

2.1 INTRODUCTION

This chapter outlines the Ghanaian administrative framework and describes the relevant Ghanaian legislation, international treaties and industry standards that the Jubilee Phase 1 project will be required to comply with. An outline of the corporate Environmental, Health and Safety policies and standards that have been adopted by Jubilee Joint Venture team is also provided.

2.2 ADMINISTRATIVE FRAMEWORK

An overview of Ghanaian government ministries and the key administrative bodies (ie authorities, agencies and commissions) with responsibilities related to the project is given below and illustrated in *Figure 2.1*.

- Ministry of Environment, Science and Technology - represented through the Environmental Protection Agency (EPA);
- Ministry of Energy - represented through the Ghana National Petroleum Corporation (GNPC);
- Ministry of Transport - represented through the Ghana Maritime Authority (GMA) and the Ghana Ports and Harbours Authority (GPHA);
- Ministry of Food and Agriculture - represented through the Directorate of Fisheries and the Regional Departments of Fisheries; and
- Fisheries Commission.
- Ministry of Defence - represented through the Ghana Navy;
- Ministry of Local Government and Rural Development - represented through the ten Regional Coordinating Councils.

The duties and authorities of the relevant administrative bodies within these key Ministries are discussed further below.

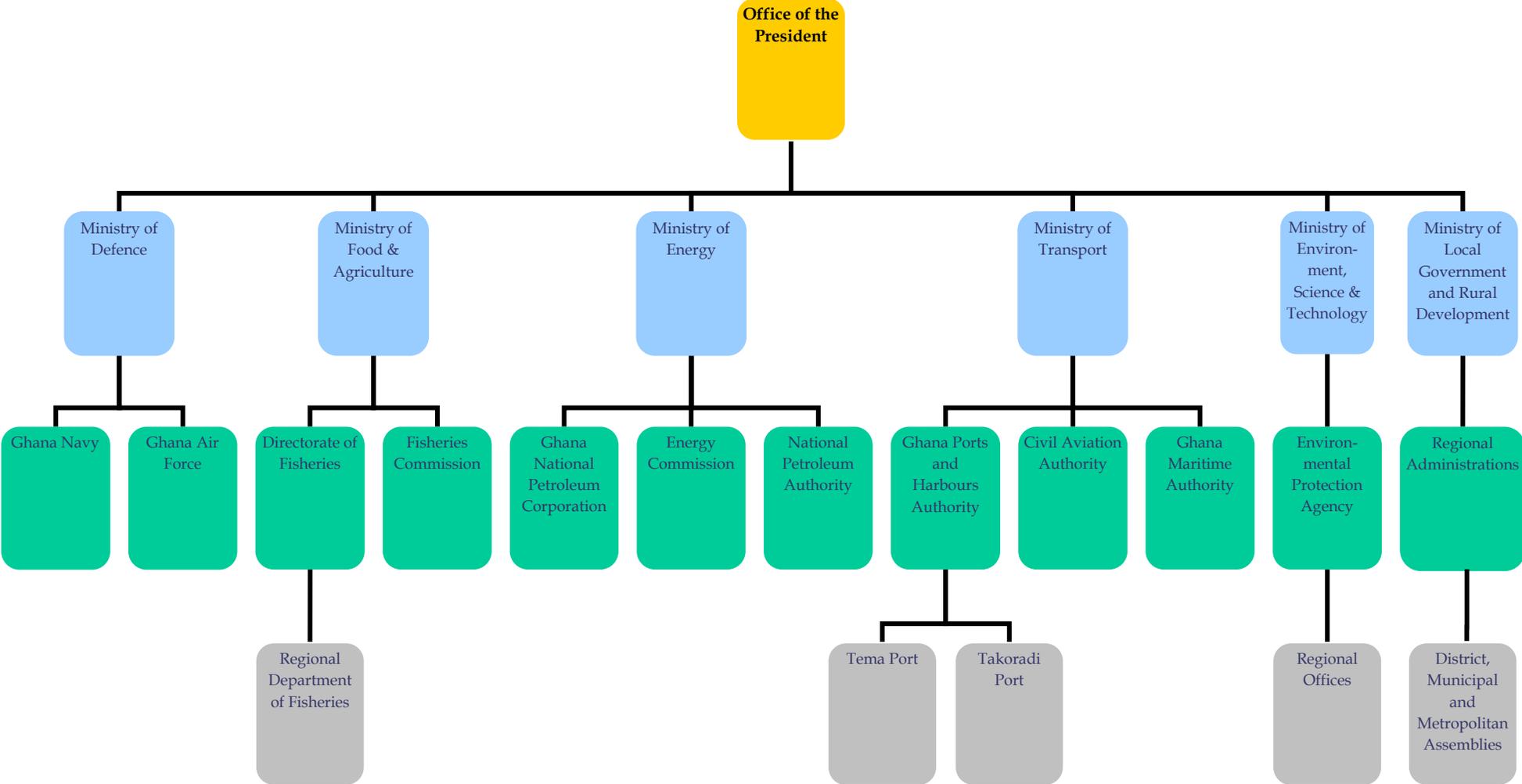
2.2.1 Ministry of Environment, Science and Technology

The Ministry of Environment, Science and Technology exists to establish a strong national scientific and technology base for accelerated sustainable development of the country to enhance the quality of life for all. The Environmental Protection Agency (EPA) is part of this ministry.

