

Environmental and Social Review Summary

Banda Gas-to-Power Project (Upstream Project)

This Environmental and Social Review Summary (ESRS) is prepared by MIGA/IDA staff and disclosed prior to the date on which MIGA/IDA's Board of Directors considers the proposed issuance of a Contract of Guarantee. Its purpose is to enhance the transparency of MIGA/IDA's activities. This document should not be construed as presuming the outcome of the decision by MIGA/IDA's Board of Directors. Board dates are estimates only.

Any documentation that is attached to this ESRS has been prepared by the project sponsor, and authorization has been given for public release. MIGA/IDA has reviewed the attached documentation as provided by the applicant, and considers it of adequate quality to be released to the public, but does not endorse the content.

Country:	Mauritania
Sector:	Energy
Project Enterprise:	Banda Gas Upstream Joint Venture
Environmental Category:	A
Date ESRS Disclosed:	March 12, 2014
Status:	Due Diligence

A. Project Description

The integrated Banda Gas-to-Power Project involves the development of an upstream offshore gas field (the Banda gas field), off-shore and on-shore pipelines and gas processing facility, and the downstream construction of two power plants near Nouakchott in Mauritania and finally transmission lines to Nouadhibou and Tasiast to the North and to Senegal to the South. The Banda Gas-to-Power Project seeks to develop natural gas resources from the Banda gas field, which will serve as the primary fuel source for power generation that will supply Mauritania's domestic and industrial (including extractive) sectors, as well as export power to Senegal and Mali.

The Upstream Project: The Banda gas field is located approximately 55 km offshore of Nouakchott. It is owned by a consortium of investors, with Tullow Oil Plc (Tullow) as the majority shareholder and operator in the Joint Venture (JV). Other JV entities are: Petroliam Nasional Berhad (Petronas), Kuwait Foreign Petroleum Exploration Company (Kufpec), and Premier Oil Plc. National oil company SMH will be entitled to participate in the JV. First gas is targeted for second quarter of 2016. Tullow acquired operatorship of the Banda field in November 2011 and declared the Banda field as a commercial discovery in September 2012. Tullow has prepared a field development plan (subsequently approved by the Government of Mauritania in January 2013) which provides for production of up to 65 million standard cubic

feet per day of gas over 20 years. It consists of the drilling and installation of two subsea wells¹ tied back to an onshore gas processing plant via a subsea production manifold and a 10-inch pipelines. Banda gas reserves are estimated at approximately 1 trillion cubic feet of gas, and gas recovery will be managed in accordance with market demand.

The Banda field is located about 20 km east of the neighboring Chinguetti oil field (producing). The Banda field is about 200-325 m below sea level. The wells will be drilled from a single drill center using a moored semi-submersible Mobile Offshore Drilling Unit (MODU). During drilling, an estimated two supply vessels per week will be used to transfer materials (mud, casings, tools and water) from the onshore supply base to the MODU for the duration of drilling. A 500 m temporary safety exclusion zone will be established around the MODU. Once drilling is complete, the MODU will be removed, and there will be no permanent surface infrastructure associated with the operation. An existing onshore support base located at the Port of Nouakchott will be used under a lease agreement. Subsea trees will be installed at seabed, and produced gas will be exported to shore via a 74 km 10-inch subsea pipeline and a 6km 10-inch on-shore pipeline. An umbilical will be laid alongside the pipeline to supply power and communications, as well as necessary chemicals to the subsea wells. Subsea pipeline and umbilical will be trenched or, where trenching is not possible, protected by rock dump and / or flexible concrete mattresses. The gas processing plant will be located onshore approximately 9 km north of Nouakchott, within a 1km x 1km plot which will also accommodate the downstream power plants. A 6 km onshore pipeline and umbilical will connect the subsea pipeline and umbilical to the gas processing plant. The onshore pipeline and umbilical will be trenched along their entire length to prevent accidental damage. The plant will be designed to condition 65 million standard cubic feet per day of gas to fuel the adjacent power plant to be developed, owned and operated by a third party (Société de Production d'Electricité à partir du Gaz, SPEG). Stabilized condensate will be transported via road tanker to the storage facilities at Nouakchott port for onwards export for out-of-country refining.

The Downstream Project: The Downstream Project will be developed by SPEG, a special purpose vehicle formed by the Government of Mauritania, SOMELEC (National Power Utility in Mauritania), SNIM (National Company of Industries and Mines in Mauritania) and Kinross Gold Corporation in September 2012, for the purpose of the generation, transmission, and sale of power using Banda gas. In early 2013, SPEG shareholders decided to phase the development of the SPEG power project in order to match the evolution of electricity demand and optimize capital allocation. The first phase of power generation includes the construction of two power plants at the same site: a 120 MW combined cycle power plant, and a 180 MW dual-fuel thermal gas fired power plant. By 2020, SPEG's conceptual goal is to achieve 400-500 MW capacity by construction of a third power plant (which is outside the scope of this project and MIGA/IDA related guarantees). Phase 1 also includes, as part of the national grid, a high voltage transmission line to be constructed from the power plant to the North to serve the communities of Nouadhibou and Zouérat and the Tasiast mine. Power will also be exported to Mali and Senegal.

