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Introduction

The Republic of The Gambia (hereafter referred to as 'The Gambia') has identified six offshore blocks for potential oil and gas exploration and production. FAR Gambia Ltd (hereafter referred to as the 'Operator'), a wholly owned subsidiary of FAR Ltd, has obtained a licence to undertake exploration drilling of two blocks, A2 and A5 (hereafter referred to as the 'Project').

The Project would include the following activities:

- mobilisation of the drilling unit and land supply base;
- transfer of drilling unit to the drill location (well site);
- Jetting, placement of wellhead, drilling, placement of blow-out preventer and continuation of drilling;
- insertion of casing and cementing;
- well testing and sampling, including flow of hydrocarbons[1];
- ongoing maintenance operations including loading and offloading of cargo vessels, supply vessel operations and waste disposal; and
- well suspension or abandonment and demobilisation of the drilling unit.

The Project is classified as "*exploration for the production of petroleum in any form"* and therefore under the National Environmental Management Act (Government of The Gambia, 1994) and the Environmental Impact Assessment Regulations (Government of The Gambia, 1999) is a project considered as requiring an Environmental Impact Assessment (EIA).

The Operator submitted an EIA Screening Report to the National Environment Agency voluntarily agreeing to undertake an EIA and outlining the proposed methodology for the EIA and its Terms of Reference. The proposed Terms of Reference were accepted by the National Environment Agency.

This Environmental Impact Statement (EIS) details the methodology of the EIA, socio-economic and environmental baseline conditions and identified receptors, the potential and residual impacts of the Project on the receptors and the identified mitigation measures.

Baseline

The Gambia has a long coastline facing on to the Atlantic Ocean with a relatively constant tropical climate characterised into the rainy and dry seasons. The Canary Current brings cool rich oceanic waters from the north, which support a diverse marine life.

The Gambia has a variety of marine and coastal ecosystems including mangrove swamps, mud flats, sandy and rocky beaches and brackish estuaries. These support a diversity of marine and coastal life including sedentary and migratory seabirds, fish, marine mammals, sea turtles, crustaceans, cephalopods and plankton.

The Gambia has a low level of directly paid employment and is greatly dependent on its tourism and export industries to generate income, although a small percentage of the population work within these industries. There is a large artisanal fishery industry supplying local markets which fishes within 20 nm of the shore, and an increasing international industrial fishery industry which fishes out to 200 nm offshore. There is currently no offshore oil and gas industry within The Gambia.

[1] Note: that hydrocarbons to flare is not planned for the single and first exploration well in The Gambia

Planned Impacts

Planned impacts are environmental and socio-economic impacts arising from the Project that the Operator has identified with a high degree of certainty, such as noise, atmospheric emissions and discharge to the marine environment.

The scale of impacts has been determined by taking into consideration the sensitivity of the receptor and the magnitude of change caused by the impact. Impacts can be either beneficial or adverse, and range from negligible and non-significant, to major and significant.

Atmospheric Emissions

Atmospheric emissions associated with each Project activity will either be hydrocarbon gases or products of combustion. Emissions of hydrocarbon gases may have both a global environmental effect (greenhouse gases thought to contribute to climate change) and local human health effect. Similarly, combustion product emissions will include pollutants classified as greenhouse gases (carbon dioxide CO_2) and those which will have adverse human health effects.

The emissions associated with the Project have been quantified and their dispersion modelled. The prevailing wind direction is south-westerly, therefore emissions from the field will be carried towards the coast, however the emissions plume is expected to disperse in the atmosphere as it travels. Based on the separation distance between Blocks A2 and A5, the closest sensitive receptors (onshore) and the expected dispersion of the plume, predicted ambient pollutant concentrations are low and it is not expected that any air quality objectives will be exceeded.

Emissions will be minimised where possible using industry good practice throughout the Project operations. Overall, negligible adverse residual impacts are anticipated on local air quality.

Discharges to the Marine Environment

Discharges to the marine environment are anticipated from the following sources, during project activities:

- ballast and bilge water;
- grey (deck drainage, personnel cleaning) and black (sewage) water;
- produced water (from the oil well);
- drill cuttings and water-based drilling fluid; and
- cement.

A Ballast Water Management Plan will be implemented on board each vessel, which will require that the boarding, circulation, treatment and discharge of ballast water is recorded and appropriately managed. The implementation of the Ballast Water Management Plan will ensure that residual impacts on local ecosystems from ballast water will be of negligible adverse significance.