The Environmental Protection Agency

The EPA was established under the *Environmental Protection Agency Act (Act 490 of 1994)* as the leading public body responsible for the protection and improvement of the environment in Ghana. It is responsible for enforcing environmental policy and legislation, prescribing standards and guidelines, inspecting and regulating businesses and responding to emergency incidents.

Figure 2.1 Relevant Ghanaian Ministries and Administrative Bodies



The EPA is responsible for issuing environmental permits and pollution abatement notices for controlling waste discharges, emissions, deposits or other source of pollutants and issuing directives, procedures or warnings for the purpose of controlling noise. The EPA has the authority to require an EIA, is responsible for ensuring compliance with EIA procedures and is the lead EIA decision-maker.

2.2.2 *Ministry of Energy*

The Ministry of Energy is responsible for developing and implementing energy sector policy in Ghana and for supervising the operations of a number of government institutions, including the GNPC.

Ghana National Petroleum Corporation

The GNPC was established in 1983 by the *Ghana National Petroleum Corporation Law (PNDCL 64 of 1983)*. The GNPC is a corporate body established under the Ministry of Energy to promote, explore, develop and regulate Ghana's hydrocarbon resources. The GNPC is empowered to conduct petroleum operations and partner with foreign investors to promote the economic development of Ghana. The GNPC is a joint venture partner in the Jubilee Phase 1 project

2.2.3 *Ministry of Transport*

The Ministry of Transport was created to handle infrastructural development and service delivery for the maritime and rail transport subsectors and to complement the other modes of transport for the socio-economic development of the country. The Ghana Maritime Authority (GMA) and Ghana Ports and Harbour Authority (GPHA) all fall under the national Ministry of Transport

With the assistance of the GMA and the GPHA, the Ministry aims to ensure the provision of an efficient, safe, economic and reliable movement of goods and people using the rail and maritime systems and ensure that rail, inland waterways, ports and harbours contribute significantly to the socio-economic development of the country.

The Ghana Maritime Authority

The GMA was established under the *Maritime Authority Act (Act 630 of 2002)* and is responsible for monitoring, regulation and coordination of all maritime activities for the Republic of Ghana. The purpose of the GMA is to ensure the provision of safe, secure and efficient shipping operations and protection of the marine environment from pollution from ships.

Ghana Ports and Harbour Authority

The GPHA is responsible for planning, managing, building and operating Ghana's seaports. The GPHA owns Ghana's two main seaports (Takoradi and

Tema) and has the following functions with regard to their operation, maintenance and control:

- regulate the use of ports and of the port facilities;
- provide, maintain, extend and enlarge port facilities as required for the efficient and proper operation of the port;
- maintain and deepen the approaches to, and the navigable waters within and outside the limits of any port;
- maintain lighthouses and beacons and other navigational service and aids as necessary;
- provide facilities for the transport, storage, warehousing, loading, unloading and sorting of goods passing through any port, and operate or provide access to road haulage service providers; and
- provide stevedoring and portage services.

Takoradi is the main sea-port closest to the Jubilee field and has been used to support exploration and appraisal drilling previously and will be used for support of the development project's activities.

2.2.4 *Ministry of Food and Agriculture*

The Ministry of Food and Agriculture is the ministry charged with the development and growth of agriculture, including fisheries, in the country with the exception of the cocoa, coffee and forestry sector. Its primary roles are the formulation of appropriate agricultural policies, planning and coordination, monitoring and evaluation within the overall national economic development. The Directorate of Fisheries and the Fisheries Commission fall under this ministry.

Directorate of Fisheries and Fisheries Commission

The Directorate of Fisheries is responsible for policy formulation and implementation, management and control of the fishing industry under the general guidance and direction of the Fisheries Commission.

The Fisheries Act 625 (2002) established the Fisheries Commission as a body to regulate and manage the utilisation of the fishery resources of Ghana and coordinate the related policies. The commission also advises the Minister on all matters pertaining to the fishery industry. The Commission's functions among other things are to ensure the proper conservation of the fishery resources through the prevention of over fishing.

