



REPORT OF THE:

**EXTERNAL INDEPENDENT
MONITORING GROUP**

TULLOW GHANA LTD

JUBILEE PROJECT



GHANA

Site Visit: May 2015

Prepared by:
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Prepared for:
International Finance Corporation

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FREQUENTLY USED ACRONYMS

AMR	Annual Monitoring Report
ALARP	As Low As Reasonably Practicable
ATBA	Areas To Be Avoided
CAR	Corrective Actions Report
CLO	Community Liaison Officer
CHPS	Community-based Health Planning and Services
COSHH	Control of Substances Hazardous to Health
CSR	Corporate Social Responsibility now changed to SI: Social Investment
DLE	Dry Low Emission
ED	Enterprise Development
EDC	Enterprise Development Centre
ESIA	Environmental and Social Impact Assessment
ESMS	Environmental and Social Management System
EHS	Environmental Health and Safety
EMS	Environmental Management System
EMP	Environmental Monitoring Plan
ESAP	Environmental Social Action Plan
EZ	Exclusion Zone
FFDP	Full Field Development Plan
FSA	Formal Safety Assessment
FPSO	Floating Production, Storage and Offloading
Gh EPA	Ghana Environmental Protection Agency
GHG	Greenhouse Gases
GTG	Gas Turbine Generator
H&S	Health and Safety
HSE	Health, Safety and Environmental
IMO	International Maritime Organization
IEC	Independant Environmental Consultant
IFC	International Finance Corporation
KPI	Key Performance Indicators
LEED	Livelihood Enhancement and Enterprise Development
LTI	Lost Time Incidents
MAH	Major Accident Hazard
MARPOL	Marine Pollution: International Convention for the Prevention of Pollution From Ships
M&E	Monitoring and Evaluation
MMO	Marine Mammal Observer
MMscfd	Million standard cubic feet per day
MOC	Management Of Change
MSDS	Material Safety Data Sheet
NADF	Non Aqueous Drilling Fluids
NORM	Naturally Occuring Radioactive Material

NTS	Non Technical Summary
OOC	Oil On Cuttings
OIW	Oil in Water
OMS	Operational Management System
OSC	Offshore Safety Case
OSCP	Oil Spill Contingency Plan
OSCR	Offshore Safety Case Regulation
OWS	Oil Water Separator
PCDP	Public Consultation and Disclosure Plan
PPE	Personal Protective Equipment
PS	Performance Standard
PTW	Permit to Work
RRM	Risk Reduction Measures
SCE	Safety Critical Elements
SI	Social Investment previously known as CSR :Corporate Social Responsibility
SME	Small and Medium Enterprises
SP	Social Performance
SSEA	Safety, Sustainability and External Affairs
STOP	Safety Training Observation Program
TEN	Tweneboa, Enyenra and Ntomme
TGL	Tullow Ghana Limited
TVET	Technical, Vocational Education and Training
WHO	World Health Organisation
WMP	Waste Management Plan

INDEPENDENT EXTERNAL MONITORING TULLOW OIL JUBILEE PROJECT MAY 2015

1 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 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 eight additional oil production and water injection wells, the tie-in to the existing Floating Production Storage and Offloading (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 2015, relevant to the period of 2014 and up to the time of the site visit.

The IEC site visit conducted included the TGL headquarters in Accra, the FPSO, the onshore Project facilities in Takoradi, the Waste management contractor facilities, Takoradi Port, meeting with the National Ghana Canoe Fisherman council, and the fishing community of Dixcove in Ahanta West District.

At the time of the present 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 under review. Some instances were identified where ongoing obligations of TGL are inconsistent with ESAP requirements, however, based on discussions and TGL provision of documentation, these are not deemed to represent non-compliances. Further observations collected, concerning the current implementation status of the ESAP actions and next planned milestones, have been reported in the ESAP updated table (see Section 5 of the current report).

Throughout 2014 and ongoing in 2015, the TGL "Simplification Project" has resulted in the identification of positions/functions within TGL for downsizing. Phase I of this project has recently been completed with about 50% of these functions eliminated (no technical functions included). The process has seen some positions removed while others have been merged and responsibilities of some increased. TGL report that the redundancy process was carried out according to legislative requirements and a termination package offered and accepted by those affected. Phase II is ongoing and expected to be completed within 2015.

During the site visit, the IEC observed, perhaps as a result of the OMS review process or employee restructuring, that the majority of TGL EMPs have not been reviewed within the nominated time frame.

In 2014 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. A new EHS & Asset Protection manager has been recruited as well as a Head of Sustainability and External Affairs in Accra; a new Social Performance Manager has been recruited, based in Takoradi.

The existing TGL management system is currently being strengthened by the TGL Operational Management System (OMS), currently being rolled out in 2015. The OMS can be seen as a tool aimed at integrating how Tullow/MODEC runs the FPSO in a joint and coordinated manner, and as such is FPSO operations based. Elements of the TGL EMS will support and contribute to the OMS, however, the OMS itself is not intended to replace the EMS but will instead be focused on the management of operational activities and will include some practices and standards for site environmental management onshore and offshore.

Protests of MODEC employees on the FPSO, largely related to pay and wages, were reported in 2014. The actions of MODEC employees undertaken during the strike created potential environmental and safety hazards, with a number of MODEC individuals being fired as a result. TGL reported that MODEC has been engaging with its stakeholders to resolve the dispute, and even though some feelings of resentment remain regarding the way the situation was handled, the issue appears to have now been resolved.

Extensive EHS training continued in 2014, covering a wide range of topics, including crisis and emergency management response, safety observation and hazard awareness, and safety leadership. The high turnover of staff in 2014 and on-going organizational changes has resulted in positions being removed and previous roles combined, and therefore may justify additional training sessions in IFC performance standards.

Environmental monitoring actions, as foreseen by the Project ESAP related plans are consistently carried out by the Project, in compliance with the relevant time schedule and external reporting requirements. Some actions have been overlooked by TGL in 2014 which are further discussed in the environmental section 6.2. of this report.

TGL were authorized by the Gh EPA to undertake abnormal flaring of 500 million standard cubic feet (MMscf) per month for a 5 month period in 2014 (largely due to the delay in the Ghana Gas plant), after which levels returned to previous levels. The Ghana Gas Plant is now operational, and TGL have renewed their environmental permit with approval from the Gh EPA to flare up to 3% of total production (an increase of 0.5% on the previous certificate limit).

TGL continue to report on a monthly basis to the Ghana Environmental Protection Agency (Gh EPA), and the Annual Monitoring Report (AMR) for 2014 was released in March 2015. Some suggestions for improvement have been made regarding the 2014 AMR relating to both social and environmental aspects in the relevant sections of this report.

The monitoring team 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 was observed to be good across all sites visited and the management facility found to be proactive, well managed and a good example of an effective waste management approach with a close working relationship with the Project.

Marine mammal observations are continually recorded by the Project. The IEC have received the 2014 observation report and the report undertaken by the Gh EPA subcommittee regarding the incidence of mortality of Cetaceans in Ghana's waters in 2013. The resulting study outlines a range of potential contributing factors, with the oil and gas industry not found to be directly responsible for the increase in mortality rates.

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 permit to work (PTW) remains in place and continues to be an effective measure to ensure that operations are carried out in a safe, controlled and coordinated manner. Some additional findings related to TGL and contractor management and contractor management plans and procedures have been outlined in section 6.3.

As part of the increased flaring undertaken in 2014, TGL undertook additional H&S surveys on the FPSO, which resulted in some additional temporary mitigation measures being implemented by TGL throughout the increased flaring period.

A Social Performance Manager replaced the positions of the previous SI Manager and social advisor. Hopefully, the current annual turnover trend of the position has come to an end to ensure a stable guidance to the Social Performance (SP).

Community engagement is outstanding. Combined engagement for Jubilee and TEN projects has been enriched in 2014 via meetings related to the Gas Management Campaign; which has been conducted correctly. Notwithstanding comprehensive education and training programs with fishermen, the level of boat incursions is increasing both in the exclusion zone (EZ) and in the area to be avoided (ATBA). The increased presence of TGL in the area requires a comprehensive strategy to ensure that TGLs "Social License to Operate" and Sea Access is managed in a way to protect both the company's assets as well as fishing activities. It is evident that the issue can no longer be managed only within the law (entering the EZ is a criminal offense), but also within the livelihood strategies of the communities; investments to strengthen local farming/agriculture are being considered within the Livelihood Enhancement and Enterprise Development (LEED) project as a way to ensure alternative livelihoods to fishing.

A Non-Technical Summary (NTS) of the Public Consultation and Disclosure Plan (PCDP) has been prepared. The document should be edited and made available at Community Liaison Officers (CLOs) offices.

Grievance management continues and is unchanged. Inconsistencies in the Grievance report have been noted by the independent environmental consultant (IEC) and should be addressed. Most issues are addressed to the satisfaction of the complainant, including a major accident which occurred with a boat; the issue is still under investigation but independently from the results, TGL decided to fully compensate the owner for the damages.

The Grievance management system currently implemented should ensure that CLOs working conditions are assessed and any grievances addressed.

2 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.



Figure 2.1: Jubilee Oil Field Location Map

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). Phase 1A development drilling and well completions which started in 2012 continued in 2014. J-24, J-25 (J-50) and J-46 wells were drilled in 2014 as part of the phase 1A development.

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 Project, the TEN project is referred to in the current report with regards to potential cumulative impacts.

2.1 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.

3 INDEPENDENT VERIFICATION SCOPE OF THE WORK AND ADOPTED METHODOLOGY

Scope of the external independent verification, as defined by the relevant Terms of Reference issued by TGL on April 17th, 2015, 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) and the TGL Corporate reports;
3. review and verify the effective implementation of H&S management system requirements for the safely 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 2014 AMR report (dated 10 April 2015);
- 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 2013);
- 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.

4 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 4th May) to discuss the site visit scope and agenda and to collect ESAP related documentation to be reviewed;
- Meeting in Accra with Social Performance Manager and Human Resources Director on 4th May;
- visit to the FPSO (5th 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 meetings with TGL personnel (FPSO OIM FPSO Facilities Manager, FPSO operation/Environment Team Lead, FPSO Safety Specialist), and verification of correct implementation of procedures and monitoring, followed by a walkthrough of the key topside facilities of the FPSO;
- meetings in the TGL Takoradi Office with the Social Performance (SP) team (on 5th and 6th May) to get an overview of the main progresses and changes in implementing activities with local communities through social engagement and investments including the 2014 flaring campaign;
- meeting with the project Community Liaison Officers (CLOs) on 5th May;
- meeting with representatives of the NGO Friends of the Nation (Western Region) on 5th May;
- visit to the fisher community of Dixcove in Ahanta West District (STMA) (6th May) to meet fishermen and fishmongers, target of the “flaring campaign” and beneficiaries of social investments activities;
- meeting with the President of the Ghana National Canoe Fishermen Council (6th May);
- visit of Waste Management Contractor facilities (Zeal) (May 6th), to evaluate the Project and appointed contractor performance with respect to the Waste Management Plan (WMP) and auditing requirements;
- visit to the port facilities (May 6th) including the chemical storage facility run by Baker Hughes and the TGL berth to observe HSE aspects on site;
- visit of the TGL Shore Base and annexed pipe yard and chemical storage area (May 6th) to evaluate Project performances in terms of raw materials, chemicals and waste handling and storage;
- Additional meetings in Accra with TGL (May 7th) and additional documentation requests;
- Close out meeting with the TGL EHS&AP Manager, Operations Manager, Operations EHS Superintendent and Environmental Team Lead EHS Operations Team Lead in order to present initial monitoring team findings and discuss any remaining queries; and Close-out meeting (May 8th) to review site visit findings and anticipate the content of the final report.

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

1. EHS & Corporate affairs Organisational charts;
2. Environmental Management Plan Rev.4 reviewed in May 2015;
3. Environmental Monitoring Plan issued in November 2012;
4. Ambient air quality survey 1 - 30 June 2014 Report;
5. Waste tracking metrics for 2014;
6. FPSO Environmental reports – January and February 2014;
7. FPSO EHS Audit September 2014 – Final Report;

8. FPSO HSE reporting January – March 2014;
9. Completion operations environmental monitoring terminal report for J08-P Acid treatment;
10. LRQA ISO14001:2004 audit;
11. MODEC FPSO Stack Emissions report August 2014;
12. MODEC FPSO Stack Emissions report December 2014;
13. Exercise Oscar - Observation Report 2014;
14. EPA Ghana Subcommittee Final Report of Mortality of Cetaceans in Ghana's Waters August 2014;
15. Jubilee Flaring Technical Note 04 February 2014
16. Various EMEX incident and Injury logs 2014;
17. HIPO incident records 2014;
18. Various Drill reports from 2014 (including Vessel collision and Chemical spill scenarios);
19. 2014 Marine Mammal and Turtle Observations (Gardline);
20. TGL Safety Case Roadshow 2014;
21. EHS training matrix 2014 and plan for 2015;
21. Public Consultation and Disclosure Plan (PCDP) (Non-technical summary for communities), February 2015;
22. Summary of Community Consultations from Jan 2014-to date
23. Social Performance 2015 (PP)
24. Community Engagement Campaign – Gas Management, Executive Summary
25. Jubilee Gas Management Programme (PP for communication with communities)
26. Social Investment Update, as of April 2015
27. Ghana BU Communities Grievance Register
28. Communities Grievance Report (Jan-Dec., 2014), attached to the AMR 2014

5 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, which last revision is dated 10th December 2010, outlines the related actions to be implemented, the completion indicator for each Performance Standard applicable to the Project, and the timetable in a table 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 2015 Status” column. Previous year tracking columns of ESAP items (from 2011 to 2013) has been removed from the ESAP table, and a summary has been provided for 2014 only. The May 2015 summary outlines the changes registered during the May 2015 visit, and a continuation of ESAP status where no change has been registered in 2015.