Bilge water and water produced on the drilling unit and supply vessels will be collated through a closed drainage system on board each ship. The water will then either be transported to the shore for appropriate treatment or treated on board prior to discharge to the sea. If treated on board, the treatment will include oil/water separators which will ensure that water discharged has no more than 15 ppm oil as per the MARPOL Convention and the Marine Pollution Act 2013. The appropriate treatment of the water will ensure that the residual impacts to marine species are of negligible adverse significance.

Black and grey water will be collected on the drilling unit and supply vessels and will be treated on individual vessels to meet MARPOL Convention and the Marine Pollution Act 2013 requirements before being discharged to the sea. The discharge of treated black and grey water will give rise to residual impacts of minor adverse significance for plankton and negligible adverse significance for other marine animals.

Where possible, the Project will utilise a low toxicity, aqueous-based drilling fluids. All drill cuttings will be treated on board the drilling unit prior to discharge at the drill site location, this is to remove as much drilling fluid as possible from the cuttings. Should a non-aqueous Group 1 fluid be required, then the drill cuttings will be subjected to further purification prior to discharge at the drill site location to reduce residual cutting saturation to 5% or less. The residual physical impacts of the drill cuttings release on the seabed will be of minor adverse significance in the short-term and negligible adverse significance in the long-term. The residual impact to the water quality would be of negligible adverse significance and the residual impact to species of high sensitivity (e.g., marine mammals and sea turtles) would be of minor to moderate adverse significance during drilling and negligible adverse significance following the completion of drilling.

The Project will use low toxicity chemicals within the cement where possible leading to residual impacts of negligible adverse significance.

Socio-Economic Impacts

The Project has the potential to impact on both the economy of The Gambia and on the human population of The Gambia. The Project will potentially impact on both the overarching economy of The Gambia through the lease of Blocks A2 and A5, and local economies through impacts on industries which use the same marine space (Blocks A2 and A5) or facilities (e.g., Banjul Port) as the Project, in particular the tourism, fishing and shipping industries.

The Operator proposes to ensure that local staff, suppliers and infrastructure are used where possible throughout the Project to develop the skills of the local population and provide revenue to the local economy. The Project is anticipated to have minor beneficial residual impacts on the GDP of The Gambia during the 40-45 day lifespan, however, should the Project lead to the development of an offshore oil industry this is anticipated to have significant local benefits and potential benefits for the whole of The Gambia.

The Operator proposes that an exclusion zone will be in place around the drilling unit for the duration of the Project. The size of this exclusion zone will be agreed with the Government of The Gambia and the Gambia Ports Authority but it is anticipated to have a 500 m radius. Typically, National Navy resources/assets are offered for policing of this zone and the Operator intends to work closely with the Ministry of Petroleum and Energy to build out this security framework. The Operator will provide all relevant information including the names of supply vessels and/or work boats, the final position of the drilling unit and the minimum horizontal clearance required for transitioning ships to the Gambia Ports Authority, prior to drilling commencing. The Gambia and/or Dakar Ports Authority will then provide this information for promulgation in the Notices to Mariners (NTM). Residual impacts on the shipping industry from the Project are anticipated to be of negligible adverse significance.

The Operator will undertake a survey of the ocean floor prior to commencing drilling to record the ecology (and therefore fish species) present. The Operator will also minimise the impacts to the seabed where possible using a dynamic positioning system instead of anchors to maintain the location of the drilling unit. Residual impacts on the fishing industry from the Project are anticipated to be of negligible to minor adverse significance.

The Operator will promote the accommodation facilities in The Gambia with their staff and encourage staff who are on leave to explore and make use of the tourism facilities within The Gambia. Residual economic impacts on the tourism industry from the Project are anticipated to be of negligible to minor beneficial significance.

The Operator will liaise closely with Civil Aviation Authority to ensure that there is no impact on the day to day operations of Banjul International Airport from additional helicopter flights to and from the drilling unit. Discussions will also be held to ensure that disturbance to the population and tourism industry from helicopter flights is kept to a minimum. Residual noise and visual impacts from the Project on the tourism industry are anticipated to be of negligible adverse significance.

Noise

The Project will generate noise, both above water (atmospheric noise) and underwater. Noise Sensitive Receptors (NSRs) which can be affected by atmospheric noise comprise; people, and locations at which people may expect reasonably low noise levels, such as dwellings, institutions (educational facilities, hospitals) and cultural locations (churches, museums etc.). However, atmospheric noise generated by the Project will be

sufficiently far from land based NSRs (at least 50 km) that distance attenuation will result in noise levels due to the Project well below the level of detectability and no impacts are anticipated.

