caisson at least 15m below surface level.

According to Gh EPA requirements, in case of failure to meet the above level of OOC, surcharges are imposed on an increasing scale depending on the % OOC reported, up until a maximum of OOC>15% where discharge to the sea is prohibited. The OOC residual is averaged across the well section (gram of oil/kg of dry cuttings) based
on retort and it is normalised for the entire well section drilled with a limited quantity of low toxicity oil based mud. The oil on cuttings summary for Jubilee in 2015 is outlined in the table below.

<table>
<thead>
<tr>
<th>Well</th>
<th>Rig</th>
<th>Ave OOC%</th>
<th>Cuttings discharge (t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>J37-P</td>
<td>DrillMax</td>
<td>2.14</td>
<td>1033.7</td>
</tr>
<tr>
<td>J36-WI</td>
<td>DrillMax</td>
<td>2.05</td>
<td>928.21</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>Average OOC: 2.095%</strong></td>
<td><strong>Total</strong></td>
<td><strong>1961.21</strong></td>
</tr>
</tbody>
</table>

TGL pays a surcharge of USD 20,000.00 per well if OOC falls within the 2-5% range. As wells fell within the 2-5% OOC in 2015, TGL will pay a total of 40,000.00 USD for the Jubilee field drilling operations in 2015.

As indicated by TGL post site visit, TGL in the early stages of the development programme conducted a study on the various disposal options available in order to avoid OOC residuals. The result of this indicated that a Thermal Desorption Unit (TDU) appeared to be the best option to achieve oil removal efficiency of 99.99% and to meet the legal limit. TGL also note that the installation of a TDU onboard a Rig is only economically justifiable when a drilling campaign performs a minimum of 20 wells per year. With the drilling activity intensity levels observed over the last 3 years, it was uneconomical to make the TDU installation investment. With the current levels of OOC achieved, TGL undertook a drill cuttings impact study within the Jubilee field to assess any possible impacts. The results indicated that there were no detectable impacts observed within the operational area with the current levels of OOC discharge and therefore the installation of the TDU package was not critical or essential for drilling operations.

Currently, cuttings continue to be managed in line with the TGL WMP and are treated using a multi stage system managed by MI-Swaco (A Schlumberger Company) prior to discharge.

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 Environmental Monitoring Plan, 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. Mi Swaco purchases barite with a test certificate on mercury and cadmium content already attached. The annual average of samples results for 2015 show that mercury and cadmium content of the barite is well below the above applicable limits with a sample average of 0.54 mg/kg for mercury and 0.33mg/kg for cadmium.

5.2.1.4 Produced Sand

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

For the period under review no sand was produced or discharged from the FPSO. Data are consistently reported to the Gh EPA and tracked on a monthly basis in the FPSO 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. A positive detection was made for the presence of NORM on board the FPSO in 2015 and TGL subsequently developed a procedure aimed at applying the correct management approach for the handling of the material.

As outlined in the TGL procedure, all potentially NORM contaminated equipment are temporarily stored in a demarcated area on board the FPSO. During the May 2016 site visit, the IEC noted a TGL identification of inconsistency report relating to incorrect transportation of NORM material onshore for testing in 2015. The IEC verified that the procedure is now implemented and well understood on the FPSO, with no additional inconsistencies with the procedure reported. TGL received an approval from Nuclear Regulatory Authority (NRA) for the decontamination of equipment and offshore disposal of sludge. The approval was based on dose assessment submitted to the NRA and EPA. MODEC is responsible for the decontamination unit supply (which according to TGL will be installed and ready to use on the FPSO by end 2016).

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 slop, oily sediments, oils, fluorescent lights and batteries. These wastes are collected and disposed onshore through the appointed Waste Management Contractor Zeal.

Adequate waste segregation was noted at all Project facilities visited during the visit. Waste logs of quantities produced and disposed of are also available at the Project premises, and include the waste manifest form which tracks waste up until the point of disposal. The 2015 AMR outlines types and quantity of waste and the final disposal of both hazardous and non-hazardous wastes. The updated Waste Manifest Form (WMF - implemented by TGL during the last site visit) to improve the waste tracking system is still in place. The WMF incorporates six duplicate (carbon) pages in different colors (as presented in Appendix 1 of the WMP) and must be completed and accompany any transfer of any waste between TGL facilities and /or all waste handlers.

Some non-compliance issues were identified in 2015 during the ISO14001 external review and the GH EPA audit on board the FPSO. These related to waste quantity irregularities recorded on FPSO waste manifests, monthly MODEC waste reports and monthly reports from Zeal, and irregularities of hazardous waste recorded in the waste manifest recorded on the FPSO. These issues were due to waste recorded in volume offshore (as a MARPOL requirement) and registered by weight (kg) onshore when unloaded. TGL explained the recording methods were different but that the quantities were the same.

TGL immediately rectified this issue for future waste disposal by ensuring that the FPSO includes recording by both volume and weight.

5.2.1.7 Waste Management Contractor in Takoradi

TGL continues to work with the local waste contractor “Zeal Environmental Technologies”, in order to improve capacity in the Takoradi region. In order to introduce competition within the waste management arena, “Zoil Service”, another local waste contractor, is being considered for a partial waste management contract award. As part of TGL’s focus on continual improvement, the company has decided to stimulate market competition by considering the option of introducing a secondary contractor in the delivery of industrial waste management services. The long-term objective of this arrangement is to grow two indigenous companies supporting the Petroleum Commission’s local content initiatives and also deriving the benefit of improved quality of service as well as competitive pricing in the waste management sector.
During the 2016 site visit, the IEC was not able to visit Zeal facilities due to time constraints. It was however stated by TGL that Zeal facilities are still well managed with a high level of housekeeping and adequate pollution prevention measures. The IEC has visited the Zeal site for numerous years and share the positive TGL assessment of Zeal. It is understood that oil contaminated solids will be sent for treatment to Zoil as part of a capacity building initiative by TGL. The IEC understand that the waste management tender technical evaluation process identified Zoil as suitability placed to manage oily sediments and sands/cuttings. The remaining waste will be still handled by Zeal. The waste streams will continue to be:

- 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;
- several other waste segregation and processing activities.

### 5.2.2 Waste Water Management

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

- produced water (from crude oil treatment at FPSO);
- sewage water;
- deck drainage, bilge water and ballast water;
- FPSO 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 at the FPSO. 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 AMR and in monthly reports to the Gh EPA. Data are monitored directly on the FPSO 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 performance against monthly average EPA and IFC discharge limits from produced water was met throughout 2015.

#### 5.2.2.2 Sewage Water

Sewage water on the FPSO 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 IEC.
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 Oily 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 present on board and transferred to EHS personnel onshore for reporting.

The 2015 AMR illustrates that annual average Bilge Water of the offshore installations is below the effluent discharge requirements.

5.2.2.4 Well Completion and Work over Fluids

This wastewater stream mainly consists of completions brines with some oil content. According to EMP requirements, oil in water content has to be checked prior to discharge (same reference limits set for produced water, plus pH in the 6-9 range). This stream is continually analysed on board the FPSO through an automatic inline analyser prior to discharge. In the event of exceedances, this is collected and disposed of at the Zeal waste facility, where it is treated through the oily wastewater treatment unit. Logs of quantities and chemical tests are correctly collected by the Project. Monthly drilling rig reports and terminal well reports are submitted to the Gh EPA, with no environmental related incidents reported for the period in review. The IEC were informed that TGL performed acid stimulation intervention jobs on 2 wells in the Jubilee field, with positive results with no environmental incidents reported. TGL applied for and received the necessary permits to undertake acid stimulation activities for these wells.

5.2.2.5 Spills

In 2015 the AMR lists 16 environmental incidents including 8 minor gas leaks and 8 contained spills, classified as negligible incidents. Considering the repeated recommendation by the IEC over the last 2 years to distinguish between environmental release and environmental harm incidents in the AMR, as no action has been taken to incorporate this clarification in the AMR, Tullow should verify whether there is any added benefit in including these definitions in the AMR or not. The IEC are aware that environmental harm refers to any leak or spill that has reached and 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 IEC would like to see this recommendation either implemented, or a justification by Tullow as to why this will not be actioned to avoid continual IEC repetition.