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

Based on the observations reported in the table below, it is confirmed that **no non-compliance** situations, as defined in Section 4 of the present report, were observed with respect to ESAP commitments. 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.

**ENVIRONMENTAL AND SOCIAL ACTION PLAN
Tullow Oil (#27918) - December 10, 2010**

Item	Action	Completion Indicator	Timetable	May 2015 Status
TULLOW PLC¹				
PS1: Social and Environmental Assessment and Management Systems				
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.	(a) Completed. (b) Completed. Facility disbursed only for Jubilee project. (c) Completed	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.	(a) Completed. (b) Completed.	No update or further action required
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.	(a) Completed. (b) Periodic training sessions discussed in the Annual Monitoring Reports (AMR)	The high turnover of staff in 2014 and on-going organizational changes has resulted in positions being removed and previous roles combined, and may justify additional training sessions in IFC PSs.

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.

ENVIRONMENTAL AND SOCIAL ACTION PLAN
Tullow Oil (#27918) - December 10, 2010

Item	Action	Completion Indicator	Timetable	May 2015 Status
PS1: Social and Environmental Assessment and Management Systems				
Jubilee Field Development Project – Phase 1				
4	The Project will prepare the ESIA for Ghana EPA, incorporating the results of the Environmental Baseline Survey (EBS).	(a) A draft ESIA has been submitted to IFC for review and comments. (b) The final ESIA has been disclosed in Tullow Oil website.	(a) Completed (b) Completed	No update or further action required
5	The Project will develop and implement a management of change procedure and Tullow Oil will use reasonable endeavors, 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).	(a) Tullow Oil has submitted the procedure acceptable to IFC. (b) The procedure is integrated in the Project environmental and social management system (ESMS).	(a) Completed. (b) Completed. Integrated into the Project EMP.	No update reported or further action required. No environmental management of change (MOC) has been implemented for the period under review. MoC will remain a part of the TGL ESMS and will be extended to the OMS.
6	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.	(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.	(a) Completed. (b) Completed (c) Ongoing, as per agreed timeline.	ISO 14001 successfully renewed in 2014. The majority of EMPs have not been reviewed by TGL within the Project determined timeframe. TGL operations management framework is being reviewed. Existing TGL Operations monitoring commitments remain as part of the EMS and additional detail will be included in the OMS where necessary, which was being developed at the time of the site visit and is set to be implemented by end 2015.
7	The Project will disclose the EMP, including this Action Plan, to local communities as it evolves and report on completion of its action items.	(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.	(a) Completed. (b) Ongoing. Reporting at least twice per year or per PCDP once it is disclosed.	A NTS of the PCDP has been prepared as a guideline document for community consultations. The document could be edited and made available for consultation at CLOs offices. Other disclosure tools could be considered when the full PCDP document is improved.
8	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.	The Project has developed and submitted a draft plan acceptable to IFC.	Completed.	Updated records on training sessions and EHS organization chart provided by the project and adequate for ESAP requirements. Training records provided for 2014 and plan for 2015 received.

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Item	Action	Completion Indicator	Timetable	May 2015 Status
				Training is detailed further in section 6.1.2.
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.
PS2: Labor and Working Conditions				
10	The Company will have a Human Resources Policy that communicates to workers their rights under Ghanaian law and spells out terms of employment, including 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. An Employee Relations Procedures exists to guide internal grievances.
PS3: Pollution Prevention and Abatement				
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 2014 have been provided to the monitoring team, and results summarized in the AMR. Most of the monitoring requirements for the period under review had been completed at the time of the site visit. Some comments and suggestions have been included in section 6.2.
12	The Project will maintain a monitoring program for greenhouse gases (GHG).	Periodic public reporting of GHG emissions for the Jubilee Field production operations.	At least yearly reporting.	Ongoing. Data provided through AMR report to IFC and statutory reports to Gh EPA. AMR details increase in GHG emissions for 2014 (when compared to 2013) due to abnormal flaring. Project applying to Gh EPA to increase flaring rate to 6% of production. Additional details can be found in section 6.2.3.

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Item	Action	Completion Indicator	Timetable	May 2015 Status
13	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.	Availability of the cuttings deposition model and the drilled cuttings and fluid disposal methods and procedures, acceptable to IFC.	Completed.	Log of all drilling waste produced and disposed of are provided within the relevant Well Terminal Report, 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 not been reviewed in 2014 and is currently undergoing review and amendment. . Detailed description of drilling cuttings and fluids disposal methods, results and outcomes of studies carried out are reported in Section 6.
14	The Project will ensure that a Hydrotest Water Disposal Plan will be prepared.	Availability of the plan, acceptable to IFC.	Completed.	No update reported or further action needed.
15	The Project will install a produced water discharge sampling point in the FPSO and relevant procedures developed.	Availability of the sampling point and procedures, acceptable to IFC.	Completed	Produced water is continuously monitored through an analyzer and off-spec water is automatically diverted to the Off-spec Water Tank for further treatment and/or additional retention time. Results of sampling are provided in the AMR and data presented to the monitoring team. No further action required.
16	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.	Availability of tanker vetting and ballast water management procedures, acceptable to IFC.	Completed.	Both components are embedded within the Environmental Monitoring Plan. Environmental Monitoring Plan, currently being reviewed, outlines TGL approach to ballast water management, with monitoring results showing no ballast water was used by FPSO during 2014.
17	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.	(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	(a) Completed. (b) Completed. (c) Completed. (d) Received Revision 0 for Ghana EPA submission, June 2010. Ongoing review of Revision 1.	WMP is currently undergoing review, while monitoring requirements remain in place and are continually implemented by the Project. Monitoring results have been provided for 2014 and incorporated in the AMR. Waste handling and management reporting ongoing. Waste Facilities visited (Zeal) continue to meet

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Item	Action	Completion Indicator	Timetable	May 2015 Status
	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.	IFC.		project requirements, and are audited annually by the Company. The existing chemical handling procedures remain in place. Chemical handling management plans (including COSHH) have been merged into a single chemical management guideline (see section 6 for additional details).
18	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.	(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.	(a) Completed (b) Ghana Incident Management Plan (IMP) Revision 7 received, acceptable to IFC.	ERP remains in place and made available. No further update
19	Quantitative modeling of defined potential surface and subsurface oil spill release scenarios will be conducted and an assessment of potential for oil spill related impacts to offshore and coastal environmental resources, including turtle nesting beaches, will be conducted for both the drilling/installation phase and the production operations phase, and incorporated in the Oil Spill Contingency Plan (OSCP). The OSCP will define specific measures for protecting turtle habitat and other protected and sensitive coastal habitats. The Project will develop spill scenarios for the operations phase Oil Spill Contingency Plan (OSCP).	(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.	(a) Completed. (b) OSCP Revision 1 received, acceptable to IFC.	Current OSCP for the production and operations phase remains in place. Review is currently underway as part of the management plan restructure. In accordance with OSCP, MODEC has implemented its own procedure, which refers back to the TGL OSCP. Records on OSR drills conducted have been provided and are consistent with ESAP requirements, as detailed further in Section 6. The Jubilee OSCP is set to be expanded in scope to cover TEN Operations, with response resources and equipment to be shared with TEN. Jubilee Oil spill response resources to be shared with TEN. TEN will have a separate OSCP as trans-boundary of spill from TEN is possible.
20	The Project will develop and adopt a H2S Program and ensure that it is also adopted by its contractors, as needed.	Availability of the Project's H2S Program, acceptable to IFC	N/A	No further update reported or action needed.

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Item	Action	Completion Indicator	Timetable	May 2015 Status
PS4: Community Health, Safety and Security				
21	<p>(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.</p> <p>(b) Procedure for boat traffic management and for warning boats away from the safety zone, including rules of engagement for use of physical intervention.</p> <p>(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.</p>	<p>(a) Education program information and schedule for meeting with villages.</p> <p>(b) Procedures for offshore facilities provided to and accepted by IFC.</p> <p>(c) Procedures for managing traffic into and out of Takoradi Harbour</p> <p>(d) Security Plan provided to and accepted by IFC.</p>	<p>(a) Program ongoing.</p> <p>(b) Completed.</p> <p>(c) Tullow follows Africa Pilot for Takoradi Harbour, acceptable to IFC.</p> <p>(d) Completed.</p>	<p>Awareness program with fishermen strengthened as per additional activities related with the TEN project and seismic surveys. The Ghana National Canoe and Fishermen Council fully involved and able to take the lead in training fishermen.</p> <p>Procedures for offshore facilities and managing traffic along with the Security Plan consistently implemented.</p> <p>Training of coast guards on respectful human rights, and ways to manage intrusion still on-going to face staff turnover.</p> <p>New strategies are being developed for "Sea Access"</p>
PS6: Biodiversity Conservation and Sustainable Natural Resource Management				
22	The Project will develop and implement a program for training vessel's and helicopter's operators in marine mammal observation and monitoring at and in the vicinity of the proposed Jubilee Field development. The program will be included in the final Jubilee ESIA and developed in consultation with the Ghana EPA.	<p>(a) Availability of the program, acceptable to IFC.</p> <p>(b) Observations analyzed by an experienced marine mammal biologist and reported in the annual monitoring report to IFC.</p>	<p>(a) Completed.</p> <p>(b) At least yearly reporting.</p>	<p>Program in place and consistently implemented.</p> <p>Marine spotters continue to collect data and report on a monthly basis. Reports delivered to Gh EPA and annual dedicated report compiled by TGL consultant. Overview incorporated in the AMR.</p>
23	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.	Availability of the policy and procedures, acceptable to IFC	Completed.	Procedure remains in place. Gh EPA report regarding increase in Whale deaths in 2013 not attributed to TGL vessels. Some additional mitigating actions resulted from EPA report (additional details in section 6.2).
24	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.	Availability of the policy and procedures, acceptable to IFC	Completed.	Procedure in place. No further update reported or action needed.

6 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 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.

6.1 EMP 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 and Accra.

6.1.1 Organization and Staffing

A major organizational restructuring occurred in 2014. 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. A new EHS & Asset Protection manager has been recruited as well as a Head of Sustainability and External Affairs in Accra. The SSEA structure is outlined in the following figure.

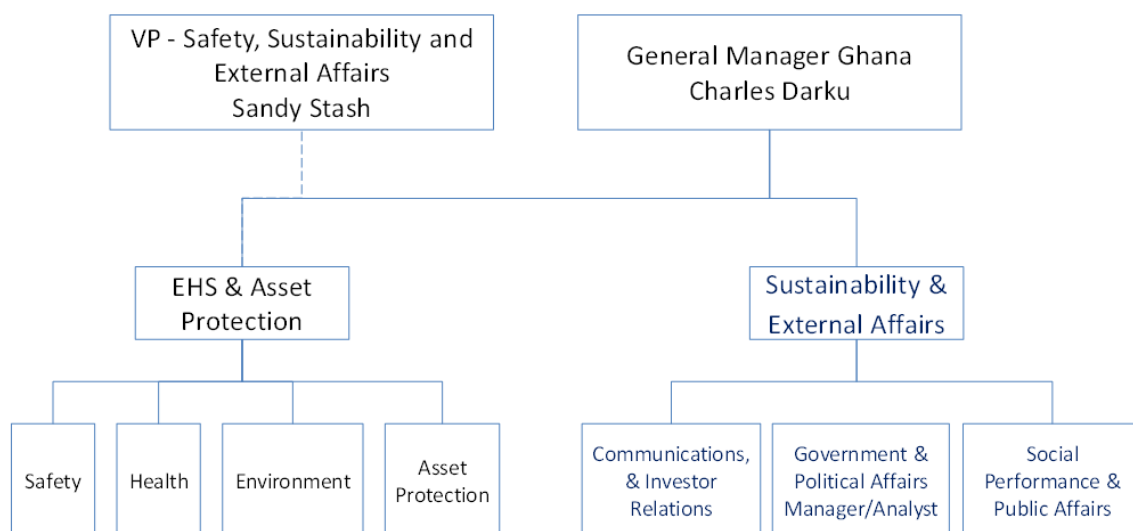


Figure 6.1: High level organisational chart of the SSEA (source: Tullow Ghana)

At Takoradi, a Social Performance and External Affairs Manager has taken over the functions of the social advisor and of the previous Social Investment Manager. Under his guidance, the Social Performance Team has been strengthened and includes a Planning Performance and Reporting Advisor, a Community Engagement Coordinator, a Social Impact Advisor, a Social Investment Coordinator, a Construction Supervisor, CLOs and administrative support. The annual turnover of the social performance manager is unfortunate; it is hoped that the new manager, who is of Ghanaian origin and was formally a Tullow staff member in Uganda, will sustainably fill the position.