World Bank Group Role: The World Bank Group's proposed intervention includes: (i) three credit enhancement partial risk guarantees (PRGs) backstopping the creditworthiness of SPEG (of Mauritania) and the public utilities, SENELEC (of Senegal) and EDM (of Mali) for the payment

¹ Future provision will be made for the tie-in of a third gas production well if required to meet demand or improve reservoir performance; however, this third well is outside the scope of this ESRS and current Tullow ESIA.

of gas under the Gas Sales Agreement (GSA) and for the payment of electricity under the export Power Purchase Agreements (PPAs); and (ii) a MIGA guarantee, for up to 20 years, in favor of the Banda Gas Joint Venture Partnership. Although MIGA's guarantee is limited to the upstream component (Banda Gas project), downstream components such as the power plants, and transmission lines are considered associated facilities from the point of view of the environmental and social assessment.

While the main focus of this ESRS is on the upstream Banda Gas Project, it includes a general overview of potential environmental and social risks related to the associated downstream component. A separate ESRS covering the Downstream Project was prepared and disclosed by the World Bank through the World Bank InfoShop. The link to the downstream ESRS is available [here](#).

B. Environmental and Social Categorization

This Upstream Project is Category A under MIGA's Policy on Environmental and Social Sustainability and the World Bank Operational Policy 4.01. Key risks include: vessel collision risk regarding interference with shipping and navigation of other sea users, economic displacement through loss of access to fishing grounds (in the unlikely event of a spill), water and sediment contamination, discharges of commissioning fluids, noise, habitat loss and impacts to marine and coastal habitats and species, well blowout and pipeline rupture, soil erosion, hazardous materials and waste generation and air emissions (including CO₂). Based on current information, the Upstream Project has not identified impacts that could not be avoided or reduced to acceptable levels through the application of the proposed mitigation measures, as described in the Environmental Management Plan (EMP).

C. Applicable Standards

While all Performance Standards (MIGA 2013 / WB 2012²) are applicable to this investment, current information indicates that the investment will have impacts which must be managed in a manner consistent with the following Performance Standards:

- PS1: Assessment and Management of Environmental and Social Risks and Impact
- PS2: Labor and Working Conditions
- PS3: Resource Efficiency and Pollution Prevention
- PS4: Community Health, Safety and Security
- PS5: Land Acquisition and Involuntary Resettlement
- PS6: Biodiversity Conservation and Sustainable Management of Living Natural Resource
- PS8: Cultural Heritage

² These Performance Standards are completely consistent with each other.

Performance Standard 7 (Indigenous Peoples) is not applicable as there are no Indigenous Peoples as defined by this standard in the Upstream Project area.

The World Bank Group (WBG) General Environmental, Health and Safety (EHS) Guidelines (2007) and Industry specific guidelines, including EHS Guidelines for Offshore Oil and Gas Development (2007), EHS Guidelines for Onshore Oil and Gas Development, EHS Guidelines for Shipping (2007), and EHS Guidelines for Ports, Harbors, and Terminals (2007) are applicable. Applicable WBG EHS guidelines for the downstream component of the larger Gas-to-Power project include: General, Thermal Power, and Electric Power Transmission and Distribution.

D. Key Documents and Scope of MIGA Review

In addition to email correspondence on various environmental and social (E&S) topics, the following documents were reviewed by MIGA and IDA for the Upstream Project:

- *Environmental Impact Assessment for Tullow Banda Field Development – Gas Project*, ERM, August 2013 (Banda Gas ESIA / Tullow ESIA);
- *Non-technical Summary of the Environmental Impact Assessment for Tullow Banda Field Development – Gas Project*, ERM, August 2013 (Banda Gas Non-technical Summary / Tullow Non-technical Summary);
- Environmental permit issued by the Ministry of Petroleum, Energy, and Mines (Permit no. 209), August 2013; and
- *Tullow Oil plc EHS Management Standards (Rev 4)*, prepared by Tullow Oil plc.

Documents reviewed for the downstream component included and are available through the World Bank Infoshop:

- *Etude d'Impact Environnemental du projet de production et de transport d'électricité à partir du gaz en Mauritanie et son Résumé non-technique (Executive Summary of the EIA for the Production and Transport of Electricity from Gas in Mauritania)*, ERM, November 2013
- Draft ESIA for the projected southbound Transmission Line to Senegal.

MIGA has coordinated its due diligence with the World Bank (IDA). As part of MIGA's and IDA's environmental and social due diligence, World Bank environmental and social specialists visited the Upstream Project site in November 2013. In addition, the mission held discussions with the environmental consultants who prepared the project ESIA, the Minister of Environment, and members of the larger project team.

E. Key Issues and Mitigation

PS1: Assessment and Management of Environmental and Social Risks and Impacts

Social and Environmental Assessment: An environmental and social impact assessment (ESIA) for the Upstream Project was prepared by an independent environmental consulting firm, supported by local specialists, from June 2012 to April 2013. The ESIA was disclosed by the World Bank through the Info Shop August 30, 2013. The Banda Gas ESIA was prepared in line with the Mauritanian regulations, internationally accepted best practice (i.e., World Bank 2012 Performance Standards / MIGA 2013 Performance Standards, and relevant WBG Environmental, Health, and Safety Guidelines), and Tullow's corporate environmental and social management standards.