5.2.2.6 Shore Base Liquid Discharge

No discharge is currently produced at the shore base sewage and storm water runoff collection system with the exception of the storm water runoff collected at the Chemical Storage area at the Takoradi port. The IEC inspected the Takoradi pipe yard, the Baker Hughes chemical storage area at Takoradi seaport and the Sekondi naval base. At the first two sites it was noted that the storm water drainage system is unchanged (incorporating a closed drain system incorporating a security valve, sufficient secondary containment, and a holding tank which is periodically purged). Liquid discharge monitoring from the sewage treatment unit is ongoing. At the Sekondi base, storm water 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 FPSO, point emission sources from onshore activities, fugitive emissions and flaring; and
- ambient air quality monitoring at FPSO and shore bases.
5.2.3.1 Emission Testing

The Project consistently reports the Green House Gases (GHG) emissions data within the AMR and 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 2015 are illustrated in Table 6.3. The GHG emissions are quantified taking into consideration FPSO production operations (including fixed wing and helicopter aviation and marine supply vessels), flaring, rig operations and TGL totals. TGL activities resulted in a total of 576,539 tonnes of CO2 equivalent (tC02 eq) in 2015.

<table>
<thead>
<tr>
<th></th>
<th>FPSO Production Operations (include Aviation and Marine)</th>
<th>Rig Operations Total tCO2 eq</th>
<th>TGL Total tCO2 eq</th>
</tr>
</thead>
<tbody>
<tr>
<td>GHG Emissions 2014</td>
<td>513.232</td>
<td>63,307</td>
<td>576,539</td>
</tr>
</tbody>
</table>

The total tCO2 eq GHGs in 2015 have decreased by more than 20% when compared to the tCO2 eq of 2014. GHGs emission in 2014 was higher due to the abnormal flaring period, performed from June to October, caused by a delay in the completion of the onshore gas processing plant.

The annual fugitive emission campaign was performed on the Jubilee FPSO in January 2015. The campaign was conducted with a FLIR infrared camera and 4 fugitive emission sources were detected and promptly repaired. The annual stack emission monitoring on the FPSO was not carried out in 2015 because of scheduled maintenance conflicts and unplanned upgrades on the FPSO for the greater part of the 2015. Stack emission monitoring is planned for 2016.

5.2.3.1 Flaring

Based on the TGL EMPs and agreements defined by the Gh EPA, flaring is allowed under process upsets conditions and during plant and equipment maintenance.

As mentioned previously, Gh EPA authorized TGL, with the Environmental Certificate issued on the 26th May 2015, a flaring limit of production of 3% only during upset and maintenance periods. However as noticeable from Figure 6.2 flaring performance has regularly exceeded Gh EPA limits for a large part of 2015. A considerable peak was recorded in July due to a FPSO shut down caused by a gas compression system failure. As reported in the AMR and confirmed by TGL, whenever monthly flaring exceeded 3% of total gas production, a flaring justification note which describes the reason for excess flaring is submitted to the EPA for review and approval.

Flaring remains a constant aspect of the Project. As verified by the IEC, ongoing regular maintenance, breakdown and shutdown periods result in high flaring rates which represent environmental and OHS concerns. A step toward flaring containment was initiated by TGL with the planned installation of a deliquidizer aimed at reducing and eliminating compressor tripping. However, the IEC 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 Project is encouraged to undertake their best efforts in determining what GIIP approaches are implemented in similar projects and whether these can be adopted by TGL, especially considering the imminent TEN Project commencement.
5.2.3.2 Ambient Air Quality Monitoring

Ambient Air Quality Monitoring is a requirement outlined in the EMP for both the FPSO and onshore facilities in order to evaluate the levels of NOx, NO2, SO2 and VOCs on the FPSO, and at the Shore Base and Port Facilities. Tullow did not undertake the occupational exposure assessment on board the FPSO in 2015 because of schedule conflicts and several maintenance activities ongoing. Additionally, no ambient air quality monitoring was undertaken at onshore TGL locations in 2015. However as strongly requested by coastal local communities since 2014, the TGL Environmental Team in collaboration with the Social Performance team, performed a community ambient air quality study for eight communities located in four frontline areas along the Ghana western coast. The study aimed at verifying that offshore emissions do not generate any impact on the local air quality.

NO2, SO2 and Ozone were selected for ambient air quality monitoring survey which was conducted between the 19th August 2015 and 9th September 2015. Measurements were carried out with passive diffusion tubes and post exposures, each captor was properly stored and sent to the appointed laboratory for analysis.

The results of the measurements were evaluated according to Gh EPA, US EPA and WHO air quality standards and are reported in the following table.

<table>
<thead>
<tr>
<th>DISTRICT</th>
<th>SAMPLING LOCATION</th>
<th>CONCENTRATIONS [µg/m3]</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Average Value</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>SO2</td>
<td>NO2</td>
</tr>
<tr>
<td>JOMORO</td>
<td>New Town</td>
<td>5.5</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td>Half Assini</td>
<td>4.1</td>
<td>0.8</td>
</tr>
<tr>
<td>ELLEMBELLE</td>
<td>Ankobra</td>
<td>3.5</td>
<td>5.1</td>
</tr>
</tbody>
</table>

Table 5.4: Air quality Community Monitoring Results 2015
### District Sampling Location

<table>
<thead>
<tr>
<th>DISTRICT</th>
<th>SAMPLING LOCATION</th>
<th>CONCENTRATIONS [µg/m³]</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>Average Value</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>SO2</td>
<td>NO2</td>
</tr>
<tr>
<td>Ahanta West</td>
<td>Atuabo</td>
<td>5.4</td>
<td>3.3</td>
</tr>
<tr>
<td></td>
<td>Cape -3- Points</td>
<td>7.9</td>
<td>0.6</td>
</tr>
<tr>
<td></td>
<td>Upper Dixcove</td>
<td>3.2</td>
<td>1.5</td>
</tr>
<tr>
<td>Nzema East</td>
<td>Lower Axim</td>
<td>7.4</td>
<td>0.9</td>
</tr>
<tr>
<td></td>
<td>Upper Axim</td>
<td>5.6</td>
<td>2.0</td>
</tr>
</tbody>
</table>

The results indicate that the monthly mean concentration of the three selected gas analysed within the survey period were below the Gh EPA, US EPA and WHO air quality. Therefore, the survey identified that ambient air quality within the coastal districts was not being impacted by offshore flaring from the FPSO. TGL need to ensure that monitoring commitments are undertaken in accordance with TGL procedures and for year on year comparison of air quality, and that the AMR explains clearly which surveys were and were not actually undertaken and for what motive.

### 5.2.4 Chemical Management

During the visits conducted at the FPSO, chemicals were correctly stored, Material Safety Data Sheets (MSDS) observed and adequate secondary containment noted. The IEC did note that a chemical storage cabinet outside the laboratory on the FPSO was found open; its access needs to be better controlled. The new laboratory facility has now been approved and is to be installed within 2016, which will lead to a decrease in unnecessary OHS risks. The IEC 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 area were observed to be well organized, nevertheless a temporary oil storage area was not provided with adequate containment and traces of an incorrect grease disposal were found by the IEC nearby an Oily Water Separator. While the IEC understands that the oil storage is temporary, 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 with hazardous material labelling and MSDS observed by the IEC team. The storage area incorporates a closed drainage system and spill response equipment. The working conditions when ships are loading and unloading still pose a potential H&S issue for the contractor, however, with the approval of the new storage facility, this issue will be avoided once the facility is operational (within the coming months).