NSRs potentially affected by underwater noise comprise marine life, including fish, reptiles, diving birds and marine mammals. The drilling unit will be the primary noise source, comprising propulsion engines and auxiliary power generation, with the noise being of comparatively short duration and transient through the environment.

Although it is anticipated that the noise from the Project operations may cause disturbance to noise sensitive species present near the drilling unit; a review of the available literature indicates that the majority of species will actively avoid sources of noise. The distances at which permanent damage may occur are small, in comparison to the speed and range of identified noise sensitive species. Following "soft start" procedures, to minimise startle effects and allow sensitive species to migrate to safe distances following any period of shut-down, will reduce the likelihood of effects and residual impacts of negligible adverse significance are anticipated.

In addition to the drilling unit, it is proposed that seismic-while-drilling (SWD) will be used. SWD comprises a seismic source, either located at the sea surface or within the well, and a receiver within the well. Unlike noise from the drilling unit, noise from SWD will not be continuous, and will be in pulses at approximately hourly intervals. Despite the non-continuous nature of SWD noise, it is assumed that its frequent occurrence will allow noise-sensitive species to move away from the area and maintain a comfortable stand-off distance without risk of injury. A marine mammal observer will be retained to ensure no species are present within the zone at which adverse effects may occur during seismic survey.

Waste Management

The Project will produce waste through a variety of activities, including:

- food waste produced by the drilling unit and supply vessels;
- packaging and domestic waste (cans, bottles, plastic, paper and cardboard) produced by the drilling unit, supply vessels and onshore supply facilities;
- scrap metal and/or wood; and
- hazardous or chemical waste (oils, paints, batteries, containers) produced by the drilling unit and supply vessels.

The Operator will produce and abide by a Waste Management Plan for the duration of the Project. The Waste Management Plan will identify all types of waste anticipated to be created by the Project (through both the marine and shore based operations) and the appropriate methods of disposal. The Waste Management Plan will operate on a hierarchy basis with the re-use and recycling of waste promoted over the discarding of waste to landfill and will follow International Finance Corporation Environmental, Health and Safety guidelines and the MARPOL Convention.

Following the correct implementation of the Waste Management Plan a negligible beneficial residual impact is anticipated on seabirds and pelagic fish from the discharge of food waste. Negligible adverse residual impacts are anticipated due to the correct disposal of packaging, domestic waste and scrap metal and wood.

Unplanned Impacts

Although engineering and management controls are in place to minimise the risk of unplanned hydrocarbon release occurring, the potential for such risks remain. Unplanned release may occur due to:

- Discharge of hydrocarbons from drilling activities, e.g., uncontrolled hydrocarbon flows from the well often referred to as a blow out, well test release, emergency disconnect of the marine riser package.
- Discharge of hydrocarbons from the drilling unit or supply vessels during the transfer of fuel from the supply vessels to the drilling unit.

- Discharge of diesel from the drilling unit or supply vessels due to a rupture of the fuel storage containers.

To assess the potential impacts, four different release scenarios were modelled and assessed. An Oil Pollution Emergency Plan (OPEP) has been prepared detailing the release scenarios and identifying the mitigation measures required to prevent the release of hydrocarbons and in a worst-case scenario measure to control and recover hydrocarbons from a spill.

Impacts from a hydrocarbon discharge range from negligible adverse significance to moderate to major adverse significance depending on the volume and type of discharge. Receptors impacted would potentially include water quality in the Atlantic Ocean, marine organisms (marine mammals, sea turtles, seabirds, etc.), marine and coastal habitats and the tourism and fishing industries.

The OPEP provides a specific and an appropriate response to each scenario to minimise the risk to these receptors. This includes a tiered approach, recognising Operator, national and international tiered response.

Socio-Environmental Management Plan

A Socio-Environmental Management Plan (SEMP) for the Project will be in operation for the duration of the Project. The SEMP provides a delivery and reporting mechanism for the implementation of the mitigation measures identified in the EIS. The SEMP identifies the following:

- the socio-environmental responsibilities of the Operator and its employees/contractors;
- the requirements for Project operatives to undertake method statements and/or risk assessments of the different tasks relating to the Project;
- the socio-environmental monitoring and reporting requirements of the Project;
- incident and emergency preparedness and response;
- the mechanism for grievances to be raised; and
- the incident and emergency response.

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