The Banda Gas ESIA focused on all aspects and phases of the upstream component. The ESIA identified all significant environmental and social impacts, including impacts on terrestrial and marine biodiversity. The ESIA also adequately considered alternatives to the proposed Upstream Project (e.g., pipeline routing, condensate export options, umbilical line routing). Based on the chosen design for the Upstream Project, both impacts on the marine as well as the terrestrial biodiversity have been evaluated as minimal. The social impacts are also expected to be limited, with the primary impact being the presence of the onshore pipeline 60 m exclusion zone, which could limit suburban expansion. It should be noted that the ESIA concluded that the consequences of a spill would be moderate, and, as drilling is only targeting gas, primarily associated with an accidental loss of fuel from the MODU and/or the supply vessels used in the drilling, subsea installation or pipe laying phases.

For the Banda Gas ESIA, adequate mitigation measures have been developed in the Environmental Management Plans (EMPs) for potentially significant impacts, including drilling discharges (muds), potential risk of small oil spills (an Oil Spill Contingency Plan will be prepared, although a large diesel spill is unlikely to occur), as well as the identification of navigation and collision risks with other marine traffic and terrestrial noise pollution to communities 5 km away.

Tullow will evaluate condensate transport and storage options in more detail, including further assessment of potential environmental and social impacts related to these options. Appropriate mitigation and monitoring measures will be developed in support of the chosen option.

Management Program and Monitoring: At a corporate level, Tullow has an established Environmental, Health and Safety (EHS) Policy which is applicable to the Upstream Project. The Policy aims at managing EHS risks and extends this commitment to those entities working on Tullow's behalf. In support of its Policy and as part of its EHS management system, Tullow has implemented processes and policies at both the corporate level and at the operations/country level. The integrated Environment, Health and Safety Management System (EHSMS) is ISO 14001 (environmental management) certified. The Company has developed Tullow Oil Environmental Standards ("TOES") which are a set of standards focusing on four key areas: biodiversity, greenhouse gases, resource management, and socio-economic aspects. These corporate standards are applied at the project-level.

As part of the ESIA, an environmental management plan (EMP) has been developed for the offshore drilling and construction phase, as well as EMPs for the onshore construction and

operational phases. Detailed EHS management procedures will be developed prior to commencing project activities. In addition to the EMP and management procedures, Tullow and its contractors will also prepare and implement Environment, Health and Safety Plans (EHS Plans).

It is expected that Tullow will apply sound engineering and construction practices during drilling, development of offshore & onshore facilities. Tullow's project management team will monitor the performance of contractors to ensure a fit for purpose design which complies with all necessary standards. Further, Tullow will put in place the necessary quality assurance / quality control arrangements to ensure that the Inspection & Test Plan is implemented and therefore that manufacturing of materials and equipment and construction of facilities are carried out in accordance with design requirements. Similar arrangements will be put in place for drilling & completion of wells. It is also expected that Tullow will employ adequately trained staff and contractors, the latter being expected to follow industry standards and abide by Mauritanian labor laws.

As Operator of the Upstream Project, Tullow will be responsible for the implementation and overall monitoring of the EMPs and EHS Plans, while the contractors will integrate the EMP and EHS requirements into their operational procedures. The Banda Gas ESIA includes an overview on decommissioning of the facilities, and a decommissioning plan will be developed at a later stage.

Organizational Capacity and Training: Tullow has adopted the good practice guidelines of the International Association of Oil & Gas Producers. The applicable Mauritanian and International requirements are summarized in the ESIA, including the International Convention for the Prevention of Pollution From Ships (MARPOL), International Regulations for Preventing Collisions at Sea 1972 (COLREG), and Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR). As an organization, Tullow has almost 30 years of experience in offshore and onshore oil and gas exploration, field development and production operating in compliance with these international standards. At a corporate level, Tullow has recently integrated the Performance Standards into their management approach.

The Tullow Banda EHS Lead responsible for the Upstream Project is located in Tullow's headquarters (UK), and will monitor Tullow Banda operated assets in Mauritania and will report to the Tullow North Africa Business Unit (NABU). This EHS Lead will be supported by an in country EHS Advisor and appropriately staffed team of onsite specialists. A training program will be established to ensure that all personnel are formally trained to competently perform their activities in accordance with Tullow's EHS requirements. This training program will include induction and ongoing training specific to the tasks being carried out. Tullow will maintain oversight of contractor training to ensure contractor workers are adequately trained and supervised. Tullow will ensure that staff at all levels and lead contractors will receive appropriate training in the Performance Standards as well as the relevant WBG EHS Guidelines.

Associated facilities for the Upstream Project: The downstream power plants and northbound transmission line associated with the integrated Gas-to-Power Project are considered associated facilities. An ESIA for the downstream SPEG facilities and for the transmission lines owned and operated by Somelec has been completed including consultation and was disclosed through the World Bank InfoShop on December 2, 2013. Based on this downstream ESIA, this part of the

larger project is not expected to have major environmental impacts, except for an impact on air quality during the period the dual power plant will be running on heavy fuel oil. As soon as the SPEG power plants start running on natural gas in mid-2016, the air quality should improve significantly. A separate [ESRS](#) was prepared covering the downstream SPEG infrastructure. Managing environmental and social impacts related to the downstream project will be the responsibility of SPEG, excluding the transmission lines which will be the responsibility of SOMELEC.

PS2: Labor and Working Conditions

Human Resources Policy and Working Conditions: Mauritania has ratified the eight fundamental International Labour Organization (ILO) Conventions addressing forced labor, freedom of association and protection of the right to organize, collective bargaining, equal remuneration, non-discrimination, and minimum age of 14. Even though the minimum age is 14, Tullow's labor policies adhere to a minimum age of 18. Tullow will ensure compliance with national labor laws (including the "Code du Travail") and WB/MIGA's Performance Standard 2.