### 5.2.5 Noise

A noise survey was carried out on the FPSO between the 3rd and 5th February 2015 to assess the level of occupational health noise exposure levels and in order to develop control measures to minimize effects on personnel. The revised TGL monitoring plan (TGL-EHS-PLN-04-0006) removed the environmental noise monitoring requirement at the FPSO (upwind and downwind due to the relative distance from potential receptors), therefore, only the OHS noise monitoring was undertaken in 2015. 263 spot measurements of sound pressure were made using a Cirrus Noise level analyser and Cirrus calibrator and, Cirrus Dose Badges placed onto 16 operatives. The results demonstrate that operatives are likely to receive noise exposure doses above the upper exposure action values. Background noise levels around the FPSO were found to fluctuate...
below the numerical value of the lower exposure action value and above the numerical value of the upper exposure action value. Personnel responsible for the noise survey indicated that there is a good level of compliance with the hearing protection policy. The study outlined that the majority of people entering the hearing protection zone were observed to be wearing hearing protection; which is an observation supported by the IEC during the 2016 site survey.

The onshore environmental noise survey was carried out at the TGL shore base in Takoradi in August 2015. The noise survey was conducted at the following locations:

- Shore base- Office;
- Shore Base- Pipe Yard; and
- Airport Ridge staff House.

According to the survey, the noise sources and decibel level measurements at all locations did not cause annoyance within the ambience. Measurements conducted at the various survey positions recorded noise levels significantly lower than the thresholds that could cause immediate threat to health and welfare. However, the noise generated during helicopter take-offs and landings had the characteristics (intensity and loudness) to cause annoyance or disturbance to close-by offices. The IEC note that this is a one-off survey, and suggest that repeat surveys be conducted to establish a more comprehensive assessment.

5.2.6 Ecology

The TGL marine mammal observer (MMO) programme remains in place. As reported in the AMR 2015, no unusual behavioural trends for marine mammals have been observed around the offshore facilities. Based on this information, it is reasonable to suppose that ongoing offshore activities did not affect behavioural patterns of marine megafauna. Furthermore in 2015 no seismic activities, supposedly the main type of activity with impacts to marine mammals, have been conducted within the field.

Logs of marine avifauna sightings continue to be kept by TGL. Sightings are reported to the EPA on a monthly basis as part of the offshore monthly reports. Observations of avifauna at the FPSO are quite limited, and no increase was recorded during the high flaring period (June-August) undertaken in 2015.

During the 2016 site visit, the 2015 MMO report was currently under preparation and was yet to be submitted to the EPA. As such it was not provided to IEC. The IEC were informed that the report does not contain any significant findings or issues. The IEC will review this aspect during the next site visit.

As required by the Environmental Monitoring Plan, a field marine environmental monitoring survey was performed during September/October 2015. Sediment and water samples were collected at specific sampling locations and at different depths (0-1000m). The monitoring survey results indicate that field development activities have affected sediment concentrations of organics and various metals, but there have been no detectable effects on the faunal assemblage. Current levels of sediment parameters indicate there is little or no potential to cause adverse ecological effects. However, the consultant who undertook the survey recommended to conduct a future monitoring program with the same survey design, study area, sampling parameters, methods and analytical laboratories procedures used for the survey performed in 2015. The IEC recall that the Project undertook a similar survey activity in the past and would encourage TGL to undertake a monitoring follow up as suggested to determine the ongoing impact if any of Project activities.

5.3 HEALTH & SAFETY COMPONENTS

5.3.1 General

The main scope of this review was to verify if TGL Safety Management System requirements have been fulfilled, or, even, improved during the period under review.
The conducted review has been carried out by checking relevant H&S requirement related records collected for the period under review including amongst others:

- Updating on Occupational Risk Management;
- TGL Safety Management System procedures;
- Process Safety Management;
- TGL/MODEC incident and near miss recording, investigation and implementation of corrective actions;
- H&S Training activities;
- H&S internal and external auditing program implementation;
- Emergency drills and related training provisions;
- KPI (Key performance indicators).

TGL Safety Management includes the analysis of safety critical elements (SCEs). The function of SCEs is to prevent, detect, control, mitigate and provide sufficient response in case of a Major Accident Hazard (MAH).

This analysis is performed according to the OSCR (Offshore Safety Case Regulation), which includes the following key features:

- Concept of duty holder;
- Safety Case;
- Identification of Major Accident Hazards;
- Identification of SCEs;
- Setting of Performance Standards for SCEs;
- Written Schemes of Verification and Examination;
- Independent Verification Requirements.

The OSCR is not only a UK legal standard, but now used in the wider world and has become an example of best practice.

The original OSCR was issued by Tullow in December 2010 and reviewed in 2014, with the update completed in 2015. At the time of the May 2016 site visit, the safety case review was being planned, with the review to be undertaken in 2016 and rollout expected in early 2017.

The ICB (Independent Competent Body) is a contracted third party used to guarantee the prevention of conflict of interest when reviewing the offshore safety case (OSC), verifying the assumptions and judgments and determining recommendations for TGL to consider.

During the initial IEC meetings with TGL in Accra on the 3rd May, the IEC were informed of an ongoing critical HSE issue regarding the Turret on the FPSO. Essentially the Turret bearings have seized up, and as such the FPSO no longer has the ability to weather vane. This is by far the most concerning HSE risk at the moment for TGL, as it restricts product offloading procedures and volumes, and also requires an additional 3 vessels (tugboats) to be present 24 hours a day to secure the FPSO in a fixed position. This results in an increased level of risk with specific regard to offloading procedures, the safety of crew and ships (increased collision potential), and spills, due to the use of new equipment, the instability of vessels, additional transfer time and an increased number of connect/disconnect operations. The offload vessels can no longer line up behind the FPSO and use the current to remain aligned. It also carries an increased level of OHS risk on board the FPSO with a greater roll on board as a result of swell exposure. As a result of this issue, TGL developed a Case To Operate (CTO) on the 12th February 2016, in collaboration with the relevant government authorities of Ghana. The CTO underwent a series of reviews and was updated to the final version currently in place (rev.4). Rev.3 of the CTO gave permission to TGL to operate with the mitigations put in place to address the Turret issue, but not to offtake. Rev.4. enables TGL to offtake, but with the provision that this will be halted should safety be compromised.
Safety criteria is key, and TGL’s approach remains “safety before production before cost”. While the offtake hose remains the same, it has been modified for the current operating conditions and includes an emergency shut off valve in the event of unplanned disconnect to enable the offloading of product and the avoidance/minimisation of spills. The IEC were informed that there are 3 potential solutions to the issue being evaluated by TGL at the moment, however, there is no quick fix option and the issue will likely remain for the greater part of 2016. The CTO outlines the safety criteria being followed by TGL, and due to the additional vessels in the FPSO vicinity, the Ghana Maritime Authority has been informed of the increased vessel activity.

5.3.2 Update of Occupational H&S

The TGL and MODEC Safety Management systems remain adequate and effectively maintained for the control of all H&S occupational risks. As mentioned previously, the operational management systems are being updated and rolled into the TGL OMF. As such, the previously established TGL and MODEC safety, avoidance and mitigation measures are now integrated in the one OMF system, under TGL control.

The FPSO crew (which includes MODEC and contractors) continues to be managed directly by MODEC. There are only a few TGL staff constantly on board, and are limited to the OIM and a couple of other key roles that are employed directly by TGL.

TGL management commitment towards safety continues to be observed by the IEC during the annual site visits and via discussions with TGL and their main contractors. The Permit to Work (PTW) remains in place on board the FPSO and continues to be an effective measure to ensure that operations are carried out in a safe, controlled and coordinated manner. TGL undertook a PTW/control of work audit in 2015, while a review of the PTW was set to commence shortly after the IEC site visit in May 2016. The IEC reviewed the established PTW process on board the 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 FPSO walkthrough, the IEC observed a range of barrier job boards outlining the PTW numbers and the job details/hazards related to particular ongoing job sites. The PTW numbers and descriptions were additionally verified by the IEC against the hard copies kept in the Safety managers PTW folders. In 2015, and while the PTW system was being integrated into the OMF, MODEC continued to send the completed PTWs to TGL for verification.