As per past years, no turnover occurred among the six CLOs appointed to work as the linking focal points between TGL and the communities. Although still commendable, their increased responsibility and workload linked with activities for the TEN project appear to be not adequately recognized. Actions should be taken to ensure their positions remain stable considering the key role they play in interfacing with stakeholders and the trust they have gained from community members.

The Tullow Ghana Employee Handbook, operational since 2009, is reportedly under constant revision. During the reporting period, difficulties in the Oil&Gas Industry and the implementation of the so called “Simplification Project” led to the identification of positions/functions for downsizing. Phase I of this project has recently been completed with about 50% of these functions eliminated (no technical functions included). This resulted in an additional workload for some of the staff. Reportedly, the redundancy process was successfully concluded by both parties’ signature of settlement agreements. Termination packages included 3 months’ salary for each year worked (in line with the country’s common practice) plus 3 months’ paid notice; in addition, the worker is assisted by TGL in various ways to overcome the change occurring in his/her life.

An Employee Relations Procedures document guides the workers internal grievance mechanism. The AMR reports that so far 5 employees have been taken through the workforce grievance procedures, out of which only one during 2014. TGL has no worker organization or worker representative figures.

Protests of MODEC employees on the FPSO, largely related to pay and wages, were reported in 2014, the first in July and the second in October. As outlined by TGL, on July 24th 2014, 33 MODEC employees participated in an illegal strike, failing to show up for duty, leading to absences on the FPSO in key operational areas. Following this, 24 MODEC employees participated in a sit down strike on October 29th, 2014. These employees were subsequently quarantined in a non-operational area to avoid any operational interruptions, and Police officers were flown to the facility to peacefully demobilize the strike. The actions of MODEC strikers created potential environmental and safety hazards, with a number of MODEC individuals being fired as a result. TGL reported that MODEC has been engaging with its stakeholders to resolve the dispute, and even though some feelings of resentment were expressed to the IEC during the FPSO site visit as to the way the situation was handled, the issue appears to have now been resolved. Considering the implications that actions such as these can have for TGL operations, closer follow-up and monitoring of the situation is suggested by closely working with MODEC to find amicable solutions in case of eventual additional grievances, and to ensure that TGL contractors have sufficient management procedures in place to deal with worker grievances.

Although no non-compliances have been identified, TGL may want to revise its Grievance mechanism in order to bring it more in line with current IFC PS requirements (i.e. ensure it allows for anonymous complaints to be raised and addressed) and ensure that contractors have extended a similar one to their workers.

6.1.2 Training

According to the records provided, the TGL training program continued to be carried out in 2014, and into 2015. A wide range of topics have been covered, including crisis and emergency management response, safety observation and hazard awareness, and an extensive safety leadership program targeting the Senior and Supervisory levels.

As part of the environmental training, and as part of the TGL ongoing annual oil spill response training, training on International Maritime Organization (IMO) level II and level III oil spill response was undertaken in 2014. Exercise Oscar was undertaken in November 2014, designed to test a range of elements of TGLs overall oil spill response capability. The scenario centered upon a release of Jubilee crude originating from the FPSO during product off take to a receiving tanker, and included a range of participants across the TGL operational team (additional details can be found in section 6.3).

The current EHS training matrix was provided to the monitoring team during the visit, providing an overview of the TGL mandatory training to be completed by FPSO employees and TGL staff. The training matrix details the individual training carried out by each employee on a variety of internal and external EHS topics, including permit to work (PTW), facility emergency response, BOSIET and specific training required across different working environments (electrical isolation, confined space training etc). 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 operational management system has been rolled out across the organization.

6.1.3 Certification

TGL currently operates under the Gh EPA certificate to continue offshore operations of the Jubilee oil field, issued May 26th, 2012 with a validity of 3 years. At the time of the site visit, TGL were preparing to apply for recertification from Gh EPA(see section 6.2.3. for additional information).

TGL obtained its first standalone ISO 14001:2004 Certification for the Environmental Management System in 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 underwent an external independent ISO 14001 annual surveillance audit in 2014 by Lloyds Register Quality Assurance. Some observations and one minor nonconformance and was 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 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)”.

6.1.4 Periodical Review of ESAP Related Plans

ESAP requirement #6 requires TGL to regularly review and amend EMPs. For the 2014 reporting period, the previously established EMPs remained in place and the monitoring requirements undertaken according to the TGL monitoring plan (TGL-EHS-PLN-04-0006). During the 2015 site visit, the IEC noted that the majority of TGL EMPs have not been reviewed within the nominated time frame (annually, or every 2 years depending on the document). This may be a result of the restructuring process at TGL. An updated table of the ESMS related plan status is included below.

Table 6.1: ESAP Related Plans and Review Milestones

Doc.No	Description /Title	Rev.	Type	Issue Date	Doc.Live Cycle (Minimum) / status
TGL-EHS-PLN-04-0004	Jubilee Development - Environmental Management Plan	4	Plan	May 2015	3 years as per environmental certificate duration. Updated
TGL-EHS-POL-001	EHS Policy	1	Policy	Oct 2013	Updated on an as required basis. No amendments.
T-EHS-STD-0008	Environment and Social Performance Standard	0	Standard	Jan 2015	Annually. Updated

Doc.No	Description /Title	Rev.	Type	Issue Date	Doc.Live Cycle (Minimum) / status
TGL-EHS-PLN-04-0006	Jubilee Development - Environmental Monitoring Plan	3	Plan	Nov-12	Annually. Document is currently under review.
TGL-EHS-PLN-04-0008	Waste Management Plan	3	Plan	Oct-13	Annually. Document is currently under review.
TGL-EHS-PLN-04-0010	Jubilee Development – Oil Spill Contingency Plan	4	Plan	Mar 2013	Annually. Document is currently under review.
TGL-EHS-PLN-04-0011	Jubilee Development - Decommissioning and Abandonment Plan	0	Plan	Jun-11	5 years. Will be updated in 2016
TGL-EHS-PLN-04-0013	Integrated EHSS Audit Plan	4	Plan	Jan-14	Reissued annually based on drawn up audit schedule. Document to be reviewed.
TGL-EHS-PRC-04-0040	EHSS Audit Process - SOP	1	Procedure	Oct-14	Annually. No change reported. Will be re-issued for use
TGL-EHS-PRC-04-0045	EHSS Legal Compliance & Evaluation	2	Procedure	Oct-13	Annually. No change reported. Will be re-issued for use
TGL-EHS-PRC-04-0047	EHS Communications Procedure	1	Procedure	Oct-12	Annually. No change reported. Will be re-issued for use
TGL-EHS-PRC-04-0049	Aspects O&T EMP Procedure	1	Procedure	Oct-12	Annually. No change reported. Will be re-issued for use
TGL-EHS-PRC-04-0052	EMS Management Framework Process	2	Procedure	Oct-13	Annually – ISO 14001 EMS Framework Document currently being developed (see note below)
TGL-EHS-PRC-04-0053	EHS Management Review Process	1	Procedure	Oct-12	Annually. No change reported. Will be re-issued for use
TGL-EHS-REG-04-0001	Environmental Aspects Register	3	Procedure	Mar 2015	Annually. Updated and issued for use
TGL-EHS-REG-04-001	Environmental Legal Register	3	Register	Mar 2015	Annually. Updated and currently being re-issued
TGL-EHS-PRC-04-0059	Ionizing Radiation Management Procedure	1	Procedure	Jul-12	Annually. Currently under review
TGL-EHS-PRC-04-0058	NORM Management Plan procedure	0	Plan	n/a	Under development
TGL-EHS-PLN-0-003	Chemical Management Guidelines	0	Plan	Sep-14	Annually. Incorporates previous chemical management plans. Issued for use
TGL-EHS-GUD-04-0002	Biodiversity - Marine mammal and turtles Avoidance guidelines	1	Procedure	Sep 2012	3 years. Currently under review
TGL-EHS-PLN-04-0003	Ghana Incident Management Plan	7	Plan	Jan 2013	1 year renewal
TGL-SP-PLN-02	Public Consultation Disclosure Plan	1	Plan	Oct 13	Plan yet to be finalized
	Other EMS and Social Performance documents	n/a	n/a	n/a	To be developed as and when required

While the IEC note that the majority of plans may not require significant changes, they need to be reviewed within the agreed document review cycle. As outlined by TGL, the Environmental management system plans are currently going through a restructuring process, and will be updated within the year. The TGL approach intends to consolidate existing management plans to simplify and streamline the EMS, while continuing to incorporate the respective monitoring requirements. As such, the ISO 14001 EMS Procedures document is currently being developed, which will integrate all documents related to ISO 14001 Environmental Management System (EMS Framework Document, Environmental Aspect Register, Legal register, compliance evaluation procedure, audit process and plan etc.).

In addition to the EMS upgrade, TGL explained during the site visit that an Operational management System (OMS) is currently being rolled out. The OMS can be seen as a tool aimed at integrating how Tullow/MODEC runs the FPSO in a joint and coordinated manner, and as such is FPSO operations based. Elements of the TGL EMS will support and contribute to the OMS, however, the OMS itself is not intended to replace the EMS but will instead be focused on the management of operational activities and will include some practices and standards for site environmental management onshore and offshore. It will essentially be focused on operations with integrated elements of environmental management for purposes of achieving compliance under TGL permits and the environmental regulatory framework.

6.1.5 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. The MoC will remain an integral part of the TGL ESMS and will be extended to the OMS to be implemented across all TGL operations within 2015.

No environmental MOCs were reportedly implemented by TGL for the period under review.

6.1.6 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 2014) has been carried out in order to identify possible areas for improvement.

The IEC note that, in general, the 2014 AMR has been improved when compared to the 2013 AMR, with additional information incorporated (such as waste handling and final disposal), an improved structure and a noticeable improvement in consistency. Some areas of improvement, in terms of additional information/clarification, have been identified during the 2015 IEC site visit (including Environmental Incident reporting, NOx exceedances and emissions monitoring, waste disposal), and have been outlined in the relevant sections that follow.

6.2 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.

6.2.1 Waste Management

Waste management produced at the Project facilities includes 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, currently under TGL revision.

6.2.1.1 Disposal of Solid Waste from FPSO

A check of the records on garbage collected and sewage water discharged to sea was conducted on board during the FPSO 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 appear to be consistent with EMP requirements. The IEC note that TGL identified a breach of project standards regarding the disposal of food waste to the sea in 2014, due to faulty equipment not macerating food to <25 mm, in line with MARPOL requirements. The issue related to food waste only and was correctly identified and remedied under TGL internal EHS procedures and the WMP.

6.2.1.2 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 Terminal Reports, with data provided to the Gh EPA in monthly reports.

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. The OOC concentration is quantified through measurements on board collected every 150 feet of advancement.

According to both Ghana EPA and EMP requirements in place, low contaminated cuttings and fluids are discharged 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 (see following sections for details). 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 oil on cuttings summary for Jubilee in 2014 is outlined in the table below.

Table 6.2: Jubilee OOC Cuttings Summary for 2014

Well	Rig	Ave OOC%	Cuttings discharge (t)
J24- P	West Leo	2.40	822.86
J46- WI	DrillMax	2.27	629.44
J50- P	DrillMax	2.00	699.57
		Average OOC Jubilee: 2.23%	Total 2,151.87

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 2014, TGL will pay a total of 60,000.00 USD for the Jubilee field drilling operations in 2014.

Combined with the TEN drilling operations, the company recorded an OOC% average of 2.25% in 2014, TGL will pay a total surcharge of USD 120,000.00 in 2014 (as outlined in the AMR 2014). Cuttings continue to be managed in line with the TGL WMP and are treated using a multi stage system managed by MI-Swaco and Brandt prior to discharge.

6.2.1.3 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.

The Company Mi Swaco purchases barite with a test certificate on Mercury and Cadmium content already attached. The annual average of samples results for 2014 show that results are in compliance with the above applicable limits with a sample average of 0.40 mg/kg for Mercury and 0.60mg/kg for cadmium.

6.2.1.4 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 discharging: residual concentration 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.

6.2.1.5 Naturally Occurring Radioactive Materials

The presence of natural occurring radioactive materials (NORM), possibly embedded in the drill cuttings recovered, must be monitored by the Project. Measurements are conducted onboard the FPSO using a Geiger meter. TGL originally planned to develop a naturally occurring radioactive material procedure which has to date not been developed.