Tullow has a corporate level Code of Business Conduct and Human Resources (HR) Policy, both of which will be applied to the Upstream Project. To support the HR Policy, in 2012, Tullow launched a new HR system ("TullowPeople") to improve recruitment, management and development of human resources. For the Upstream Project, Tullow will establish working conditions for their employees which promote fair treatment, non-discrimination and equal opportunities, protect workers, especially vulnerable groups, will not employ children and avoid the use of forced labor and respect the rights of the workers to collective bargaining. Tullow's labor and working conditions include a grievance mechanism for workers. Through Tullow's recruitment and procurement policy in Mauritania, Tullow has committed to recruit and procure locally where possible. The same standards will be applied by Tullow's contractors.

The number of personnel on the Mobile Off-shore Drilling Unit (MODU) will fluctuate between 60 and 110 depending on its operation (e.g. mobilization, drilling, etc.). It is estimated that the installation vessels will employ approximately 510 offshore personnel. During the onshore construction phase the peak number of personnel onsite is anticipated to be 90 workers at any one time. For the majority of the construction phase the numbers of workers will fluctuate between 20 and 40. The onshore support base will be manned by about 10 dedicated personnel and a further 20 personnel will be required for logistical operations. The percentage of locally employed workforce will be approximately 5% for the MODU, 90% for the support base, and 25% for the logistics operations. The gas processing plant is designed to be operated by a limited number of staff. Up to approximately 35 people will work at the plant, including rotational positions such as Plant Operators and Control Room Operators.

Occupational Health and Safety: Adequate occupational health and safety plans will be prepared and implemented by Tullow and their contractors. Tullow's H&S plans will address personnel transfer to and from offshore facilities (by helicopter), worker accommodations on the Mobile Offshore Drilling Unit (MODU), and potential well blowouts and ship collisions. Potential hazards will be identified and evaluated for all Tullow operated production facilities during the design and pre-commissioning phases, and appropriate risk mitigation measures will be implemented and monitored. Job safety analysis will also be carried out before performing tasks. Incidents, including near misses, will be reported to management and Corporate, and will include

results of the investigations. Procedures will be modified where necessary to prevent recurrence of a similar incident. Tullow will ensure that its staff are aware of potential H&S risks and are trained in occupational health and safety matters prior to offshore mobilization. Required personal protective equipment is provided by Tullow to its workers. Contractors will be required to have clearly defined roles and responsibilities, and training programs.

Emergency Preparedness and Response: The Upstream Project will have a passive and active fire protection system and gas leak detection devices. A fire and life safety plan will be implemented for the workforce. Tullow has requested that residential development shall be prohibited in certain areas close to the gas plant perimeter, as described in Tullow's ESIA. Based on front-end engineering calculations, this requirement affects an area adjacent to the northwest corner of the gas plant site. Calculated distances will be updated in detailed design and will be communicated by Tullow to local authorities. A 500 m exclusion zone will be maintained during construction for offshore components. Firefighting and emergency response plans will be developed in advance of project activities commencing.

PS3: Resource Efficiency and Pollution Prevention

Tullow will avoid or minimize impacts on human health and the environment by reducing pollution from project activities. An overview of some of Tullow's mitigation measures for preventing and abating pollution are summarized below.

Air emissions (including greenhouse gas emissions): The main sources of atmospheric emissions (continuous or intermittent) are from combustion sources (e.g., generators, MODU thrusters, diesel engines), and flare emissions from the gas plant. The main pollutants coming from these sources are nitrogen oxides, sulfur oxides, carbon monoxide, methane, and particulate matter. Other air pollutants include volatile organic compounds (ethane, BTEX - benzene, toluene, ethyl benzene, and xylenes), glycols and polycyclic aromatic hydrocarbons. During construction, approximately 100,000 tonnes of CO₂e will be generated, mostly from the offshore construction portion. During operations, annual CO₂e emissions are estimated to be less than 1,400 tonnes.

Potential impacts to ambient air quality will be limited to the immediate vicinity of the emissions sources. These emissions are expected to comply with local standards and regulations and WBG EHS guidelines. Regular monitoring of the main pollutants for the Upstream Project will be conducted to verify compliance with emission limits. To maximize gas recovery, Tullow opted for the recovery of flash gas in a flash-gas compressor unit. This approach minimizes greenhouse gas emissions compared to venting. Flaring of gas production effluents offshore will only occur during well clean-up and testing. The volume of completion and flowback fluid to be flared and the duration of well testing will be minimized as much as possible. Efficient flare burners will be used both during testing offshore and onshore to promote cleaner combustion. Flaring will occur at the gas processing plant, and will be limited for safety reasons to emergency situations.

Light: Artificial lighting on the MODU may have short-term minor impacts on migratory birds until the MODU demobilizes. Because of the temporary nature and localized area of the impact, mitigation is not anticipated.

Noise: Main sources of noise underwater are associated with drilling and completions phases (drilling noise, propeller and thrusters, machinery noise, and equipment in the water). Onshore noise will be associated with construction of the gas processing plant and operational noise will be generated by compressors, pumps, engine generators, flare stack, and traffic (including helicopter). Equipment will be maintained in good working order. Excessive speed and rapid change of direction for vessels will be minimized. Monitoring will be carried out to ensure WBG guidelines are being met.