As outlined previously, during the site visit the IEC team visited the following facilities:

- TGL headquarter in Accra;
- TGL shore base in Takoradi, including pipe yard and warehouse;
- FPSO Kwame Nkrumah MV21;
- TGL facilities at the Sekondi Naval Base;
- Tullow pier at Takoradi harbour;
- Takoradi Port FPSO Chemical Support Facility managed by Baker Hughes.

All TGL employees, contractors and visitors arriving at Tullow facilities, in Accra or at the Takoradi base and Sekondi Naval Base, are duly informed about health and safety precautions on site. Comprehensive induction slides are available and are clearly explained by skilled personnel. The IEC note that while the safety induction presentation at the Accra site is quite exhaustive, the process is quite long with a lot of information presented to guests who do not specifically need to be made aware of all details contained in the presentation. The IEC accept the need for new employees and contractors to undertake the entire induction process, however, as a suggestion, the presentation could likely be modified and adapted for visiting personnel to ensure that only the key health and safety messages are conveyed. The IEC spent more than one hour in the induction and still did not get to the end of the induction before the session was cut short. The IEC understand that TGL has already identified the need for a more tailored presentation to be developed for visitors.
People arriving on board the FPSO are informed about the ship characteristics by means of an induction video, which is quite comprehensive and clear. In 2015, the IEC noted that the video is overly long and not focused specifically on aspects that a new arrival on board would need to know as a matter of H&S priority. During the 2016 site visit, and due to the teams' visit time constraints on board, the IEC were not shown the safety video, but were given a brief yet adequate presentation by the Safety Specialist on board. This presentation was direct and focused on the critical H&S aspects that would need to be remembered by a visitor to the FPSO in the event of an emergency. The IEC would suggest to formalize this FPSO safety presentation to be delivered to those visitors on board the FPSO, while the longer H&S induction video would remain in place.

The IEC understand that TGL has already identified the need for more tailored H&S presentations to be developed for visitors.

The walkthrough on the FPSO also enabled the IEC to observe OHS aspects implemented on board, the workplace conditions and to verify standards of housekeeping, safe access and fire safety precautions. The IEC observed that appropriate PPE was correctly worn by all operators in the visited sites, and as the FPSO was in shutdown during the IEC visit for maintenance activities, the PPE stocks had been increased to enable a sufficient supply of PPE during shutdown periods. Additionally, the lifejackets on board had been increased for shutdown periods. The Site working areas and accommodation areas are correctly identified, are kept clean, well lit and are protected as far as possible from the elements (rain, wind, etc.). The IEC noted that the gym facilities are set to be upgraded.

All materials continue to be stored and stacked safely with sound packing and pallets. Hazardous, toxic or dangerous substances are suitably contained and appropriate hazard warning signs are clearly displayed where hazardous, harmful or toxic substances are present. MSDS are available for all 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. In some instances, the IEC noted that some materials (including flammable materials and chemicals), were stored incorrectly on board the FPSO, and some without adequate signage and labelling. It was understood by the IEC that this was a temporary storage situation due to the fact that the support vessels had not been able to approach the FPSO due to the amount of roll. The IEC highlights that while these materials were not hindering access or emergency escape routes, these materials need to be stored in areas with sufficient secondary containment and labelled correctly even in temporary situations. Due to the uncertainty of the period of time required to address the Turret situation on board, TGL and MODEC should ensure that their HSE walkthroughs and toolbox talks focus on the need to increase awareness and practices of adequate and safe storage, especially as the FPSO will experience delays and likely added storage difficulties while the Turret issue is addressed.

The IEC were informed that the temporary laboratory (due to be upgraded in 2015), had only recently received approval to be made permanent with the purchase of a prefabricated laboratory. Due to other current safety priorities (Turret), the laboratory upgrade had been put on hold, however, with management approval received, the permanent facilities are due to be installed over the coming months. The IEC note that the current temporary facilities are cramped with aging equipment, and insufficient storage of chemicals that is in fact located outside the laboratory. While it is understood that the storage of these chemicals is temporary, these chemicals have been stored temporarily for a significant period of time, and are not locked or stored sufficiently to avoid potential H&S incidents (especially considering the current increased roll on board). While the quantities are not substantial, this observation again falls under the IEC previous recommendation to ensure safe and adequate storage of ‘temporary’ materials on board and increased scrutiny of safe storage.

The IEC continue to note clear emergency procedures on board, including clearly identified emergency escape routes and muster points. These are kept free of obstructions at all times, and limits of PPE free areas are clearly marked outside the accommodation areas.

The IEC visited the medical facility on board and note that it continue to be adequate, constantly staffed by a doctor with well stocked medical supplies. Medical and Hygiene reports are issued each week by the doctor. No major medical incidents have been reported over the last year on board the FPSO.
One issue identified by the IEC during the 2015 audit concerned the MODEC HSE procedures on the FPSO and reference of the MODEC procedures to the most recent versions of the TGL plans/procedures. The IEC found while MODEC procedures were kept up to date, some of these procedures referenced previous versions of TGL documents. It was recommended that MODEC and TGL undertake a cross checking exercise to ensure that TGL requirements implemented on the FPSO fall in line with the most updated TGL plans. As the OMF is being rolled out in 2016, the MODEC and TGL operational plans are being revised, integrated and uploaded into the new system, which should effectively eliminate this issue. While significant changes in the revision of procedures has likely not occurred, the IEC understands that the OMF will be completed within 2016, and will verify that this upgrade has effectively addressed this issue during the next scheduled visit.

The IEC verified the oil spill training and drills undertaken in the period under review. As outlined in section 6.1.2, in 2015 additional IMO Oil Spill Response training was provided for a range of HSE personnel, and OSPAR training was carried out due to Ghana’s EPA adoption of the Norwegian approach in the regulation of Ghana’s oil and gas industry. TGL undertook a series of offshore oil spill response training exercises through the external contractor Oil Spill Response Limited, for both in house and external 3rd party contractors. In addition, TGL undertook their annual oil spill emergency response drill in November 2015 dubbed ‘Exercise Wonsom’ (see section 6.3.8. for additional details).

There continue to be six ships chartered to fulfil FPSO necessities, among which are 2 patrol vessels and 4 supply vessels. One of the supply vessels involved in the operations is a fast crew vessel capable of reaching the FPSO in five hours. Personnel working on vessels chartered for marine operations and supply, and the current FPSO tugboats are completely managed by contractors, except for the patrol vessels and ROV vessels where TGL personnel are directly responsible.

In 2015, a compressor outage in July resulted in TGL undertaking additional flaring (for which a notification was issued to the EPA and approved), however, due to potential OHS (noise) concerns of personnel aboard working in the vicinity of the flare, a HAZID study was undertaken by TGL (as outlined in section 6.2.6). Assessments were undertaken on board to determine the potential OHS issues, and the resulting additional H&S mitigation measures (additional noise mitigation measures) were implemented during the actual time period of the exceptional flaring. During the IEC site visit in 2015, a recommendation based on the fact that additional flaring was underway, was that permanent mitigation measures should be incorporated in standard operating procedures to ensure that all personnel are provided with sufficient PPE in the event of increased flaring. Based on flaring rates of 2015 and during discussions with TGL employees, flaring will remain a constant aspect of operations, and as such, the IEC would again recommend that the additional mitigation measures be implemented in standard operating procedures to ensure PPE is available during periods of increased flaring (which appears likely for 2016).

TGL continues to have a dedicated area of the jetty at Takoradi Harbour for cargo operations. The IEC 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. Based on discussions at the Harbour, there are occasional issues with dust during loading and offloading of commercial vessels other than TGL fleet; however, the PPE appeared to be sufficient and procedures remain in place to ensure that health is not compromised during offloading of other vessels in the Port.