In 2014, TGL undertook independent sampling of equipment removed from the FPSO and stored at the Takoradi storage yard (in line with TGL monitoring plan requirements). Based on sampling results, TGL have identified that NORM levels are now required to be managed as part of an ongoing operational management plan. As such a NORM procedure is currently under development, outlining safe handling measures and proper disposal, and will be integrated in the TGL OMS.

6.2.1.6 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 (see following section relevant to the visit conducted at the Zeal facilities).

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 IEC note that during TGL health, safety and environmental (HSE) audits onboard the FPSO in 2014, TGL correctly identified a discrepancy regarding the compilation of the waste manifest form determining final disposal of hazardous waste. The IEC have confirmed that this issue has now been resolved, while the incorrect compilation of the waste manifest form has not resulted in any incorrect disposal of hazardous waste, with all hazardous waste transported to Zeal facilities for treatment in line with the WMP.

The IEC have received the waste tracking matrix which outlines the quantity of waste and the final disposal of both hazardous and non-hazardous wastes. The IEC note that additional information has been included in the 2014 AMR regarding the final destination of waste, however, TGL should clarify the waste disposal table in the AMR to reflect actual practices (i.e. Plastics are recycled and not sent to landfill).

6.2.1.7 Waste Management Contractor in Takoradi

Zeal continues as the principle waste management contractor for TGL in Takoradi. TGL is also considering Zoil Services, as an additional waste treatment contractor located in the vicinity of the Zeal facilities. A visit of the Zeal facilities was conducted by the IEC in order to evaluate waste management performance and identify possible areas of improvement with respect to EMP and WMP requirements.

As was the case in 2014, Zeal facilities were found to be well managed with a high level of housekeeping and adequate pollution prevention measures. The waste management facility in Takoradi continues to be used for:

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

The facility has been recently upgraded with additional mud treatment equipment, and ZEAL are currently looking to initiate a bioremediation Project. TGL undertake an annual audit of Zeal facilities to determine the level of compliance with Tullow procedures and to follow up on Audit recommendations from the previous year.

The main observations of the 2015 IEC visit to Zeal were in relation to the final usage and end of life of the bricks made from the hazardous waste ash, and minor H&S improvements (storage of hazardous waste ash and roofing in the sorting area). TGL is advised to seek clarification on the hazardous ash bricks usage (including ensuring that bricks are not used for residential buildings) and to determine the procedure for

end of life of the bricks (including ongoing verification of the structural quality and the end of life disposal options).

TGL continues to work closely with Zeal to develop methods for the treatment and disposal of all waste streams generated by TGL's operations, compliant with the requirements of the WMP. In 2014, TGL undertook a gap analysis between TGL standards and Zeal and Zoil HSE standards which resulted in the identification of a range of potential improvements. Training is currently ongoing for EHS aspects identified during the assessment (working in confined space training was ongoing at the time of the visit).

6.2.2 Waste Water Management

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

- produced water (from crude oil treatment at 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.

6.2.2.1 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 analyzer 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 onboard. Some exceedances of Tullow limits of oil in water (OIW) content from produced water were reported for 2014, however, the monthly average EPA and IFC discharge limit was met throughout the year. As outlined in the AMR (figure 12), Tullow exceedances appear to have been recorded in OIW discharge in February 2014 (where OIW content over a 30 day average should not exceed 29 mg/L according to IFC requirements). The IEC have reviewed the raw data from the FPSO OIW readings for January and February 2014 and confirm that daily OIW levels do not exceed the maximum daily level (maximum levels are as per IFC requirements of 42mg/L), with the highest recorded OIW reading over the two months noted to be 28mg/L. Taken over 2014, the average monthly OIW levels fall back to within the IFC limit of 29 mg/L (an average of 22.39 mg/L per month is reported for 2014).

6.2.2.2 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 analyzed on board, while presence of floating solids and discoloration is conducted visually by the on board personnel. A spot check of the collected records has been conducted during the visit at the FPSO and no exceedances are reported.

6.2.2.3 Deck Drainage, Bilge Water and Ballast Water

All three waste water streams are collected on board and conveyed to a retention tank, connected with an Oil Water Separator (OWS) unit. Monitoring of effluent wastewater quality is conducted through an automatic online analyzer 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.

As reported in 6.2.2.1, a few exceedances in OIW discharge limits were reported in the period under review for produced water. The IEC requested and reviewed FPSO monthly environmental monitoring reports, where no exceedances of maximum ppm levels of OIW were identified for bilge water and ballast water in 2014, however, the monitoring team suggests TGL provide additional information regarding OIW levels from deck drainage, bilge and ballast water in the AMR.

6.2.2.4 Well completion and work over fluids

This waste water stream mainly consists of oily water with Calcium Chloride used for well testing and clean up. According to EMP requirements oil in water content has to be checked prior to discharge (same reference limits set for produced water, plus pH in the 6-9 range). This stream is continually analyzed on board the FPSO through an automatic online analyzer prior to discharge. In the event of exceedances it is collected and disposed of at the Zeal waste facility, where it is treated through the oily water treatment unit. Logs of quantities and chemical tests are correctly collected by the Project and have been viewed by the monitoring team during the site visit. Monthly drill rig reports and terminal well reports are submitted to the Gh EPA, with no environmental related incidents reported.

6.2.2.5 Spills

There were 3 TGL identified significant environmental incidents reported in 2014, consisting of 2 gas release incidents and 1 spill event to the environment. On the 08/08/2014 approximately 108 liters of water based hydraulic fluid was discharged to the sea after a BOP control system hose failed. A report was submitted to the EPA and the investigation findings and closeout provided to the IEC, which show that the incident was largely the result of equipment failure. Correct procedures were followed to limit the loss of fluid once the leak was identified, and corrective measures have been implemented. In December of 2014, 2 gas release incidents were reported, however, the releases were quickly contained and the quantity of gas released did not require an incident report to be submitted to the Gh EPA. The IEC have reviewed the incident reports and note that in both instances the root cause of the incidents were maintenance issues and equipment failure, but also inadequate work planning and lack of policies and procedures. The IEC note that actions have been taken as a result of the incidents, including the replacement of equipment and the training of personnel in the correct implementation methods, including increased training of workers on types and operations of PSVs.

As outlined by the IEC in the site visit report of 2014, the AMR still does not provide sufficient information to distinguish between environmental spills and environmental harm incidents. According to the AMR, a total of 15 environmental releases were recorded which are classified as environmental harm incidents. According to TGL, environmental harm refers to any leak or spill that has impacted on the environment, while spills/flammes/leaks refer to environmental incidents that have not had an impact on the environment (near misses or confined leaks). The IEC suggests that TGL provide additional details on environmental incident reporting in the AMR, including outlining what constitutes an environmental harm incident, and recorded environmental spills/flammes/leaks, to better clarify how these incidents are then categorized in the severity matrix.

6.2.2.6 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 and chemical storage area and note 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. No issues are reported.

6.2.3 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.

6.2.3.1 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. 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 722,947.40 tonnes of CO₂ equivalent (tCO₂ eq) in 2014. The following table shows the GHG emissions from various sources within TGL operations for 2014.

Table 6.3: Total GHG Emissions from TGL activities in 2014

	FPSO Production Operations (include aviation and marine) Total tCO₂ eq	Rig Operations Total tCO₂ eq	TGL Total tCO₂ eq
GHG Emissions 2014	676,022.50	46,924.83	722,947.40

The total tCO₂ eq GHGs in 2014 have increased by more than 10% when compared to the tCO₂ eq of 2013. The increase in GHGs for the period under review can be attributed to the increase in flaring undertaken across a 5 month period in 2014 onboard the FPSO. Permission was granted to TGL from the Gh EPA to undertake abnormal flaring due to the limited reservoir capacity for reinjection and the delay in the Ghana Gas plant. The abnormal flaring ceased at the end of October 2014, coinciding with the Gas Plant becoming operational.

The Project carries out a stack and fugitive emission campaign on an annual basis. In 2014, two independent stack emission monitoring campaigns were carried out by SGS Ghana at the FPSO, the first in August and the second in December 2014. Emission levels from the Gas Turbine Generators (GTGs), Deck Boilers (formally known as the Emergency Boilers), Port Side Crane and Starboard Crane were assessed. The sampling included the measurement of O₂, CO, NO, NO₂, NO_x, CO₂, SO₂, CH₄ and VOCs and fugitive sources, where visible emissions were noted.

Based on results provided to the IEC, NO_x exceedances were reported at GTG A (75mg/Nm³) and at GTG B (113mg/Nm³) versus a reference limit of 51 mg/Nm³ (IFC applicable guidelines) in December, while no exceedances at these GTGs were reported in August. GTG C registered a slight NO_x exceedance of IFC limits in August, but was within limits in December. Both studies have been disclosed to the Gh EPA, with a summary of results included in last AMR.

TGL state in the AMR that at the time the monitoring was undertaken (in August and December), all three GTGs were each running at about 35% load. Based on this, it is not clear to the IEC why there are significant differences between the August and December readings of NO_x at GTG A and B. GTG C results from the 2 monitoring campaigns appear to reflect a constant load, however, without additional clarification, it is difficult to determine why there are vast differences if the GTGs were in fact operating at the same load. The IEC note in the SGS external reports that the sample points at GTG A, B and C could not be used during the August 2014 monitoring campaign, while in December sampling was undertaken at the designated sampling points (with the aid of a pump). Sampling in August was undertaken from fugitive sources and could therefore have influenced the readings. As the December samples were undertaken at the sampling points used in previous years, the results of the December monitoring would likely reflect the actual emissions levels to be used for comparison with previous years (which appear to be more in line with results provided for previous years). TGL have also clarified that the variation in NO_x measurements for August 2014 in comparison to December 2014 could possibly be attributable to fuel type (diesel or gas) in use at the time of the testing.

Exceedances of NO_x have been consistently detected at the GTGs over the past 3 years of monitoring. During the IEC site visit in 2014, TGL were asked to verify manufacturer design specifications to determine normal operating emission levels to determine whether the Generators were functioning within the foreseen limits. During the 2015 IEC visit, TGL presented the design specifications of the GTGs to the IEC, which shows that the Generators are functioning within their limits, even though they exceed IFC emission limits for NO_x on occasion. In addition, TGL have looked into performance improvements in offshore gas turbines and dry low emission (DLE) combustors to determine the best technology available for the Jubilee and TEN project. A study undertaken by Oil and Gas UK in October 2014 was also used by TGL. As reported by TGL, replacing and retrofitting of the GTGs with currently available technology would provide limited value, as DLE technology has not proven to be worth the expense in terms of NO_x reductions achievable on turbines. Although emission levels of NO_x appear to regularly exceed IFC levels, TGL conclude that NO_x is not a EHS problem on the FPSO, a claim supported by the ambient air survey results undertaken onboard the FPSO in 2014 which indicates that the upwind and downwind sampling locations are well within World Health Organisation (WHO) and Gh EPA limits. As a result, the use of DLE technology is not being considered for the FPSO as yet, however, TGL continue to assess potential improvement options on stack emissions in collaboration with the TEN project. The monitoring team suggest that TGL provide additional information in the AMR to ensure that exceedances and resulting TGL actions and supporting surveys provide a more complete overview of the actual situation.

6.2.3.1 Flaring

Based on the TGL EMPs and agreements defined by the Gh EPA, flare use is limited to discharges in case of process upsets and in case of maintenance of equipment/tanks. As discussed in previous IEC reports, the Project operates on a maximum flaring volume equal to 2.5% of total production, which was reflected in the operational permit by the Gh EPA. The Project has regularly exceeded this flaring rate over the last 2 years, largely due to maintenance, shutdowns and plant upsets, and due to the delay in the Ghana gas processing plant. As such, the Project was issued with an amendment/variation to the original environmental certificate on the 24th May 2013, outlining “No production flaring of associated gas when the gas infrastructure project in the western region is complete and operational”.

As discussed previously and outlined in the AMR, TGL were authorized by the Gh EPA to undertake abnormal flaring of 500 million standard cubic feet (MMscf) per month for a 5 month period in 2014 (from June to October as outlined in the figure below) due to gas disposal constraints and in order to maintain production levels. As outlined in the AMR, flaring levels fell back to within previous level after the 5 month period ended, and at the time of the IEC visit, flaring rates were 1.5 MMscf per day (or roughly 0.8 - 1% of production values), estimated by TGL to represent a standard daily flaring figure based on normal operating conditions.

Flaring will remain a constant aspect of the Project, with TGL estimating (based on process efficiency historical levels) that 5.5 % of gas produced per month will need to be flared. During the site visit, the IEC were informed that TGL planned to apply to the Gh EPA to increase the flaring limit with the renewal of the environmental permit (due to expire at the end of May 2015). After the site visit, TGL informed the IEC that the Project had not sought to increase the flaring limit as originally planned and had instead accepted a revised flaring limit of production of 3% (up from 2.5%). The IEC expect the Project to amend the relevant EMPs, procedures and monitoring plans and implement EHS mitigations as appropriate considering the environmental permit conditions and the 3% flaring of production permitted by the Gh EPA.