Drilling muds and cuttings management: Drilling muds will be either water based or synthetic based mud. Low toxicity chemicals will be selected so that the discharges of mud or cuttings have a minimal impact on the environment. Fluids and cuttings returned to the MODU will be separated and cleaned using shale shakers. Cleaned cuttings will be discharged overboard while the drilling fluid will be recycled and ultimately returned to the supplier. Modeling carried out predicts that elevated total suspended solids concentrations will be localized, short-term, and dissipate rapidly as a result of the dispersion capacity. Monitoring will be carried out to confirm the modeling predictions and compliance with WBG EHS guidelines (including oil concentrations in water contents and pH levels).

Wastewaters: At the onshore facilities, the primary wastewater will include produced water from the Banda Field. Produced and associated water will be recovered in the high pressure and low pressure separators and sent for treatment. Injection chemicals will be removed during water treatment and reused where possible. The produced water system will be designed to meet WBG EHS guidelines for onshore oil and gas development. Treated water discharge from the gas processing plant will be used for irrigation or may be exported to the adjacent power plant. Offshore wastewater includes sanitary wastewater, deck drainage, bilge and ballast water. Sanitary wastewater (black and grey waters) will be treated with an approved marine sanitation unit, including maceration and chlorination. Bilge, ballast, and deck drainage water will pass through an oil-water separator. Compliance with MARPOL and good industry practice will be monitored. Mitigation measures to minimize the transfer of organisms will also be implemented as part of ballast water management.

Potential for Contamination of Soils and Seawater and Groundwater: To minimize the risk of potential spills, project design and operations will include hazard identification and operational procedures, use of certified crews in well management and well control procedures, follow international process codes with alarm and shutdown systems, install and regularly test industry standard safety valves (blowout preventers) on subsea well heads, and install overtrawlable protection structures to reduce the risk of damage to wellheads, manifolds, pipeline and umbilical from trawling activities. An integrated control and safety system will control and monitor the subsea system to detect abnormal conditions. The system will be monitored using sensors downhole, on the Christmas trees and in the gas plant. Pressures, temperatures, valve positions and sand production data from the tree will be used to monitor well performance and ensure that production rates from each of the wells are optimized to meet the demand.

Pipeline integrity will be addressed through an inspection, maintenance, and repair program to be developed in the Execute phase of the Upstream Project. Condition monitoring will include side scan sonar surveys, remote operated vehicle inspection and monitoring of corrosion products received at the gas plant. Provision for intelligent pigging will be included in the design. Routing pigging is not anticipated. External corrosion will be prevented by means of coatings and

cathodic protection systems. Onshore pipeline right-of way will be subject to regular surveillance to identify potentially damaged areas.

In case of onshore spills and accidental liquid releases, barriers and dykes will be used around the contaminated area to prevent the migration of spills. Contaminated topsoil or sand will be removed, and will be remediated at either biological treatment pads or through thermal desorption and/or incineration technology. An oil spill contingency plan will be developed as part of the EMPs, and will take into account Mauritania's National Oil Spill Contingency Plan.

Hazardous materials and waste management: Hazardous materials such as additives for drilling will be properly stored, handled, and disposed of. Storage areas will include secondary containment and impermeable floors. Solid wastes (domestic and hazardous) generated offshore on the drilling or support vessels will be shipped back to shore where it will be reused / recycled or properly disposed. Hazardous solid waste includes batteries (large lead-acid types.), chemical residues, clinical/medical wastes, oil filters, oil rags and absorbents, etc. Onshore wastes will be collected and disposed of by an appropriate waste contractor. All wastes will be managed as per the Upstream Project's waste management plan (to be developed).

Water and energy efficiency: Service water for plant services and firefighting purposes will be delivered via road tanker. Water efficiency will be considered during the project design, and the small volumes of treated produced water will be used for plant services and firefighting purposes where possible in an environmentally sound manner. The Upstream Project will continue to identify opportunities for efficient use of resources.

Cumulative impacts: The Tullow ESIA evaluated the potential for the Upstream Project to have cumulative impacts with existing activities and with committed developments in the area. Most impacts resulting from the Upstream Project are localized, and the assessment did not identify significant potential cumulative impacts associated with pollution and resource efficiency. Other activities or proposed developments in the vicinity of the onshore component of the Upstream Project may contribute to additional constraints on land planning during the project operations. Thus, Tullow should inform the Ministry of Urbanization about the proposed exclusion zones. Future developments in the vicinity of the project area such as the SPEG power plant will generate much more significant air emissions than the Banda Gas processing facility. Road infrastructure servicing the project area is considered to have capacity to accommodate the additional traffic.

PS4: Community Health, Safety and Security

The onshore gas processing facility is set in an undeveloped area with no particular sensitive receptor identified in the immediate vicinity; however, the nearest receptors appear to be the new University of Nouakchott, along with 700 housing units located 2.7 km south/southwest of the facility and rare permanent residential buildings located 3.8 km west /northwest of the proposed gas processing facility.

The client will anticipate and avoid impacts on human health and safety of nearby communities, personnel and property. During construction, offshore workers will be accommodated on the MODU and onshore workers will be housed in Nouakchott, so that no separate worker camps will

be needed. Tullow, SPEG and their contractors and sub-contractors will carry out HIV/Aids prevention activities.