The Baker Hughes FPSO Chemical Support Facility (located close to the TGL jetty area) continues to be used by the Project. The IEC again confirmed that all personnel are provided with suitable PPE, and that fire-fighting equipment and other H&S equipment, such as eye wash stations, are located in close proximity to hazardous storage areas. Observations made by the IEC during previous visits related to the quantity of dust and wind-blown materials at the facility as a result of non TGL vessel offloading. While HSE procedures and PPE are in place, the IEC had recommended that an alternative solution be found to eliminate the potential OHS issues at the storage facility. The IEC were informed during the 2016 site visit that an alternate storage facility within the Harbour, which is not exposed to vessel such offloading dust issues, has been approved and TGL will relocate their chemical storage within 2016.
5.3.3 Updates in Process Safety

Several actions have been implemented during the period in review in order to ensure the most effective control of process safety related risks. Of note are the following:

- Tullow Safety Rules Self-Assessment (which resulted in 100% compliance with targets set for 2015);
- Jubilee safety case update from the review undertaken in December 2014 was completed;
- Establishment of the OMF, ongoing at the time of the site visit;
- Asset integrity audit was undertaken.

As outlined previously, The OMF continued to be rolled out in 2015. At the time of the site visit, a total of 287 procedures had been uploaded to the OMF. During the review process of existing procedures for inclusion in the OMF, some of the pre-existing procedures have been integrated and rolled into an amended procedure, meaning that operational requirements that are common to project activities spanning Jubilee, TEN and Takoradi will be located together. The majority of the OMF plans will be at the TGL level, but once the TEN project comes online, the OMF will include overarching documents (for example the overarching Permit to Work plan/procedure), while more specific procedures are to be implemented and tailored for Jubilee and TEN.

As discussed during the site visit, the OMF structured in this way will also allow lessons learnt at the specific TEN or Jubilee plans/procedures to be carried over to the other project’s through the overarching plans/procedures and specific plan/s. The OMF is set to be rolled out in June 2016, and an audit is scheduled for July and August. The outcomes of the audit will then feed back into the system, and the system upgraded accordingly.

Regarding incident management, Tullow have completed investigations for all the high potential incidents and lost time incidents (LTI) recorded in 2015. The total recordable injury frequency (TRIF) and the LTI Frequency increased slightly when compared to the 2014 figures. These figures coincide with an increase in total man-hours worked in 2015, but fall below the Oil and Gas UK (OGUK) production TRIF average for 2014 (used as the TGL benchmark), and are close to meeting the TGL TRIF target. The IEC has been made aware of those incidents deemed to be high level and have reviewed the incident summaries accordingly (additional details can be found in section 6.3.8).

In 2015, TGL reported an incident related to the flare tower. Essentially a crack was identified on the flare tower, which, after a root cause analysis, concluded that the crack was due to poor weld control at the construction stage. A case to operate was developed while the issue was addressed, with the repair undertaken in December 2015. The IEC observed the repaired flare tower and received feedback on board the FPSO regarding the lessons learnt, and the additional monitoring undertaken as a result.

As mentioned previously, the safety case is set to be reviewed in 2016 and rolled out in 2017. There is no change in the safety case from the last IEC visit in 2015. As discussed during the visit, the review will consider current Project activities (including the turret issue). TGL outlined that top 10 priority meetings are undertaken every week by TGL management, and that upgrades planned to be rolled out in 2015, to the accommodation facilities and offices on the FPSO, have been postponed in order to deal with the more pressing HSE priorities on board, however, the upgrades are planned to be completed within this year.

5.3.4 Auditing

The TGL H&S auditing program continues to be effectively implemented in accordance with Company procedures at TGL and contractor (MODEC) levels. During 2015, a range of internal (and external) EHS audits were undertaken on the FPSO. The IEC viewed samples of recent audit findings undertaken in 2015 including the LRQA TGL Audit 2015 Report assessing compliance against ISO14001:2004, the Gh EPA 2015 audit and the FPSO internal HSE/Environmental audit report for 2015. The findings of the external audits were few and have been implemented by TGL/MODEC on board. The FPSO EHS/Environmental Audit Report (undertaken from 16-19 June 2015) was conducted by TGL Environment Team and covered waste management, waste water
management (produced water, bilge and slops), compliance with internal systems, and MARPOL requirements. The audit included the review of documents and records, interviewing of key personnel with a high level of operational responsibility and a physical tour of operational areas/sites. Follow ups on previous TGL audit findings were undertaken to verify close out of actions. A series of follow up actions were developed as a result of the audit which were implemented on board.

In addition, FPSO operational audits remain in place, with a new internal audit programme implemented on board the FPSO. A significant focus of the new programme was on improving Incident Investigation quality on board including weekly review and approval process for all investigations. In 2015 a wide range of audits were undertaken including:

- Health & Hygiene inspections (performed weekly on FPSO);
- Daily investigations are performed on the FPSO, with the daily report indicating areas of possible H&S improvement;
- Senior leadership walkthroughs (performed every 2 weeks);
- Occupational Hygiene Needs Assessment Audit;
- Internal weekly audits, with actions identified included in the Corrective Actions Report (CAR) Management System and correctly followed up. All actions resulting from audits, incident/near miss investigations, site safety inspections, safety observations and drills carried out on the FPSO continue to be managed through the CAR register; and
- Range of EHS surveys covering OHS and environmental systems and processes on board the FPSO (including chemical management, NORM, hospital, potable water, CARE cards).

During the IEC visit to the FPSO, the CAR register and a selection of FPSO operational audit reports were requested and reviewed by the IEC. These were cross checked against HSSE monthly reports submitted to the petroleum commission (a range of 3 months was selected from October to December 2015). The monthly reports provide a summary of the incidents, injuries, near misses, emergency response exercises, spills, discharges, training etc., and are representative of the findings reported on board the FPSO.

Regarding the integration of the IMS, the IEC were informed that the EHSAP group developed and implemented the EHSAP integrated audit programme in 2015, aimed at bringing the company in line with IMS requirements. As reported to the IEC, the programme achieved 85% completion in 2015 and is ongoing in 2016.

### 5.3.5 Training Activities

As outlined in section 6.1.2, extensive training activities have been carried out across a range of H&S issues in the period under review, both onshore and offshore, including:

- Process Safety Awareness training;
- Jubilee Safety Case (Rev 2) awareness and familiarisation training;
- Hazard Awareness, Task Risk Assessment, Permit to Work and Control of hazardous substances (COSHH) training (by an external third party);
- Dangerous Goods (DG) awareness training, incident investigation training, First Aid training and Task Based Risk Assessment training; and
- NORM Awareness/NORM Radiological Protection Officer (RPO) training.

Regarding Oil Spill Response Plan specific training, the following onshore training was carried out in 2015:

- Oil Spill Awareness Training completed for 15 personnel in Takoradi;
- Spill kit training sessions at Takoradi Shore Base, Sekondi Naval Base and Commercial Port;
- One day Shoreline training exercises and a one day Harbour training exercise for over 40 delegates; and
8 UTV exercises for 10 TGL drivers (duration 1 day).

The above training was required to achieve basic objectives for personnel, such as understanding the required PPE, to become familiar with emergency response processes and materials, to understand the importance of observation and maintenance of the equipment, and to highlight specific hazards and as a final achievement to work safely resulting in zero incidents. Further details are clearly reported in the 2015 AMR. The IEC were provided with the training matrix for 2016, which outlines a comprehensive H&S training program to be undertaken in 2016 (which includes MARPOL, NORMs management, IMO level 3, and confined space entry training).

5.3.6 Incident Investigation

Safety Events (incidents, near misses) are properly recorded and analysed, on the basis of the TGL emergency preparedness and incident management plan. Accident and incident statistics are collected and maintained and TGL undertake audits of the implementation of the management system in place on the FPSO on an annual basis. As outlined in the AMR, and verified by the IEC during the site visit, a total of 145 work related incidents were reported for the 2015 reporting period (relating to all TGL activities, not just Jubilee). Of the HIPOs registered for the Jubilee Project, a total of 10 related to offshore activities.