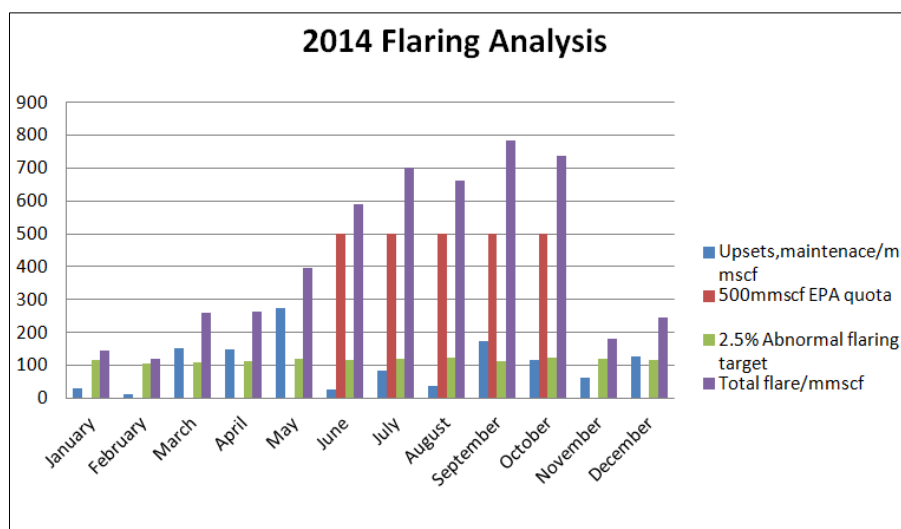


Figure 6.2: Production Operations Flaring Trends 2014

6.2.3.2 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 NO_x, NO₂, SO₂ and VOCs at either end of the FPSO, downwind and upwind of the vessel and at the Shore Base and Port Facilities. As part of the abnormal flaring campaign, the EPA required that TGL undertake an additional ambient air quality survey in the frontline coastal districts of Ghana, and to implement an education and awareness campaign (see section 6.4.2. for additional information on the campaign). Tullow undertook an occupational exposure assessment onboard the FPSO and an emissions dispersion evaluation to determine the likelihood of emissions reaching communities on the coast. Based on the data provided from the survey undertaken from 1st - 30th June 2014, the results show that NO_x and SO₂ are well below WHO and Ghana EPA limits, while O₂ levels over the same period were slightly above the WHO limits at the GTGs but within US EPA limits.

TGL assigned an independent consultant to undertake a flaring modelling study on the FPSO in February 2014. The modeling was based on 20, 40 and 80 MMscf per day flaring emission scenarios, and considered emissions of NO₂ and CO based on the composition of the Jubilee gas. The outcomes of the modelling shows that the concentrations of NO₂ and CO from flaring at the Jubilee FPSO for each scenario is very low, and that for all three flaring scenarios, the contributions for both NO₂ and CO for a 1-hour and annual period (average) are lower than 1% of their respective WHO criteria. As modelled emission concentrations were all attenuated offshore within 5 - 10 km radius with no predicted landfall, the EPA accepted to waive this requirement as part of the abnormal flaring, while the education and community engagement was carried out.

The IEC were informed of some worker complaints due to the heat in areas in the vicinity of the flare on the FPSO during the abnormal flaring period, and were informed that temporary mitigations were established including shielding workers, increased hydration efforts and reduced exposure times.

While offshore ambient air monitoring was undertaken in 2014 at the FPSO, no ambient air quality monitoring was undertaken at onshore TGL locations. This is a contradiction of the existing TGL monitoring plan and EMP requirements and was incorrectly reported in the AMR as being carried out in 2014. While data shows that ambient air quality monitoring results of recent years at the Accra office, Takoradi storage yard and the Takoradi staff house were within EPA and IFC limits, this is an annual requirement to be reported in the AMR to the lenders and needs to be undertaken. As such, 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 reflects only surveys that were actually undertaken. Post site visit, the IEC were informed that the Monitoring Plan has now been amended to outline that ambient air quality monitoring will continue to be conducted in Takoradi and offshore installations (where operational activities occur), while the Accra office is not required to undergo ambient air quality monitoring on a regular basis.

6.2.4 Chemical Management

During the IEC visit in 2014, existing TGL Chemical management EMPs were being integrated into a single overarching TGL Chemical Management Guideline (TGL-EHS-GUD-EN-0001). During the 2015 site visit, the above mentioned document was still being integrated with the existing EMPs.

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 the storage of some chemicals on deck in a makeshift storage area/workspace, which was identified by the offshore installation manager (OIM) as a temporary chemical laboratory workspace, as the current laboratory is at capacity. TGL plans are in place for the expansion of the existing laboratory (anticipated to be completed in the coming months). No spills were evident, and secondary containment and spill response material is located in the immediate vicinity.

The Shore Base pipe yard and chemical storage area has been expanded to incorporate additional warehouses (also for the TEN project) and was observed to be well organized with sufficient secondary containment, segregation and spill response equipment. The Baker Hughes chemical storage area at Takoradi port was observed to be well managed with hazardous material labeling 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 pose a potential H&S issue for the contractor (discussed further in section 6.3).

6.2.5 Ecology

The components of ecology monitoring is embedded in the Ecology monitoring requirements. During the site visit, the monitoring team were provided with information regarding:

- the monitoring of marine avifauna at the FPSO;
- the marine mega fauna monitoring; and
- the outcomes of the Ghana Ministerial Subcommittee regarding the incidence of mortality of Cetaceans in Ghana's waters (August 2014).

The TGL marine mammal observer (MMO) programme remains in place. The IEC were provided with the Marine Mammal and Turtle Observations report, produced by Gardline for 2014, which includes the incidental sightings of marine animals collected by TGL personnel on-board security vessels during offshore operations at and on route to the Jubilee and TEN field. A total of 186 sightings of marine animals were recorded by MMOs, and 164 sightings recorded by TGL personnel, which were then verified by experienced professionals. The IEC were informed that the MMO is present during seismic surveys and

some crew members are trained as observers to report any sightings on the FPSO and vessels, however, no dedicated MMO is on-board the security vessels.

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 abnormal flaring period undertaken in 2014.

As outlined in the 2013 AMR and the IEC report of 2014, an unusually high number of whale carcasses washed up on beaches in Ghana in late 2013 / early 2014. Initial blame was centered on the oil and gas industry and a study was undertaken in 2014 by the EPA to determine the likely causes of the increased mortality rates. The resulting study outlines that there are a range of contributing factors, and that while the oil and gas industry do not appear to be responsible for the increase in mortality rates, the oil and gas activity in the Jubilee field might have contributed slightly to the increasing traffic call at Takoradi port, and that increased maritime traffic could increase the risk of ship strikes. An increase in seismic activities was also suggested by concerned parties as a potential cause, however, the EPA outlined that no seismic surveys are undertaken without a permit from the EPA and that seismic activities should be undertaken outside of the peak migration period. A range of recommendations have been outlined in the final EPA report, including increased collaboration and satellite tracking to reduce the potential for ship strikes. The amendment of Regulations under the Maritime Transport regime to ensure protection of cetaceans from ship strikes was also suggested as an outcome of the report.

6.2.6 Noise

Environmental Noise Monitoring is a requirement of the TGL environmental monitoring plan both at the FPSO (at increasing distances from the vessel till 5nm) and at the onshore Project facilities, to be carried out biannually at the FPSO and shore bases.

A noise survey was carried out on the FPSO in June 2014 to assess the level of occupational health noise exposure levels, in order to develop control measures to minimize effects on personnel. As outlined in the AMR, the monitoring was undertaken as a result of the approval given to Tullow to conduct abnormal flaring of 500 MMscf per month. While OHS noise measurements were undertaken onboard the FPSO, the TGL monitoring plan requires that Environmental noise must be monitored at the FPSO, at 500m and 5nm downwind and upwind from the FPSO (at the exclusion and advisory zone boundaries). The IEC note that noise surveys were not carried out in accordance with the TGL monitoring plan. This is a repeat finding as per the IEC site visit in 2014. The IEC were informed post site visit that the TGL environmental monitoring plan is currently under review, and the revised version will remove the environmental noise monitoring requirement at the FPSO (mentioned above), given the project distance from receptors. OHS noise monitoring will continue on the FPSO as planned.

No noise survey was carried out at the TGL shore base in Takoradi during the period in review. TGL monitoring plan requires that noise monitoring surveys are carried out in Takoradi on a biannual basis. As no monitoring was undertaken during 2013, monitoring should have been undertaken in 2014. TGL to carry out noise monitoring as required in the TGL environmental monitoring plan, and include outcomes in the AMR.

6.3 HEALTH & SAFETY COMPONENTS

6.3.1 General

The main scope of this review was to verify if all 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 each H&S requirement related records collected for the period under review including amongst others:

- Updating in 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 rescue 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
- 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. The following activities were carried out:

- Operational review
- Independent Competent Body (ICB) review of existing offshore safety case (OSC)
- Review of Formal Safety Assessment (FSAs)
- Update of OSC Content

The ICB is a contracted third party used to guarantee the prevention conflict of interest when reviewing the OSC, verifying the assumptions and judgments and determining recommendations for TGL to consider.

6.3.2 Update of Occupational H&S

The TGL and MODEC Safety Management system remains adequate and effectively maintained for the control of all H&S occupational risks.

TGL management commitment towards safety has been observed during the site visit and via discussions with TGL and their main contractors. The PTW remains in place and continues to be an effective measure to ensure that operations are carried out in a safe, controlled and coordinated manner. Each 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 achieve minimization of related risks.

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

- ZETL (Zeal Environmental Technologies Limited) facilities
- Tullow pier at Takoradi harbour
- Takoradi Port FPSO Chemical Support Facility managed by Baker Hughes

Any person arriving at Tullow facilities, in Accra or at the Takoradi base, is duly informed about safety precautions on site. Comprehensive induction slides are available and clearly explained by skilled personnel.

People arriving on board the FPSO are informed about the ship characteristics by means of an induction video, which is quite comprehensive and clear. However, it is overly long and not focused specifically on aspects that a new arrival onboard would need to know as a matter of H&S priority. The IEC suggest TGL provide a shorter H&S induction video or a number of slides to be shown to any persons arriving on board, focusing only on the main safety issues. Furthermore, it would be also advisable to show some key words to enable people to better memorize them. According to the information received, this improvement is already being assessed by TGL and modifications are to be implemented within 2015.

Over the last year, TGL personnel have been subject to a significant turnover. Accordingly, the training matrix was requested by the IEC to determine whether a proper schedule had been implemented, in particular for new employees. It was reported that the reduction of personnel, still in progress, does not involve key employees acting in safety or technical roles. Based on a review of the Matrix for TGL staff, the IEC confirm that training commitments have been incorporated and are well defined for 2015. TGL should ensure that the reassessment of personnel in the restructuring process is monitored until its completion, with the aim of verifying that safety aspects are not negatively impacted as a result of the reorganization.

A “walkthrough” on the FPSO has been carried out during the IEC visit, in order to examine the workplace conditions and to verify standards of housekeeping, safe access and fire safety precautions. Based on observations, it was found that appropriate PPE was correctly worn by all operators in the visited sites. Furthermore, 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.).

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.

Emergency escape routes and muster points are clearly marked and kept free of obstructions at all times, and limits of PPE free areas are clearly marked outside accommodation areas.

Medical and Hygiene reports are issued every week by the doctor.

The FPSO crew (which includes MODEC and contractors) is managed directly by MODEC onboard. TGL staff are few, and are limited to the OIM and a couple of other key roles that are employed directly by TGL.

HSE procedures on board the FPSO are mainly issued and managed by MODEC. Some procedures, such as the Emergency Response Plan, are issued by TGL and adopted also by MODEC personnel. MODEC have specific plans and procedures that are periodically submitted to TGL and reviewed for approval, and include reference and referral to the corresponding TGL procedures to ensure that the TGL requirements remain part of the contractor's procedure. The IEC note that the MODEC procedures are kept up to date, while reference to TGL documents needs to be updated to ensure that the FPSO are referring back to the most recent version of the TGL procedure. The IEC recommend that MODEC review and update their procedural documents at least once a year and refer to the most recent TGL procedures. Generally, it would be advisable to review at least once a year both TGL and contractors procedures. According to the information received, to avoid possible misunderstanding or discrepancies between MODEC and TGL

documents, MODEC procedures shall be implemented in the TGL Safety Management System within 2015.

In 2014 additional IMO Oil Spill Response training has been provided for personnel involved in the following activities, in particular:

- IMO Level II Oil Spill response, regarding in particular mid-level personnel within Tullow staff in Accra and Takoradi.
- IMO Level III Oil Spill response, regarding in particular top level management who provide high level strategy and direction for spill situations.