Tullow is committed to prevent community disturbance through applying the following principles:

- *Mitigation by design:* focus on planning and minimizing the key risks relating to community disturbance through the evaluation of technical solutions and adoption of internationally recognized good practice and standards, and national legislation, in operational design.
- *Intervention:* mitigation actions should be undertaken where a disturbance is observed to exceed established thresholds (as set through the EIA, regulators and regulations or recognized international standards).

Tullow's *TOES* also include socio-economic aspects and the EMPs include mitigation measures in the event of drilling discharges (muds), potential risk of small oil spills as well as the identification of navigation and collision risks with other marine traffic and terrestrial noise pollution to communities 5 km away from the MODU.

Collision risk: As a minimum, a 500 m safety exclusion zone will be maintained around the MODU by a supply vessel acting as an Emergency Response Rescue Vessel equipped with Automatic Radar Plotting Aid. Communication and navigation equipment on the project vessels will comply with requirements of the International Convention for the Safety of Life at Sea, 1974 (SOLAS) and vessel operations will be in accordance with the International Maritime Organization's International Regulations for Preventing Collisions at Sea 1972 (COLREGS).

The following risk mitigation measures will be implemented to further reduce collision risk for Banda Gas development activities:

- Early notification will be provided to mariners so that they are well aware of the Banda Gas development facilities and activities when undertaking their passage planning or in advance of arriving at the field. Specific notification measures will include providing advanced notice to mariners in the area of the proposed development, issuing a Notice to Mariners and providing data on new facilities for inclusion of nautical charts.
- Detection systems will be installed in the field to provide early detection of passing vessels and improved information to aid in the management of this hazard.
- Tullow will consider the use of RAdar and beaCON (RACON) or other navigation aids (e.g., navigational markers and lights on the MODU) to heighten the visibility of the MODU.
- Industry guidelines issued by the United Kingdom Offshore Operations Association (2003) will form the basis of infield vessel management and a full Marine Operations plan will be developed for the field. This should give account to factors including vessel selection and inspection.

- Collision risk management procedures (preventative and emergency response) will be developed giving account to the traffic patterns and evacuation requirements on the MODU and support vessels.

Given that the Banda Gas operations will comply with standards of international navigation conventions and implement additional navigational aids and infield procedures to further reduce collision risk, this potential impact is assessed to be of minor significance. The risk is further minimized by the temporary natures of the MODU's presence, as it will only be moored at the site during drilling, installation and completion phases.

Security Arrangements: The onshore facility will be secured with a fence and a private security company will provide 24/7 security. Security arrangements will meet the requirements of PS 4. As part of the Banda Community Engagement Plan, a pipeline awareness programme will be implemented to ensure that local communities do not attempt to interfere with the pipeline during operation. Tullow will work with the Government to ensure there is no encroachment around the onshore facility.

PS5: Land Acquisition and Involuntary Resettlement

Based on the approved final location of the pipeline and gas plant, there will be no resettlement due to the Upstream Project. Any compensation for loss of land, assets, or livelihoods related to the Upstream Project will be carried out in compliance with PS 5.

Right of Way

Tullow has initiated a request with the Ministry of Urbanization to access Nouakchott's land title register in order to confirm land tenure on the Upstream Project footprint and identify land owners and users potentially affected by Project-related land acquisition and restrictions on land use. The onshore gas pipeline is expected to cross land designated for the proposed Ribat El Bahr project, which is owned by the Mauritanian Investment Group. This project is a multi-use real estate project, which will include development of residential villas and apartments, commercial buildings, shopping center, hotels and a financial center on 675 ha of coastal zone located 16 km from the Nouakchott Airport. The land had been attributed by the government some time ago. The company completed a master plan for housing and business development infrastructure and preliminary construction works commenced in 2010. The right-of-way (ROW) of the pipeline within Ribat El Bahr's development area, not taking into account the pipeline itself, is estimated at 60,000 sqm (6 ha). Tullow has raised this matter with the Government of Mauritania and has consulted with the developer. This issue has yet to be resolved and Tullow will continue discussions with the Government of Mauritania. Any resolution of this matter will be undertaken in compliance with PS 5.

One existing submarine communication cable was identified in the Upstream Project area. The proposed pipeline and umbilical will cross over the existing fibre optic cable therefore a physical separation will be made between the cable and the pipeline. Dialogue has commenced between the client and the cable owner and a crossing agreement will ensure the protection of the cable. Additionally, small houses and sheds are present in the immediate vicinity of the proposed pipeline route at the Nouakchott-Nouadhibou highway crossing. Only one small shed is included in the proposed exclusion zone (60 m on both sides of the proposed pipeline route), 35 m away

from the proposed pipeline route. One villa is present 350 m south of the proposed pipeline landfall, but this villa is not likely to be directly affected.

Temporary Construction Land Take

During construction, temporary land will be needed for worker's accommodation, access roads and site access, laydown areas and temporary infrastructure (e.g. administration buildings, concrete plant, etc.). Once the construction phase is over, all sites will be restored to their original condition.

The proposed pipeline will also cross under the Nouakchott – Nouadhibou highway, which will likely result in temporary disturbance to traffic during construction. Tullow will manage pipeline laying under the road in coordination with Transport Authorities.