During 2015, MODEC continued to record incidents and injuries which were then uploaded in the EMEX EHS system. The IEC observed a range of incidents and injury reports and close out of incidents whilst on board the FPSO. Through a review of incident/near miss and LTI investigation reports, the IEC noted one particular near miss/injury (classed as a level 5 HIPO), which resulted in a LTI when a worker lost consciousness while working to repair a Slops Tank pipe in the Pump Room on board the FPSO in October 2015. The asphyxiation case, which resulted in an injured worker LTI of 38 days, had the potential to be significantly more serious, which could have resulted in one or more fatalities on board. Despite the range of procedures in place and PtW requirements, the incident investigation highlights a series of critical failures leading to the conclusion that the many failures that contributed to the incident could easily have been prevented if basic standards and procedures had been followed. The report also mentioned that the lack of operating discipline and site leadership (an adequate risk assessment was not carried out), coupled with unacceptable behaviours and standards by some of the members of the offshore leadership team contributed to the incident. A series of actions have been identified focusing on worker awareness of correct procedures as an outcome of this incident. The PtW procedure is being updated, Hazard awareness training ongoing and a baseline behavioural Cultural and leadership study has been requested from MODEC. The IEC have reviewed the action list (with all items to be actioned within 2016), and consider the range of actions as adequate to address what essentially comes down to a breakdown in procedures and a lax safety approach in this case. These activities were ongoing at the time of the site visit, and the findings of the additional reviews and implementation of actions will be assessed during the next site visit.

One fatality was recorded in 2015, relating to a case of Cerebral Malaria on board the West Leo rig, contracted to the TEN development. The IEC note that while this incident is not directly related to the Jubilee Project, TGL have a contractual obligation to inform the IFC of such events (which was not undertaken in this case). The IEC were informed that no current procedure or process exists as such in informing the Lender of HIPOs and fatalities. TGL to develop, or include in existing procedures, the necessity to inform lenders of HIPO and critical injuries (fatalities), including the process to follow, the timing of the notification, and the person/persons responsible to inform the lenders of critical incidents.

The IEC have received and reviewed a sample of EMEX HIPO Lessons Learnt reports outlining the causal factors of each incident and the corrective actions implemented (including preventative maintenance and HAZID processes) in the interest of continual safety improvements. The IEC note that the system is picking up the main root causes of recorded incidents (largely mainly inadequate work planning and poor judgement), for which reactive management measures are then implemented before the incident is effectively closed out.
5.3.7 Oil Spill Response

The OSCP is based on a spill risk assessment, defining expected frequency of occurrence and size 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 ability to input weather and metocean data. During the site visit, the IEC were informed that the OSCP remains unchanged from the previous site visit and is still in place and implemented as necessary. The OSCP is now outdated (based on the TGL review period) and is currently being updated as part of the OMF rollout (rev.5 of the OSCP is to be undertaken within 2016).

5.3.8 Emergency Drills

TGL undertook their annual major emergency exercise drill (Wonsom), from the 6th to the 9th November 2015. The exercise was centred on an incident around drilling operations on board the drilling rig (West Leo), depicting damages causing an uncontrolled loss of hydrocarbons due to multiple events including a direct failure of the rig’s Emergency Shutdown System. The scenario included the Incident Management Team (IMT) in Accra and the Logistic Support Team (LST) in Takoradi. The IEC note that the exercise was carried out successfully, with the outcomes of the drill resulting in a range of observations and recommendations aimed at improving the response capabilities and team coordination in the event of an actual major response situation.

TGL provided the IEC with a list of the table top emergency response drills set to be carried out in 2016. The IEC note 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 training exercises incorporate a host of varied and 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 IEC observed the newly designated fire-fighting response area on board the FPSO, which was being converted during the site visit. The IEC were informed that the team have completed the necessary training, and undertake a series of drills on a regular basis (weekly) covering a range of potential emergency scenarios.

5.4 SOCIAL COMPONENTS

5.4.1 TGL Social Performance Strategy

Since the last site visit in 2015, the reference documents for TGL social activities have not undergone changes: the 2013-2014 Social Investment Strategy, the Monitoring & Evaluation (M&E) Plan and the Public Consultation and Disclosure Plan (PCDP, including the Non-Technical Summary (NTS) remained unvaried. A Social Performance Plan has been issued in April 2016 to manage the social impacts arising from TGL and its Partners’ operations, both within the Jubilee and TEN fields and associated support facilities. The Plan is part of the EMP but it is not clear how it interacts with all the other existing social documents.

TGL Social Performance remains based on the following four pillars:

- **Social/ socio-economic impact assessment and management**: implementation of the measures to mitigate Project impacts as identified within the ESIA;
- **Stakeholder Engagement (Grassroots)**, which includes stakeholder identification at grassroots level, public disclosure, community engagement, grievance management;
- **Sea Access**, which refers to unfettered access to sea for TGL and fishermen, safety education for fishermen, engagement with key stakeholders; and
- **Social Investment (SI)**: identification and implementation of projects to manage social impacts and to create development opportunities, monitoring & evaluation indicators against development outcomes.

For the entire exploration phase and until recently, TGL social activities were mainly focused on mitigation projects and philanthropy (referred to as the legacy projects). The current operation phase has been
characterized by a general shifting of social projects towards livelihood enhancement and diversification schemes. However, the future direction of SP is not yet clear: the strategy and objectives TGL wants to achieve need to be defined, as a necessary step to plan future activities and budget, which will likely be medium-long term interventions. This reorientation should be foreseen within the reorganization of the existing reference SP documents (mainly PCDP, social investment mandatory criteria, and Social Performance Plan) into a structured Social Management System, as it exists for environmental aspects, to be included within the IMS.

The IEC acknowledges that TGL has already recognized the need for reviewing and aligning the SI Strategy, M&E Plan and PCDP and reportedly, a socio-economic advisory (Kina Advisory Services) has been engaged at corporate level to support this process, which should be completed by Q3 2016.

Additional effort should be made when defining TGL objectives and future projects, namely to join efforts with the other JV partners (not only Jubilee but also the TEN project) to seek collaboration and avoid competition. In fact, from the information provided, in several cases TGL and other Jubilee partners have developed similar community investment projects in the same locations. Merging and coordinating resources which are invested to achieve the same goals allow strengthening the effectiveness of the actions undertaken.

According to the 2015 AMR, for what concerns SI, the company strengthened its interventions to enhance community involvement and quality assurance through the following initiatives:

- Continuing with the quarterly stakeholder engagement to provide updates on key Jubilee Operation progress;
- Strengthen the collaboration with local NGOs; and
- Continuing with the quarterly oversight review of the Jubilee funded projects by the Joint Venture Unit Operator, SI Sub-committee conducted (3 reviews conducted in 2015).

All projects, with the exception of the Tullow Group Scholarship Scheme (TGSS, which is funded from Tullow Group) were executed within the six coastal districts of the Western Region, with the fishing communities being the main recipients. Additional information on SI projects is provided in section 5.4.5.

The issue of Sea Access is becoming more visible as TGL operations increase. The awareness of the cumulative impact potential is bringing this subject to the top of the Company agenda. Within the objective of maintaining the "Social License to Operate", new frameworks for operations are being studied/strengthened in collaboration with Ghanaian authorities, especially marine police authorities; in addition, investments are considered in livelihood alternatives to fishing, as explained in sections 5.4.4 and 5.4.5.

For what concerns the legacy projects deriving from earlier commitments made to stakeholders, the construction of Essikado Maternity Block is almost completed and the Science in Schools Project is ongoing.

5.4.2 Community Engagement/Consultation and Disclosure

The main reference documents for stakeholder engagement and public disclosure of Project information remain the PCDP (last update in 2014) and the PCDP NTS, this latter prepared in 2015. As per the requirement of the Gh EPA, the PCDP should be revised regularly.