The training programs, including but not limited to the above mentioned ones, are continuing from 2011.

Currently, six ships are 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. Usually people are not transferred to and from the FPSO by ship, however, in case of any contingency, this crew vessel has the possibility to accommodate or rescue 60 passengers. Another of these supply vessels is also equipped with ROV. Personnel working on vessels chartered for marine operations and supply are completely managed by contractors, except for the patrol vessels and ROV vessels where TGL personnel are directly responsible.

TGL undertook day time noise surveys onboard the FPSO in June 2014 as part of the increased flaring. Noise levels were measured in a variety of working areas on the FPSO. The results indicated that the majority of the average values were slightly higher than the IFC recommended value for industrial areas, 70 dB(A). Some additional temporary mitigation measures were implemented by TGL throughout the increased flaring period. Should flaring noise levels continue to be an issue, especially with TGL applying to the EPA for additional flaring levels, permanent mitigations should be incorporated in standard operating procedures to ensure that all the personnel are provided with sufficient PPE.

At Takoradi Harbor, TGL has a dedicated area of the jetty for cargo operations. All those involved in loading and unloading operations have the necessary safety equipment and follow TGL HSE procedures, including Takoradi Harbor stevedores contracted directly by TGL. Load cells are provided to check the actual weight of any supply to and from the FPSO. A separate area is also available for maintenance of subsea equipment and for the construction of structures dedicated to TEN project.

The Baker Hughes warehouse is located close to the TGL jetty area. All personnel are provided with suitable PPE, Fire extinguisher and other H&S equipment, such as eye wash basins, are located in close proximity to hazardous storage areas. A high quantity of dust was observed at the facility, mostly coming from adjacent port facilities. Post site visit, the IEC were provided with an OHS process outlining the steps to be taken in the event of lime/clinker vessel offloading at the port, which does not allow contractors to work during periods of high dust. While the procedure is in place, the IEC were informed that it is not always possible for contractors to leave the premises during vessel unloading, and even though personnel are provided with PPE, it would be advisable to protect the building from dust, as reasonably as possible, to improve air quality.

At the Zeal waste facilities, all personnel are provided with satisfactory safety equipment. Areas where personnel are in contact with hazardous wastes are provided with first aid boxes and other means of safety equipment (including fire extinguishers, wash down stations etc.). An incinerator is continuously operated at the facility. The levels of emissions are monitored every hour. It was noticed during the visit that waste ashes are stored inside the main storage building without any cover. Even if the personnel are provided with the required PPE, it would be advisable to enclose the ashes to avoid their presence in the air around the facility.

With reference in particular to Zeal and Baker Hughes facilities, where people work close to hazardous materials, details were requested by the IEC regarding medical checks and health reports. The main guidelines dedicated to these issues are:

- T-EHS-PRO-0013 - Tullow Oil plc Medical Fitness to Work Procedure
- T-EHS-SPE-0004 Tullow Oil plc Medical Fitness to Work Specifications

On the basis of the information received, TGL Medical procedures appear to be in line with the guidelines issued by Tullow.

According to the information received, all the personnel managed by contractors, in this case MODEC, Zeal and Baker Hughes, are subject to periodical medical checks. These checks are managed by the contractors and include in particular personnel exposed to chemical hazards. It would be advisable for contractors to make Tullow aware of this activity, in particular when working at TGL facilities. Details of main contractor medical checks should be included in the TGL audit process and reported accordingly.

Information was requested concerning contractors employees health monitoring. The above mentioned medical guidelines include some recommendations regarding contractors' personnel. The purpose of the above procedures is to establish a consistent approach to health assessments and their outcome for medical fitness to work across all Tullow assets. It will ensure that risk based criteria are set for the health assessment for all personnel and direct-hired contractors. All direct-hired contractors shall follow Tullow standard as a minimum for medical fitness to work. It would be advisable to incorporate additional details regarding contractors' health management, in particular a procedure to assess the way to verify this process and an audit system to report on contractors medical checks. The aim of this improvement is to require contractors' employees to fall in line with the health and safety requirements outlined for TGL employees.

6.3.3 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 compliance with targets set for 2014);
- Jubilee safety case review and update was completed;
- Jubilee FPSO HAZOP Programme was completed;
- Asset integrity audit was completed was performed;

As outlined previously, during 2014 Tullow Oil restructured its approach to the management of HSE and External Affairs by bringing together the two separate functions into the SSEA. At the time of the site visit, the process of updating relevant H&S plans and procedures was underway, with the review and implementation process expected to be completed within 2015.

Tullow have completed 100% investigations for all high potential incidents and lost time incidents (LTI) recorded in 2014. The LTI Frequency reduced by a total of 27.5% when compared to records from 2013.

As outlined in the IEC report of 2014, a new risk matrix was issued by TGL to achieve a better differentiation among major hazard events with varying severities. As such, the major hazard and the number of severity and frequency levels were increased from the original matrix of five to seven. Accordingly, the IEC expected to find the EHS Performance for 2014 reported on the basis of the above mentioned matrix. The last AMR, issued in March 2015, continues to classify EHS statistics in five levels of actual and potential severity. As the IEC suggested in our last report, the fifth level of the old risk matrix may not be sufficient for addressing major hazards. As outlined by TGL, the 7x7 risk matrix has not been implemented as it was evaluated as being unsuitable for TGL minor procedures, while the 5x5 was considered to be easier to manage. On the basis of these observations, a 5x5 risk matrix could be considered acceptable for simple operations involving a limited number of people, however it would be advisable to implement the expanded risk matrix for major procedures and KPI classification.

6.3.4 Safety Critical Elements

As part of the revision of the Safety Case, SCEs and performance standard identification has been revised to reflect current Tullow corporate guidance, and to take into account the latest major hazard identification

as a result of the review of the FSA (SCEs are considered the most important items of equipment, procedures or activities for managing risk related to FPSO operations and to reduce the risk to ALARP).

The Jubilee Safety Case Structure is composed by the following steps:

- Introduction & Management Summary
- EHS Management System Description (including Gap Analysis on TULLOW & MODEC EHS-MS)
- Facility Description
- FSA and Hazard /Effects Analysis
- Management of Safety Critical Elements
- Safety Case Maintenance Activity/Action Register
- Conclusions & Approval

The EHS Management System is composed by policies and procedures both from TGL and MODEC, in particular

- Tullow EHS-MS includes:
 - Group Level Policy Standards, Procedures and Practices
 - Country Operations processes
- MODEC EHS includes:
 - Corporate HSEQ policy
 - HSE Standards
 - Corporate HSEQ MS
 - Worksite Management System

On the basis of the above, the Jubilee EHS-MS Tullow-MODEC Interface is managed as follows:

- Group Level Tullow policy standards, procedures and practices
- Country Level processes established by MODEC
- Tullow provides overall responsibility for implementation of EHS-MS while MODEC provides safe systems of work

The following graph outlines the Management of SCEs.

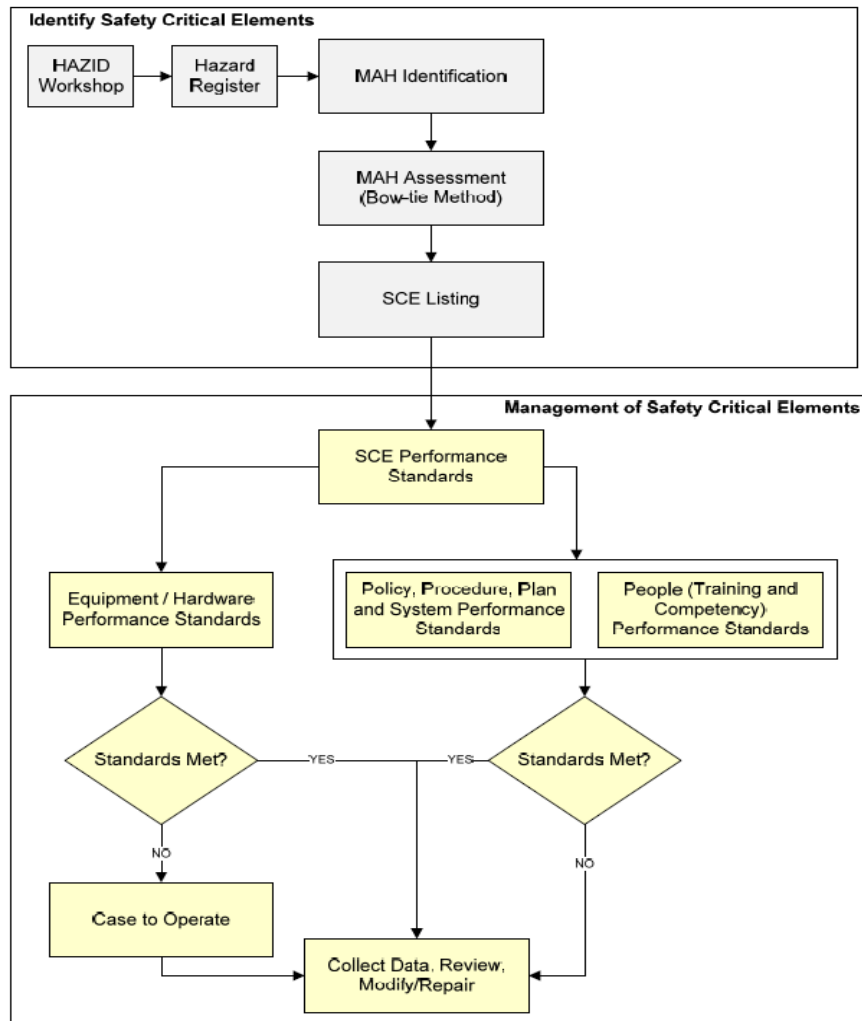


Figure 6.3: Safety Critical Elements flow chart

Tullow EHS Standards are composed by 14 different items that cover all the necessary subjects.

As far as the FSA & Hazard/Effects Analysis is concerned, the aim of the review was to:

- Review all Safety Assessments performed to identify credible hazardous scenarios; consequences and measures in place to control risks to ALARP;
- Improve ALARP demonstration;
- Revisit all FSA assumptions & judgments;
- Improve adherence to MOC processes;
- Revisit SCE performance standards;
- Review Maintenance Tasks.

The FSA review carried out in 2014 was composed by six steps, with the last step in the process being the ALARP justification. An ALARP workshop is carried out for all identified major accident events where the cost of improvement has been used as a consideration. As duty holder, Tullow implements recommendations and has determined, through reasoned and supported arguments, that there is nothing else that can reasonably be done to reduce risk further.

The ALARP review carried out in 2014 included:

- ALARP workshop - held to establish those MAHs whose risks were found to exceed Tullow risk tolerance criteria;
- Evaluation of each MAH to confirm what risk reduction measures (RRMs) were in place to prevent, detect or mitigate;
- Proposal of additional RRM where existing RRM were considered insufficient (RRMs were considered reasonably practicable when either the cost or sacrifice required to implement is not grossly disproportionate to the benefit gained).

6.3.5 Auditing

The TGL H&S auditing program continues to be effectively implemented in accordance with Company procedures at the client (TGL) and corporate (MODEC) levels. The IEC viewed a sample of recent audits undertaken in 2014 including the following.

- LRQA TGL Audit 201-5 Report. The purpose of this audit was to assess the ongoing conformance of the management system to ISO14001:2004, to assess progress made in respect of non-conformities outstanding from the previous assessment visit and to plan for the forthcoming certificate renewal assessment. Reportedly, all non-conformities from the previous assessment were closed and only one new minor non-conformity was raised. Based on the evidence sampled, Tullow Ghana Ltd demonstrated that it has maintained an environmental management system in conformance with ISO14001:2004.
- FPSO MV21 EHS Compliance Audit Report. The EHS Audit of the FPSO was conducted by viewing the installation as an integrated functional unit comprising the vessel operations and maintenance contractor (MODEC), TGL and Production Chemicals Supplier, Baker Hughes. The functional departments audited included Marine, Vessel Maintenance and Production Operations.

In addition, FPSO operational audits remain in place, 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;
- Internal weekly audits are carried out on the FPSO, 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 CAR register.

6.3.6 Training Activities

Extensive training activities have been carried out for all H&S issues in the period under review. Specifically:

- Incident Investigation training has been completed. The first tier aims at covering basics of Incident Investigation and Root Cause Analysis. The second tier aims at developing a level of master or advanced skills in investigation techniques and in particular on identification and analysis of root cause. Second tier was implemented in 2013 and continued in 2014.
- as stated in the 2014 Annual Monitoring Report, project personnel have been trained in health and safety matters including accident prevention, safe lifting practices, safe chemical handling practices, proper control and maintenance of equipment and facilities, emergency response, PPE, emergency response, etc.;
- all contractor and Tullow staff offshore underwent external and internal training to ensure they meet the competency level required for their various roles as per the training Matrix.