Fishing Traffic

The reports from the stakeholder engagement survey were that only artisanal and coastal fisheries are present within the study area. However, the Collision Risk Assessment conducted by Anatec found that 67% of all vessels within the 30 nautical miles (nm) around the Banda drilling centre were fishing vessels, and of these 80% were large industrial sized stern trawlers. It appears that the majority of the fishing vessels pass through the 30 nm around the Banda drilling centre at a speed of over 4 knots (approximately 91%) and can be assumed to be passing through the area and not actively fishing. The remaining fishing vessels travelling under 4 knots may have been fishing in the area. Fishing traffic is not likely to be significantly affected by the Upstream Project.

Artisanal Fisheries

The area within 6 nautical miles of the coast has been authorized for artisanal and coastal fishing and they will likely not be affected by the temporary safety exclusion zone around the MODU. In the unlikely event of an oil spill that reaches either coastal waters, or beaches within coastal lagoons, fisheries may be suspended by the regulatory authorities to avoid contamination of fish. The fishermen might for a period be forced to stop or temporarily move to other fishing grounds nearby free of oil slicks. These fisheries closures will directly affect fishing communities along the coastline by preventing them from maintaining their livelihood during the period of closure, resulting in a reduction in both food and economic resources. In addition, tainting of fish from contamination with hydrocarbons can impact fisheries affected by oil spills by reducing the quality of the fish landed and sold to traders. As a result these fish may fetch a lower price than others unaffected by tainting. In case of an oil spill which impacts the fishermen, a compensation framework will be prepared in line with PS 5.

Seashell extraction

Seashell extraction for building materials is the main economic activity in the Upstream Project area and is unlikely to be affected by the Upstream Project. The nearest site to the Upstream Project area is located 2.7 km north-west of the proposed gas processing facility, 1.2 km north of the proposed onshore pipeline route and covers a surface area of 0.15 km².

Other activities

The Upstream Project area and its wider environment are also used by shepherds for the grazing of herds of camels and goats. However due to a government led reforestation initiative, grazing no longer takes place within the project site as it is now fenced off. The area is also located within a wider area of passage crossed by herders coming from further afield to the city of Nouakchott, to sell milk. Tullow will cooperate with the herders to ensure they can continue to pass through the site. No other economic activities have been identified in the Upstream Project area.

PS6: Biodiversity Conservation and Sustainable Management of Living Natural Resource

This Performance Standard has been triggered even though the impacts on marine and terrestrial biodiversity have been evaluated as minimal and manageable. The Upstream Project may encounter sensitive marine and terrestrial ecosystems, including natural habitats. Potential impacts have been identified by the Banda Gas ESIA and adequate safeguard management plans have been developed as part of the ESIA. Tullow conducted marine and terrestrial baseline studies in the area of its operations, focusing on species inhabiting the area and species migrating through the area. The ESIA presents information on fish species, benthic communities, marine mammals, sea turtles, marine and coastal birds, and terrestrial vegetation, mammals and reptiles.

Although there are no protected areas within a 100 km radius around the Upstream Project, there is an Important Bird Area (IBA) located 11 km south of the proposed gas processing plant. Bird disturbances will be minimized by following good construction and operations practices. Helicopters will normally avoid IBAs; however should they fly over IBAs, a minimum altitude will be maintained.

Baseline studies confirm that the offshore pipeline route will cross several different types of seabed, including rocky banks, discontinuous rocky areas and sandy seabed. Hydrocarbon and heavy metal concentrations measured at the sampling stations indicate that sediments were free from any notable contamination. Marine baseline findings did not identify sensitive benthic habitats in the Banda field or along the pipeline route, or identify sensitive habitats, or evidence of threatened and /or declining crustacean species such as those listed under the IUCN Global Red List of Threatened Species and those on the OSPAR (2008) list of threatened and /or declining species and habitats. Marine mammals which may have a presence in the project area and are listed as vulnerable include the sperm whale and as endangered, the fin whale and blue whale. Baseline studies have indicated that the following marine turtles are possible in the project area: critically endangered leatherback sea turtle, endangered green sea turtle and loggerhead sea turtle, and vulnerable olive ridley sea turtle. Major nesting areas of loggerhead and green turtles are located more than 55 km from the proposed landfall and should not be impacted by project activities. Tullow has committed to carrying out beach inspections at the pipeline landfall before commencing activities to identify any potential turtle nesting. It will also time activities outside of key nesting periods.

Seafloor disturbance will be caused by the installation of subsea production facilities, such as the manifold, Christmas trees, umbilical and pipeline. The largest disturbance will be from trenching and rock-dumping operations. Disturbed areas will be backfilled as quickly as possible to enable seabed / fauna to recover. Tullow will carry out post-installation surveys to monitor recovery.

The onshore infrastructure footprint will be about 41.1 ha. Ground disturbance will be caused by installing the gas plant facilities and the pipeline and umbilical. The onshore portion of the Upstream Project is located in a sparsely populated desert environment characterized by shifting and fixed sand dunes, alternating with some depression areas of salty clay called “*sebkha*”. None of the flora species are protected by Mauritanian legislation or are listed higher than least concern under the IUCN Red List. Almost all of the bird species recorded were categorized as Least Concern by the IUCN and the only species recorded which has a higher conservation status is the sooty shearwater. Only one mammal species, striped hyena, was identified as near threatened. Tullow will minimize areas of ground disturbance and top soils will be stored and reused. Excavated materials will be used for onsite landscaping where possible.