As advised in the former IEC monitoring report, copies of the PCDP and NTS have been made available at the CLOs offices for consultation. TGL website is not used sufficiently by the Company to disclose updated Project information. Therefore, it is suggested to consider the disclosure of PCDP, NTS, main Project milestones in the field of community engagement, relevant Project related documents (including the Annual External Independent Monitoring Reports) also on related websites (in particular TGL website) in order to reach interested stakeholders.

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

Since 2014, consultations and community engagement activities have been often conducted in conjunction for the Jubilee and the TEN Project. A summary table of the community consultation is included in the 2015 AMR.

The focus of 2015 community engagement activities continued to center on the six coastal communities, including interaction and dialogue with the Chiefs and Elders, NGOs, CBOs, District Assemblies, Regulatory Agencies, Fishermen Associations, Fishmongers, Queen Mothers, and individual opinion leaders on health, education, environment, and enterprise development activities. In addition, considerable effort was made to engage with deep-sea fishermen and the canoe council executives to continue the education program on the Safety Zones regulations (see section 5.4.4.1).

The IEC stakeholder meeting held in Abuesi evidenced that community members are informed and consider TGL as a fairly transparent actor. However, continuous consultations and awareness raising activities should be continued in the future and the responsibility shared among Jubilee and TEN partners.

From the review of the documentation provided, the IEC observed the lack of a structured approach for recording all activities and related outcomes in the field of community engagement. Specifically, an internal procedure to track all the activities carried out with communities is missing and mainly relies on the personal initiative of TGL staff, which makes it difficult to trace all the initiatives realized over time. A good system of record keeping would allow capturing and reviewing lessons learned from past experiences, would facilitate the identification of positive/negative trends, and the documentation of improvements and goals achieved from baseline status. Therefore, procedures for tracking these events should be internally adopted (including templates, information to be included and timeline) and spread among all the SP team members, CLOs included. This revision could be done as part of the general alignment of the SI strategy (explained in section 5.4.1).

The absence of an official approach towards accountability is reflected also in the lack of an appropriate database for the management of the socio-economic data available and gathered in the different activities carried out so far (starting from the ESIA preparation for the Jubilee Field). These data are a precious source of information which could be used in the future to further tailor stakeholder engagement activities, for monitoring and analysis purposes and for defining SI projects. The finalization of the Livelihood Impact Assessment will further extend the amount of available data on the socio-economic context. It is thus strongly advised to adopt a system for the integrated management of these information (i.e., Geographic Information System (GIS) or other data management platforms), where data can be edited, visualized, questioned and analyzed.

5.4.2.1 Local Community Ambient Air Quality Study

As mentioned in section 6.2.3.2, 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 GhEPA consequent to the delivery of the authorization to flare excess produced gas.

The results indicated that the ambient air quality of the coastal districts is not being impacted by offshore flaring. Considering the commitment of transparency that TGL has made towards Project stakeholders, in particular affected communities, it is suggested to disclose the results on the Company website to give them as much visibility as possible, together with the material of the 2014 Gas Management Campaign. Affected communities interested by the study should be addressed by a specific result disclosure campaign.
5.4.3 Grievance Management

A Grievance mechanism is a requirement of PS1 and is appropriately included in the PCDP. This is a mechanism where stakeholder concerns and grievances are received, recorded, investigated and answered in a culturally appropriate way. The number of grievances over the years has decreased sharply, which is likely due to effective engagement procedures.

There are no changes to the way the grievance process has been managed from 2014 to 2015. As reported in past independent monitoring reports, grievances are received verbally and in writing through the compilation of a special form (annexed to the PCDP).

The 2015 AMR indicates a stable trend in grievances compared to the previous year: four grievances were recorded in 2015 while only one unresolved complaint has been carried forward from 2014 (now closed). Most complaints reached a positive resolution with only one complaint still outstanding. A new grievance register format has been adopted from now on (Ghana Business Unit format of reporting), in order to overcome the past inconsistency in the use of different templates. The adopted format is adequate to guarantee an appropriate management and follow up of grievances, in compliance with IFC requirements.

CLOs continue to be engaged and trained to execute the grievance mechanism. The main difference from the past year is the involvement of chief fishermen and fisheries commission, specifically for the receipt of complaints from community members. The IEC acknowledges this as an important improvement.

CLOs are embedded in the communities and are themselves community members; it is commendable that no turnover has been registered over the years, greatly helping the difficult process of managing community’s expectations. More details on CLOs are provided in section 5.1.1.

In 2015, the leadership of the Ghana National Canoe Fishermen Council (GNCFC) embraced the idea of using a Drama Series (theatrical approach) to engage local fishermen communities on the grievance redress processes and the Voluntary Principles with the aim of promoting security and human right advocacy around the offshore installation at the Jubilee and TEN fields. This theatrical approach has been presented on several occasions with the purpose of showing the grievance procedure, encouraging the audience to make use of it and to advise the fishermen not to fish within the Exclusion Zone, including the possible consequences.

5.4.4 Exclusion Zone Management

The enforcement of the Safety Zone around the offshore facilities is the responsibility of the Ghanaian authorities but TGL continues to work with the Ghanaian Navy and Maritime authorities to ensure the area is respected. TGL has its own security vessels (four vessels on duty plus two in reserve), which will be increased in view of the TEN Project development. TGL workers who are residents from the six coastal areas are usually on board these control vessels to facilitate the communication in their own language with fishermen accessing the Safety Zone.

After several years of increasing trends in the recorded canoe incursions, 2014 and 2015 have been characterized by stability, with an average of about 800 cases per year. Even if this value is still significant, this plateaued level can be seen as the result from TGL efforts in training the local fishermen communities not to access the area. Nevertheless, the Project should seek to reduce the number of incursions rather than working towards their stabilization. In fact, within the additional delineation of the safety zone for the TEN field, a new rise in the number of incursions can likely be expected.

From the information collected on site, it can be stated that most fishermen are aware of the prohibition in force but continue to access the area due to the availability of fish stock attracted to the offshore facility locations. This awareness should thus push TGL to find new solutions for the management of canoe incursions; this would imply the direct involvement of different institutional stakeholders aimed at defining a new framework for the management of this issue, going beyond the mere approach of prohibiting access, which has proven to be an unsuccessful solution in the local context.
It is acknowledged that the Minister for Fisheries and Aquaculture Development (MoFAD) has recently inaugurated the Marine Fisheries Advisory Committee (MFAC), which includes representatives from MoFAD, marine regulatory agencies, commercial fisheries and fishing associations, non-governmental organizations, the academia and the oil and gas industry. The scope is, among others, to advise the Ministry on matters related to the impact of Oil and Gas activities on marine resources, to promote inter-sectoral management of marine resources information sharing and coordinate decisions. As a starting point for its activities, the Committee was mandated to formulate strategic and high level Action Plans on the following topics:

- Governance of the marine sector;
- Stakeholder awareness on oil development and marine resource issues;
- Marine environment research in support of resource protection;
- Marine spatial planning for integrated management;
- Marine and coastal data generation and utilization;
- Land-based sources of contaminants and degradation of coastal waters; and
- Livelihood diversification in coastal fishing communities.

The concept, which is at the basis of most of the interventions defined in these Action Plans, is the recognition of fish and fishery decline in the Gulf of Ghana. Several studies have been carried out to analyze this problem, which is partly related to the large increase in the number of fishing vessels (both canoe and semi-industrial fleets), and intensive fishing practices (including illegal fishing). In the past, fishing practices utilised surface nets during periods of oceanic upwelling, while nowadays fishing vessels attract fish stock to the surface during their deep-water resting periods. This decline in fish stock availability explains the reason why fishermen continue to breach the TLG Safety Zone, where fish are attracted by the presence of the FPSO and other offshore installations.

The Committee represents an important forum for the discussion of the problem related to sea access and TGL should push to the extent possible to highlight this issue on the MFAC agenda.