6.3.7 Oil Spill Response Plan Specific Training

The following onshore training was carried out in 2014:

- Oil Spill Awareness training;
- Yard and Vehicle Spill Kit Training;
- Utility Terrain Vehicle Training;
- New Tier 1 Stockpile Training;
- Harbour response Training - IMO 1 Refresher.

The above training was required to achieve basic objectives for personnel, such as understanding the required PPE, to become familiar with oil spill kits, to understand how to respond to a Tier 1 spill, 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 2014 AMR.

6.3.8 Incident Investigation

Safety Events (incidents, near misses) are properly recorded and analyzed, on the basis of the TGL emergency preparedness and incident management plan. MODEC continues to use their MODEC incident Management System (MIMS) for internal recording and investigation of incidents and near misses that occur on the FPSO, however, the incident response system on the FPSO migrated to the Tullow system (the EMEX EHS system) in 2014. The FPSO system is fully in accordance with the TGL procedure and includes an overview of the incident/near miss and an incident/near miss investigation report. The inclusion of the FPSO in the EMEX system is part of the review and implementation process of the TGL OMS.

Accident and incident statistics are properly collected and maintained and TGL undertake an audit of the implementation of the management system in place on the FPSO on an annual basis. The IEC note that while MODEC maintain up to date management procedures regarding incident and injury reporting, their procedures make reference to outdated TGL documents and need to be amended to reference the latest version of the plans.

In order to verify full compliance with the accident and near miss procedure during the period under examination, the IEC checked some of the incident immediate and root cause outcomes during the site visit on the FPSO. Of the EMEX incidents reviewed onboard, 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.

6.3.9 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 modeling with oil fate and environmental prediction for a number of spill simulations, using a computer model with ability to input local current and wind 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 OMS rollout (rev.5 of the OSCP is to be undertaken within 2015).

6.3.10 Emergency Drills

The Annual Major emergency exercise drill (Oscar) was carried out on 10th and 11th November 2014. The considered scenario was a major oil spill from the FPSO while receiving a tanker. During the first day the exercise was focused on the Offshore response, while on the second day it was focused on a real time Shoreline response to test the efficiency and effectiveness of the various departmental groups within TGL. The scenario included the Incident Management Team (IMT) in Accra and the Logistic Support Team (LST) in Takoradi. The outcomes of the drill resulted in a range of observations and recommendations,

including the amendment of procedures, the need for increased training in some areas, and efficiency improvements to be shared among the relevant teams. The IEC note that the exercise was carried out successfully with the observation report outlining a host of recommendations (28 in total) and improvements to ensure that the response system is kept up to date and in line with Project requirements in the event of an actual response situation.

Regarding drills on the FPSO, the IEC have received examples of training drills and emergency response simulations undertaken by MODEC in 2014 and early 2015. Of the drill reports received, the emergency scenarios range from smoke and chemical spills to vessel collisions. The drill reports are well set out and the IEC note that drills were effectively undertaken and suggestions for improvement identified where necessary.

6.3.11 Key Performance Indicators

KPIs were analyzed and discussed on the basis of the available data included in the last AMR issued in March 2015. No incidents at the two highest levels, Major and Catastrophic, were reported. However, some of the reported incidents have a Potential Severity at Major and Catastrophic levels. According to the information received, a detailed investigation has been carried out and appropriate measures to prevent similar occurrence are identified. From the examination of the results of monthly and yearly reports, it clearly appears that the target KPI's have been mostly fulfilled in 2014. However, On the basis of the KPIs reported in the above mentioned AMR, the frequency and the severity of reported injuries is higher for contractor employees than for TGL employees. It has to be noted that the relevant data presented in the AMR includes also reporting from the TEN project. On the basis of the above mentioned data, TGL are suggested to provide additional support for contractors to increase their H&S standards, with the aim to achieve the same results of TGL. Furthermore, it would also be suggested to split Jubilee and TEN data for next AMR report, to better identify the involved contractors.

6.4 SOCIAL COMPONENTS

Documents produced since the last Independent Monitoring visit include: i) a PCDP Non-Technical Summary for communities, dated February 2015; ii) material for conducting the Community Engagement Campaign for Gas Management; iii) a Report on the Community Engagement Campaign for Gas Management. No changes are reported to the 2013-2014 Social Investment Strategy nor to the Monitoring & Evaluation (M&E) Plan.

As mentioned in the previous Independent Monitoring Reports, no social action is contained in the EMP; the PCDP (2010 and updated as April 2014, including the Non-Technical Summary for communities produced in February 2015) constitutes the Project social management plan and has been prepared in accordance with Gh EPA and IFC requirements and international best practice. It adequately illustrates its purposes and specific objectives, identifies stakeholders and their roles at different levels and highlights tools to be used for communication and interaction.

The PCDP is considered a “living” document requiring periodical updates to reflect changes in the industry and lessons learned. Updates are exclusively a Gh EPA regulatory requirement; therefore, in terms of ESAP, no further plan/update is needed.

The revision of the PCDP produced in April 2014: i) takes account of the situation on the ground and of developments in the industry, ii) reflects the new SI approach to social engagement and investments, iii) provides an updated and detailed list of stakeholders; iv) highlights elements stakeholders would like to see disclosed. As suggested in the past monitoring report, the SI team correctly prepared a Non-Technical Summary to make the document more user-friendly for communities' members. It is unclear why the date of delivery of this document is February 2015 if it has been used during all 2014 for the Jubilee, the TEN and the Gas flaring engagements. This document represents more an internal guideline for the SP Team; it has not been provided to stakeholders.

It is suggested to: i) edit (revise if necessary) the current PCDP, the SI and the M&E plan to align content; ii) edit the NTS and ensure it is available at the CLOs offices for consultation by interested people. Ideally, in addition to disclosure at community level, the PCDP, as well as the Gas Management campaign information material, could have been disclosed on EPA and eventually TGL websites.

6.4.1 TGL Social Performance Strategy

Oil and gas industry developments in Ghana require TGL to maintain and strengthen its position as a trusted operator and partner for the Government of Ghana. This is achieved by conducting operations to industry best practice, in a socially and environmentally responsible manner, according to applicable laws and within the cultural and religious diversities. Community engagement, social impact management and social investment are instrumental to TGL's social performance.

The transition from the initial Corporate Social Responsibility (CSR) approach to Social Performance (SP) is now completed. SP at Tullow is defined as "Effective identification, assessment and management of socio-economic impacts and risks over the course of the business cycle and in accordance with international standards". The macro socio-economic review of TGL social performance in Ghana, initiated in 2012 and sponsored by the Tullow Group, is still not ready for external dissemination. The SP approach in Ghana includes: i) Stakeholder Engagement, ii) Socio-economic impact assessment and management, iii) Land Access/Acquisition (Sea Access), iv) Social Investment.

The issue of Sea Access is becoming more visible as TGL operations increase (Jubilee, seismic activities for new wells research, upcoming TEN project). Awareness of the cumulative impact this may cause is bringing this subject to the top of the 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 and police authorities; in addition, investments are considered in livelihood alternatives to fishing.

TGL Social Performance Standards are still under preparation; this reflects the need to better investigate and understand the implications for management and for the business of an eventual adoption of IFC PSs for all TGL activities. As funding is being sought for the TEN project, IFC 2012 Performance Standards (PS) will be applicable.

The 2012 Social Investment Strategy has not undergone changes; it focuses on creating clearer linkages between activities undertaken with communities (enhancing relationships), business objectives (enhancing business led impact on society and the economy – local content and localization) and risk management (identifying and managing socially based non-technical risks). Reportedly, out of the 1.5 billion USD spent by TGL on contracts in 2014, 123 million were awarded to Ghanaian companies (defined as those with at least 51% Ghanaian ownership).

The three main areas of operations remain: i) Technical, Vocational Education and Training (TVET); ii) Enterprise Development (ED) and iii) Environmental and Social Mitigation Measures. New investments were stopped last year when construction issues (where works had been undertaken with poor material) in some of the legacy projects required an additional assessment, and a decision was taken to eventually re-build two of the facilities to ensure the quality of the construction. New investments will be evaluated only after all current legacy projects will be completed. The first phase of the LEED project has been successfully completed. The design of the new phase will be informed by the "Livelihood Impact Assessment" study which is about to go to tender. The strengthening of farming and agricultural opportunities are for consideration to provide alternatives to fishing.

An SP KPIs matrix has been developed as a more responsive monitoring mechanism for 2015. KPIs related with Sea Access are under discussion and have not yet been identified.

6.4.2 Community Engagement/Consultation

Community engagement continues to progress and has reached quite good standards². It is evident that communities are well informed of TGL activities, engagement is continuous and developed using culturally 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.

Quarterly stakeholder engagements have been introduced to update communities on Jubilee operations, engaging different groups of stakeholders (i.e. traditional authorities, district assemblies, fishermen groups, fishmongers, Non-governmental Organisations (NGOs), public sector officials). During the reporting period, consultations were conducted in conjunction for the Jubilee, the TEN Project and the “2014 Gas Flaring Campaign”. Overall, this has strengthened relations with communities. TGL is seen as a fairly transparent partner; this is confirmed by locally based NGOs. Consultations also attracted regulators including the Petroleum Commission and EPA who were invited to update stakeholders on the increase in the number of whales that were washed ashore in the past years. The 2014 community consultations have been recorded and a summary table has been attached to the 2014 AMR, issued in March 2015.

TGL leads stakeholder engagement activities for all the Jubilee partners; there is increased recognition that this responsibility has to be shared among the Jubilee partners.

6.4.3 The 2014 Gas Management Campaign

An authorization to flare excess produced gas which could not be re-injected was requested to and provided by the Ministry of Energy and EPA; this was the consequence of the protracted delay in the completion of the Ghana Gas Plant. The authorization was delivered for five months on the condition that: i) an ambient air quality monitoring in the frontline coastline districts of Ghana was undertaken to assure local communities that flaring will not cause any local air quality impacts and will not cause potential health threats and ii) an education and awareness campaign with local communities was conducted and the air quality survey be made available to the EPA for discussion by June 30, 2014.

The Gas Management campaign was conducted through three rounds of consultations in the six frontline coastal districts in mid-July, end of July and August 2014. Each round of consultations targeted different stakeholders. Regional Administration and District Assemblies were sensitized before engaging with the communities. The awareness sessions had the objective of adequately informing communities of the reasons for which the abnormal gas flaring was required and the modalities by which the authorization was granted by the Ministry of Energy and Gh EPA. The engagement team included social and environmental specialists/advisors as well as a Health Advisor to answer concerns related with possible health impacts. Reportedly, the campaign was successfully conducted; no major issue emerged.

While the Gas Management campaign was successfully conducted, the air quality study was limited to the FPSO environment. Above described results indicate that no terrestrial transfer of offshore emissions materialized; as a result, it has been considered unnecessary to conduct an air study at districts level. EPA granted the authorization.

6.4.4 Disclosure

As underlined in past Independent Monitoring Reports, the EMP is a document required both under IFC requirements and Gh EPA legislation. ESAP requirement #7 indicates that the EMP has to be disclosed to local communities. Although social management actions could have been built-in to the EMP, all social issues and activities have been included in the PCDP. Therefore, the PCDP revision has to consider the need for disclosure through culturally appropriate ways of document updates or new documents produced as identified in the 2010 version (EMP for operations; updated PCDP for operations, Social Investment Plan, Grievance Statistics and Trends, Communication Strategy and similar).

² Past engagement activities are fully reported in past monitoring reports, to which reference is made.

The PCDP and the grievance mechanism have been disclosed to local communities through different culturally appropriate activities in line with their needs, preferences for spoken communication and languages as well as their decision-making processes. TGL reports that formal means of disclosure such as website publication of documents would not have reached the communities. A number of meetings were and continue to be held with village chiefs, chief fishermen and fishmongers as well as other members of the communities to provide them with information; different tools are utilized such as comic strips, the diffusion of videos and docudramas and other educational printed material to ensure appropriate transfer of information. A similar process has been followed for the management of the Gas Flaring Campaign, as requested by EPA. TORs for the Gas Flaring Campaign have been prepared together with power point information. The material has been used to disclose information to communities utilizing the same culturally appropriate tools mentioned before.

Although dated February 2015, a NTS of the PCDP has been appropriately prepared and utilized during engagements with the communities. However, it represents more an internal guideline for the SP Team than a document to be delivered to interested people. Ideally, the NTS document could be edited and copies made available at the CLOs offices for consultation. Disclosure on concerned websites could be considered in order to reach other possibly interested stakeholders.

6.4.5 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. Community grievance management mechanisms revolving around traditional leaders and family heads are the first step of the process.