A large diesel spill is considered unlikely to occur and should one occur, the proposed oil spill response measures (described in PS 3 and PS 4) would likely prevent the majority of diesel reaching the shoreline given the relatively small volume of diesel, weathering processes, distance to shore, and the time afforded to the response effort (3 days minimum and 4.6 days on average). If diesel does reach the shore, receptors are likely to be exposed to medium term adverse impacts of local to regional extent, therefore a diesel spill is considered of medium magnitude. While the residual risk of spills from the Upstream Project remains, the overall impact of a large diesel spill is considered to be of moderate significance.

PS8: Cultural Heritage

The Upstream Project is influencing a portion of Mauritania’s coastal area; therefore it is likely that Neolithic temporary fishing villages are the primary archaeological resource of concern as artefacts were observed within the footprint of the proposed gas treatment plant by the consultants during the scoping visit held in July 2012. Preliminary analysis suggested the presence of Late Stone Age Sites within the footprint of the proposed gas treatment plant. An independent Mauritanian archaeologist undertook a site reconnaissance and to suggested recommendations on measures to be implemented in order to be compliant with Mauritanian regulations in terms of cultural heritage. The site reconnaissance confirmed the presence of Late Stone Age cultural heritage within the proposed footprint. The artefacts observed include pottery fragments, stone tools, bones and ostrich egg shells. The variety of pottery techniques and patterns suggest the presence of seven or eight different human groups during the Late Stone Age period. No evidence of graves has been identified and the shell middens (evidence of ancient dining locations) have been reported to be relatively superficial. However this does not exclude the risk to encounter underground ancient burials during ground disturbing activities. Mitigation measures will be put in place including implementation of a chance finds procedure and training staff in basic archaeology site detection, and surveying the onshore pipeline route by an archaeologist in advance of commencing ground disturbance activities. A surface artifacts collection will be organized before the ground disturbing activities under the supervision of the Mauritanian Institute for Scientific Research (*Institut Mauritanien de Recherche Scientifique*).

F. Environmental Permitting Process and Community Engagement

National regulations require an environmental impact assessment for oil and gas activities in Mauritania. Tullow received its environmental permit for the Banda Gas Development in August 2013. This permit summarizes the key mitigation measures the Upstream Project is to implement to minimize environmental impacts.

During the preparation of the terms of reference for the Banda Gas ESIA and during the ESIA preparation, adequate public consultation activities were carried out. Between June 2012 and February 2013, a series of public consultation activities were carried out by Tullow. These were for both on and off shore activities. Stakeholders consulted included government authorities, representatives of the main projects currently developed in the vicinity of the Upstream Project area, residents, Mauritanian representation of the IUCN, representatives of several departments from the Ministry of Environment, fishermen unions and local Non-Governmental Organisations (NGO). Tullow's consultations also included a public consultation meeting in March 2013 to present the findings of the assessment process.

In summary, there were three kinds of questions and comments raised during the consultations, addressed as follows:

- Requests for technical clarification were met by providing more information on the Upstream Project – this applies to questions on schedule, technology used, pollution prevention and control etc.
- Points raised on environmental and social sensitivities (i.e. the sensitivity of marine biodiversity, fisheries resources, migratory avifauna etc.) were considered in developing the environmental and social baseline study supporting the ESIA, the assessment of environmental and social impacts and mitigation, and the environmental management plan, which details the measures that Tullow will implement to address potential environmental impacts and risks.
- Stakeholder expectations in terms of socio-economic benefits from the Upstream Project – largely that the Upstream Project will foster the employment of local workforce – where duly noted by Tullow and reflected in Tullow's recruitment and procurement policy in Mauritania (which includes a commitment to recruit and procure locally where possible).

Based on its engagement with stakeholders to date, Tullow considers that the proposed development has strong community support based on the fact that it will provide employment opportunities (albeit limited), and will use a national resource to reduce the cost of power and assist in growing the economy. The information provided by Tullow and the findings of the WB mission indicate broad community support and no strong objections or concerns for the Upstream Project.

Tullow's community engagement will be ongoing throughout the Project life and will take into account the local context and any vulnerable groups. Liaison with the maritime and fisheries groups will be based on the elements identified in the Banda Gas ESIA. The liaison mechanism at government level will be undertaken by the Tullow Project team. At the community level, engagement will be undertaken by the Mauritania Community Liaison Officer as part of the Banda Stakeholder Engagement Plan, which will formalize the grievance mechanism. Tullow's project office is located in Nouakchott and the company will maintain a presence in the project area. Influx management will also be taken into consideration during community engagement and will be covered as part of the Stakeholder Engagement Plan.

G. Availability of Documentation

The following listed documentation is available electronically as a PDF attachment to this ESRS at www.miga.org, and at the World Bank InfoShop (<http://www.worldbank.org/infoshop>):

- [*Environmental Impact Assessment for Tullow Banda Field Development – Gas Project*](#), ERM, August 2013, and
- [*Non-technical Summary of the Environmental Impact Assessment for Tullow Banda Field Development – Gas Project*](#), ERM, August 2013 (Tullow Non-technical Summary / Upstream Non-technical Summary).

It is also available for viewing at the following location:

- Tullow Mauritania Ltd, Immeuble Emel, ZRA N°433, PO BOX 1551, Nouakchott, Mauritania, Phone: +222 4520 0300 (Chiva Julien, Team Assistant).