Within this framework, the Project could explore new options to reduce the number of canoe incursions building on the experience of other projects facing the same problem and in addition to the activities proposed in the Action Plans. An interesting case study is provided by the Chad Cameroon Export Project (External Compliance Monitoring Group, 2012), which included in the compensation package for the affected fishermen in Kribi the development of an artificial reef project. The artificial reef had the objective to provide a sanctuary for aquatic life and enhance fisheries in the vicinity of the offshore facilities but outside the exclusion zone. In the Jubilee context, the creation of a similar artificial reef could work as a valid alternative for fishermen for the abundance of fish stock which it would attract, thus reducing the incentive of fishing within the Exclusion Zone. Another mitigation measure developed in the framework of the Chad-Cameroon Export Project was based on the special permission limited to local artisanal fishermen who were allowed to access the Exclusion Zone in a regulated way and supplied identification badges, registration plates and paint for the boats to facilitate their identification. In consideration of the fact that reportedly the Government of Ghana has started a process of identification and registration of fishermen, TGL may consider to discuss with competent authorities the feasibility of this option.

No serious security incidents have occurred from the last site visit and the internal investigation carried out following the accident that occurred at the beginning of 2015 (canoe sinking) has been officially closed. Due to legal privileges, the investigation report was not shared with the IEC. The 2015 AMR does not report the

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3 During the oceanic upwelling, nutrients are circulated up from the deep ocean and attract fish to feed at the surface

4 “Solving the Fisheries Crisis in Ghana: A Proposal for a Fresh Approach to Collaborative Fisheries Management. Integrated Coastal and Fisheries Governance (ICFG) Initiative”, USAID, September 2012
organization of training sessions addressed to the Ghanaian marine police with respect to human rights and ways to manage intrusion, as done in the past years: TGL has to ensure that these trainings are continued also in 2016 in view of the enlargement of the exclusion zone to include the TEN project.

5.4.4.1 Training

Education and engagement programs for fishermen on the Safety Zone continued throughout 2015. Regular information activities and engagement sessions are done with the fishing communities; posters, banners and other education material are used, as appreciated during past site visits. During this last IEC visit and during the meeting with the President of the Ghana National Canoe Fishermen Council (GNCF), fishermen and fishmongers in Abuesi, the IEC observed an informative poster hanging within the village regarding the arrival of the new FPSO. However, the the poster was in English language, with blurred images and concepts appropriate for an educated audience. It is recommended to use information material which is easily understandable by local communities, thus preferring the use of Akan language, visual aids, high definition pictures and key concepts.

The GNCF is fully involved in the process of training fishermen on the dangers present and on the need to keep away from the FPSO Safety Zone. At the same time, the Council is involved in the Conflict Resolution Mechanisms adopted to ensure issues are solved, as much as possible, as soon as they arise and without being brought to the attention of the public.

The participation in the training courses is defined at community level, with rotating attendance. It is thus recommended to continue to provide these educational programs to impacted communities on both the Safety Zone and emergency response, in order to extend as much as possible the number of beneficiaries. Moreover, future AMRs should be integrated with a summary of the trainings activities carried out (including location, data, topics and number of participants) to guarantee their monitoring over time.

5.4.5 Community Development Projects

Community development projects are not a requirement of the ESAP. Nevertheless, as part of its SI and SP strategy, TGL and the Jubilee Partners implement a number of activities in favor of the communities of the six districts of the Western Region. These are a sound way of gaining community support for TGL operations and mitigate possible discomfort experienced as a result of the Project.

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.

SI projects continued to be funded either through TGL discretionary budget or Jubilee Partners (of which 35.5% is contributed by TGL). For 2015, the JV Partners approved a budget of US$ 5.5 million while TLG approved budget for discretionary projects was US$ 3.6 million. This budget does not strongly differ to the one allocated in 2014, which amounted to US$ 9.9 million (out of which US$ 2.0 million for TGL standalone projects plus an additional US$ 2.0 million for the TLG Group Scholarship). Table 5.5 shows the budget allocation for SI projects since 2011.

Reportedly, due to the negative trends that the oil and gas market is facing, the SI budget for 2016 is expected to be reduced but no figures are available. 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. TGL has been reaping the benefits of the efforts done in engaging with local communities and stakeholders, which gave the Company the “social license to operate” in the area; any revision of the budget should be carefully considered to avoid any imbalance with the investments done in previous years. It is also recommended that affected communities’ expectations be carefully managed and any modification/restriction on promised benefit timely and appropriately communicated and discussed with stakeholders.
Table 5.5: 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>
</tbody>
</table>

The following list presents the SI projects currently ongoing or supported by TGL. A thorough description of the progress of projects under implementation is provided in the 2015 AMR:

1. Tullow Group Scholarships Scheme (TGL 100% funded);
2. Tullow Technical Training Scholarships (TGL 100% funded);
3. Kindergarten School at Amenano and Ayensudo (TGL Stand Alone Funded): the Kindergarten in Amenano has been visited by the IEC during the site visit;
4. Construction of Assembly Hall for Half Assini Sec. Sch. and Hostel for Axim Girls’ S (TGL 100% funded);
5. Construction of the Essikado Maternity Block (TGL 100% funded, a legacy project): the construction has been finally completed after a long and complicated process and only equipment is missing. Inauguration is planned for the forthcoming months. The structure has been visited by the IEC during the site visit;
6. Jubilee Technical Training Centre (funded by Jubilee Partners): the structure is fully operational and in 2016 it should be handed over to the Takoradi Polytechnic;
7. Science in School Projects (funded by Jubilee Partners – a legacy project);
8. Livelihood Diversification and Support Project (LDSP, formerly Livelihood Enhancement and Enterprise Development, LEED, funded by Jubilee Partners): the project entails, working with selected fishermen, wives of fishermen and youth in cassava and sweet potatoes farming, vegetable growing using the green house technology and piggery with its associated value chain. During the site visit, the IEC visited a pilot piggery project in Shama Apo;
9. Enterprise Development Center (funded by Jubilee Partners);
10. Annual Fishermen Regatta (funded by Jubilee Partners);
11. Clean Water Project - Borehole Rehabilitation (Tullow 100% funded): in 2015, 14 additional boreholes have been delivered while 14 are scheduled to be completed in 2016;
12. Star Community-based Health Planning and Services (CHPS, Jubilee Funded).

Following exploration and development of the TEN project, TGL awarded the Centre for Environment and Health Research and Training with the preparation of a Livelihood Impact Assessment of the six coastal districts of the Western Region of Ghana. The general objective is to undertake a baseline livelihoods study and collect the necessary data that will help analyze the possible cumulative livelihoods impact of the operations of the TEN Project, whose footprint is similar to the Jubilee field.

The study will include the following activities:

- baseline assessment of fish resources, fisheries and fishing-dependent livelihoods in the project areas;
- assessment of project impacts on fish resources, fisheries and fishing-dependent livelihoods;
- evaluation of potential changes, perceived or actual, in livelihoods scenarios of project affected communities;
✓ a description of potential project impacts on small-scale subsistence and artisanal fishing activities, including impacts on people’s access to and use of these resources and the productivity of their fishing activities;

✓ a description of the range and content of measures available to mitigate impacts on affected communities and/or promote development of fishing-dependent livelihoods through community investment programs;

✓ a fisheries livelihoods diversification, restoration or development plan that includes stakeholder involvement and participatory assessment, design, and implementation of mitigation and development plans, and monitoring and evaluation; and

✓ the cumulative effects arising from the existing Jubilee operation.

The Livelihood Assessment Report should be submitted in June 2016. It is recommended to integrate the outcomes of the study into the realignment process of the SP strategy explained in section 5.4.1.

5.4.5.1 Monitoring

Monitoring is provided through project officers and CLOs. A M&E Plan was prepared in 2014 and no changes have been made so far. Once the review of the Social Investment strategic direction is completed (see section 5.4.1), the M&E Plan will also be aligned.