There are no changes to the way the grievance process has been managed in 2014. As reported in past independent monitoring report, grievances are received verbally and in writing through the compilation of a special form (annexed to the PCDP). The role of the CLOs has gradually increased as they have been trained, equipped and empowered; they receive the grievance, undertake a preliminary investigation and then pass the information to the SP staff in Takoradi, together with recommendations for how to handle the issue. 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. Unfortunately, CLO grievances have been identified for this reporting year. While TGL reports that their work conditions have been improved, CLOs indicate that salary increases only reflect inflation considerations and not their additional responsibilities linked with the seismic activities for TEN and the gas management campaign. In addition, they report that suitable offices are not available as well as difficulties in covering transport expenses with the allowance provided. Consideration should be urgently given to these CLO issues, as the stable presence of CLOs is extremely important for the TGL operations and for keeping the trust of the communities. Refreshment training activities should also be considered.

The PCDP detailed implementation plan identified three levels at which grievances may be resolved, according to its specificity and the possibility to resolve it through the simplest way of discussion, or instead to go to the second level where a special committee would take over; if this system is still not satisfactory for the complainant, the issue will be deferred to an independent arbitration and ultimately will go to court.

Records of grievances are kept, analyzed and summarized in a document reporting the day the grievance was received, the name of the person/s making the claim, investigations undertaken, answers provided and if the issue is still open or has been closed. This document is attached to the AMR each year (see AMR attachments for the years 2011, 2012, 2013 and 2014). Inconsistencies have been found between the 2014 grievance record and the explanatory text in the AMR as well as with a second grievance report, which is apparently the tentative to adopt a new format.

The AMR attachment indicates that three unresolved complaints have been carried forward from 2013, 2 complaints are recurrent and one new issue emerged. Most complaints reached a positive resolution with only one complaint still unresolved. The way in which grievances have been registered in 2014 presents some problems as similar issues have been registered under one grievance even if coming from different persons and different villages. The registration of grievances should be corrected.

It is possible to observe that the single most recurrent complaint (the restriction from the Safety Zone and the gradual decrease of fish stocks)³ has been decreasing through sound management of the grievances and awareness programs enhanced as a result of the activities conducted for both the TEN project and on-going seismic surveys. However, although grievances are no longer formally lodged, incursions are still occurring and the eventual outcomes are that boats and fishing equipment have been damaged. The 4D seismic surveys developed since 2013 have the potential to endanger lives and/or damage fishermen's equipment. Generally, when these incursions and damages occurred, amicable solutions have been found. A major accident occurred as reported below in section 6.4.6.1.

6.4.5.1 Exclusion Zone Management

Since 2012, intrusion in the Safety Zone is considered a criminal offence by law. TGL continues to work with both the Ghanaian Navy and the maritime authorities to ensure fishermen and boats refrain from entering the Security Zone and eventually keep away from the Area to be Avoided (ATBA). Enforcement is the responsibility of the Ghanaian authorities but the general lack of capacities/resources led TGL to provide support and frequently coast guards operate from TGL vessels.

Notwithstanding collaboration of the SP Team with the security department, the Fisheries Commission and a sound involvement of the Ghana National Canoe Fishermen Council (an association of fishermen) to ensure consistency of the messages going out to fishermen and their families, canoe incursions have been constantly increasing both in the EZ and in the ATBA. This results from increased TGL activities involving intense seismic surveys during 2013 and 2014, which enlarged the ATBA. A serious accident occurred at the beginning of 2015 when a canoe was found in the EZ and was indicated to pull back. Inability to do so led the maritime authorities to proceed with cutting the gear nets; in the process, the canoe reversed into the boat and the canoe sank. All members of the crew were safely brought on board but the canoe and the fishing equipment were destroyed. TGL opened an internal investigation, which is still not closed, but in the meantime, the canoe owner has been compensated.

The idea to identify and register fishing boats and better manage relations by hiring a few fishermen on the control vessels to help authorities to communicate with fishermen in their own language is still on-going; however boat registration is a government task for which TGL can provide support but not take on responsibility.

6.4.5.2 Training

Training for the management of the Safety Zone and of the ATBA continues to be twofold: i) with maritime authorities and ii) with fishermen and other members of the communities; turnover of staff on one

³ As indicated in the 2012 IMR, "the warmer temperature of water, the presence of equipment, and the restriction of the Safety Zone result in the FPSO becoming a point of fish aggregation and thus a sort of protected area. Fishermen claim fish stocks are decreasing in other areas and the restrictions of the Safety Zone result in a negative impact to their livelihood. If a decrease of the fish stock is effectively observed, it is however difficult to attribute the cause to the presence of the FPSO more than it could be attributed to industrial fishing (certainly the paramount cause) or to the presence of multiple operators from other extractive activities and even climate change effects. TGL's new field T.E.N, which is close to becoming operational, is likely to worsen the situation. Fishermen also claim that currents and big waves caused by TGL vessels disturb fishing and eventually push them into the Safety Zone even when unwanted.

side and incursions of fishermen from regions other than the Western Region justify training to be a continuous activity.

The Ghana National Canoe Fishermen Council is fully involved in the process of training fishermen on the dangers present and on the need to keep away from the FPSO Exclusive Zone. Following a period of training and engagement, the Council is ready to take the lead to conduct training activities with fishermen. 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.

TGL spent a considerable budget in training the maritime authorities to ensure respect of human rights during the management of intrusions and for warning boats away from the Safety Zone. 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. Although the number of incursions has increased, mostly due to the presence of the seismic activities linked with the TEN project, reportedly there is a different attitude from fishermen and community members; people's awareness and understanding has increased. The larger presence of TGL in the area calls for new strategies to ensure that Sea Access is managed in a way to protect TGL operations and equipment and at the same time does not penalize excessively fishermen. In consideration of reported decreases in the fish stock, whatever may be the reasons, TGL is exploring investing in alternative livelihoods to fishing.

6.4.6 Community Development Projects

Community development projects are not a requirement of the ESAP nor of IFC PS1. 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 they may experience as a result of the Project.

In 2014, activities continued to follow mandatory criteria identified, that is: i) focused on business objectives, ii) efficient, iii) compliant and iv) sustainable under the three focus areas of: i) Education and specifically TVET (i.e. the Jubilee Technical Training Centre), ii) Capacity building of local businesses to support localization and local content (i.e. Tullow Group Scholarship Scheme; Enterprise Development) and iii) immediate impact projects at community level (i.e. access to water). All investments are to be identified through the ESIA and aligned to local development priorities.

Investments are tailored to maximize the type of support the private sector can offer and increase the opportunities for local businesses to access the oil and gas industry through enhancing capacities. TGL refrain from providing services or support in areas which are typically a Government responsibility.

The 2014 annual budget allocated to Jubilee and Tullow discretionary SI initiatives amounts to US\$ 9.9 million allocated to about 10 projects (out of which US\$ 2.0 million for TGL alone plus an additional 2.0 M for the Tullow Group Scholarship). The budget includes US\$ 200.000 allocated for stakeholder engagement activities. It excludes some projects still ongoing but budgeted under 2013, i.e. the borehole project. Out of the budget approved, 67% of the Jubilee Partner's budget has been spent and only 6% of the TGL discretionary project budget. This results from delays in implementing the construction projects, in particular Essikado Maternity Ward, Asuansi Laboratory Project and Half Assini Science Laboratory. For the same reason, and as per last year, the budget is partially frozen to ensure that i) legacy projects reach a successful conclusion and ii) infrastructure investments whose quality was assessed as deficient (Essikado Maternity Ward and Asuansi Science Laboratory) undergo demolition and reconstruction to ensure beneficiaries enjoy quality investments.

The table below provides an overview of the intervention areas as part of the TGL SI.

Table 6.4: SI Area of Intervention

Area of intervention	Type of project	2011 TGL standalone projects	2011 Jubilee Partners* funded projects	2012 projects	2013 TGL standalone projects	2013 Jubilee Partners projects	2014 TGL standalone projects	2014 Jubilee Partners projects
Health	Health screening, Upgrade of CHPS, Hospital rehabilitation (Essikado)	4	5	About 22 projects in the different areas, out of which 6 completed	2	3	1	1
Education	Scholarships for postgraduate education, Support to secondary/technical education, Support to kindergarten education, Construction, ICT support	7	7		5	5	4	1
Business Development	Training in accounting and enterprise development	-	2		-	2	-	1
Environment	Beach cleaning/costal protection, Provision of water, Capacity building for national fire service, Annual Regatta	-	3		-	5	-	2
Approved budget		US\$ 2,180,000	US\$ 7,000,000	UUS\$ 10,300,000 Jubilee and US\$ 260,000 TGL standalone	US\$ 2,370,000	US\$ 6,130,000	US\$ 4.0M (including US\$ 2.0M for Tullow Group Scholarship)	US\$ 5.9M

***41.27% of Jubilee Partners is contributed by TGL**

A thorough description of the progress of projects under implementation is provided in the 2014 AMR. A few notable elements are:

- The Jubilee Technical Training Centre at the Takoradi Polytechnic visited at different stages of development is now fully operational and support the vocational training of workers in four areas: Process, Mechanical, Electrical, Instrument & Control. It provides a unique training opportunity not only for the people of the area but also nationally and possibly from other countries. In 2014, the Centre successfully trained 46 students in National Vocational Qualification (NVQ) and 21 students in NEBOSH programmes respectively. The Centre is embedded in the Takoradi Polytechnic and sustained through the fees paid by trainees.
- The Enterprise Development Centre (EDC) financed by the Jubilee partners continues its training programme to provide business incubation and specialist professional services to Ghanaian Small and Medium Enterprises (SMEs) to take advantage of business opportunities in the oil and gas industry. Training modules are now provided also in Accra, using hotel facilities to train Accra based trainees. A total of 326 SMEs registered and 82 received accreditation from the Centre after having demonstrated that support received has been put to practical use in their businesses. The first ever joint TGL-TEN Project Share Fair was held in August 2014 with participation by major TEN project contractors which presented their procurement plans and processes to SMEs. The EDC in collaboration with the Petroleum Commission of Ghana and other stakeholders organized a two-day workshop on local content; a special session was dedicated to the TEN project. The workshop was attended by 112 SMEs.
- The LEED Project has successfully completed the first phase. The design of a second phase will be informed by the results of the Livelihood Impact Assessment which is currently going out for tender.
- Tullow Technical Training Scholarships for Ghanaians solely from the six coastal districts has been introduced in 2014 to study at the Jubilee Technical Training Centre as a broader strategy to increase the Scholarship Scheme implemented nationally. In 2015, 10 students from the Western Region will receive the scholarship.

6.4.6.1 Monitoring

Monitoring is provided through project officers and CLOs. A M&E Plan was prepared last year. The document is outstanding but possibly overambitious and it may undergo modifications.

7 CONCLUDING REMARKS

The review conducted by the IEC provided an overview of all the Project related environmental, health & safety and social monitoring activities conducted through a check of records and reports, visit of Project facilities, meetings with local communities and interviews of TGL personnel.

All actions foreseen by the ESAP (dated December 2010), are consistently implemented and a timeline for the review and update of the ESAP related plans is established by the Project.

Environmental monitoring actions, as foreseen by the Project EMP and E Mon P, continue to be carried out by the Project. The IEC note that some monitoring activities were not carried out in 2014 as required under TGL procedures, which may be a result of the restructuring process undertaken at TGL in 2014/2015. It is expected that the review of the management system and integration of procedures and plans in the OMS will result in a more effective and manageable system. Additional training for new and merged responsibilities of the TGL restructuring should be considered to ensure that monitoring activities are undertaken in line with the ESAP requirements and TGL monitoring plans.

The H&S management system continues to be adequate for Project requirements and is effectively implemented and maintained to control and manage any unexpected incident scenario that could lead to threats to people and assets, as well as major oil spills that could result in severe environmental damage.

TGL main contractor MODEC management was assessed to be well integrated in the overall TGL ESMS, while some additional improvements have been identified. It is assumed that potential improvements will be considered as part of the OMS review.

A new Social Performance Manager took office. The position has changed almost annually, and it is hoped that it will now remain stable to provide the SP team with consistency and proper guidance. The suggestion to align the content of the SI Strategy, the PCDP and the M&E Plan is reiterated (see independent monitoring report from 2014) as well as to ensure the NTS of the PCDP is made available in CLOs Offices and to whoever wants to consult it.

Community engagement has reached a good level of progress. The Gas Management Campaign was conducted correctly and no problems emerged. Notwithstanding education and training programs with fishermen, the level of incursions of boats increased both in the EZ and in the ATBA. This is the result of the increased presence of TGL in the area. A comprehensive strategy to keep the “Social License to Operate” and to ensure Sea Access is being studied; it aims at ensuring that the issue is not only managed within the law (entering the EZ is a criminal offense) but also within the livelihood strategies of communities. Investments to strengthen local farming and agriculture are considered within the LEED project as a way to ensure alternative livelihoods to fishing.

Grievance management continues and is unchanged. Inconsistencies in the Grievance report have been noted by the IEC and should be addressed. Most issues are addressed to the satisfaction of the complainant, including a major accident which occurred with a boat; the issue is still under investigation but independently from the results, TGL decided to fully compensate the owner for the damages. The Grievance management requires that CLOs working conditions are improved.