The Directorate's mission is "...to promote sustainable exploitation and responsible utilisation of fishery resources of Ghana through sound management practices, research, appropriate technological development for both culture and capture fisheries, effective extension and provision of other support services to fish farmers, fishermen, fish processors and traders for improved income and fish food security".

The functions of the Directorate are summarised as follows:

- to prepare and keep under continual review, plans for the management and development of marine and freshwater capture fisheries and aquaculture;
- to carry out research for the assessment for fisheries resources; and
- to ensure that monitoring, control and surveillance of the fishery waters of Ghana.

The Directorate has a number of operational divisions for marine fisheries management, namely: inland fisheries management (and aquaculture); marine fisheries research; monitoring; control and surveillance; and finance and administration.

The regional Departments of Fisheries carry out and implement policies of the Directorate of Fisheries particular to the different regions. The regional office for the Western Region is based in Takoradi and this office covers most of the fishing activities in the coastal waters close to the Jubilee Field.

2.2.5 *Ministry of Defence*

The Ministry of Defence have ultimate authority to police Ghanaian waters and enforce Ghanaian legislation. The Ghana Air Force and Navy will provide additional capacity to the Ghana Maritime Authority for marine search and rescue operations if required. They would also be available to provide assistance in the event of an emergency such as a major accident offshore, including oil spills.

2.2.6 *Ministry of Local Government and Rural Development*

The Ministry of Local Government and Rural Development is responsible for the ten Regional Administrations in Ghana. These regions each have a Regional Coordinating Council and are sub-divided into 170 metropolitan, municipal and district areas each with an administrative assembly. Further details of the structure of the administrative assemblies are provided in the Socio-economic Baseline in *Section 4.4.1*. These include the six coastal districts in the Western Region: Jomoro, Nzema East, Ellembelle, Ahanta West, Sekondi-Takoradi and Shama.

2.3 *NATIONAL LEGISLATION*

2.3.1 *The Ghanaian Constitution*

Article 41(k) in Chapter 6 of the constitution of Ghana requires that all citizens (employees and employers) protect and safeguard the natural environment of the Republic of Ghana and its territorial waters.

Environmental Legislation

The Environmental Protection Act

The Environmental Protection Act (Act 490 of 1994) establishes the authority, responsibility, structure and funding of the EPA. Part I of the Act mandates the EPA with the formulation of environmental policy, issuing of environmental permits and pollution abatement notices and prescribing standards and guidelines. The Act defines the requirements and responsibilities of the Environmental Protection Inspectors and empowers the EPA to request that an EIA process be undertaken.

Section 10 of Part 2 of the Act provides for the establishment of a hazardous chemicals committee, comprising representatives from key government organisations with an interest in chemical management, to monitor and advise the EPA on the importation, exportation, manufacture, distribution, use and disposal of hazardous chemicals⁽¹⁾.

To perform its duties under the Act, the EPA has a Division called the Chemicals Control and Management Centre (CCMC), which plays a vital role in the management of chemicals in Ghana. The CCMC's primary objective is to protect human health and the environment from the possible effects of chemicals. The CCMC issues chemical clearance permits to importers of industrial chemicals. It is mandatory for applicants to submit an application form and copies of the Material Safety Data Sheets (MSDS) of every chemical they intend to import into Ghana to the CCMC. These applications are subsequently screened based on the information provided on the MSDS and other sources. In accordance with this procedure, Tullow will obtain relevant permits for all chemicals to be used for the Jubilee Phase 1 project. The CCMC also supervises the disposal of obsolete chemicals. The CCMC collects information on all chemicals (industrial and agrochemicals) imported into Ghana. The EPA has a national database with safety information on chemicals and keeps registers on imports, toxic chemicals and pesticides which are available for public inspection.

Environmental Assessment Regulations

The EIA process is legislated through the *Environmental Assessment Regulations (LI 652, 1999) as amended (2002)*, the principal enactment within the *Environmental Protection Act (Act 490 of 1994)*. The EIA Regulations require that all activities likely to have an adverse effect on the environment must be subject to environmental assessment and issuance of a permit before commencement of the activity.

(1) Certain important terms used in the EPA Act such as chemicals, toxic substances, substances which are hazardous have not been defined.

The Regulations set out the requirements for the following:

- Preliminary Environmental Reports (PERs);
- Environmental Impact Assessment (EIA);
- Environmental Impact Statements (EISs);
- Environmental Management Plans (EMPs).
- Environmental Certificates; and
- Environmental Permitting.

Schedules 1 and 2 of the Regulations provide lists of activities for which an environmental permit is required and EIA is mandatory, respectively. Schedule 2 includes oil and gas field developments, construction of offshore and onshore pipelines, construction of oil and gas separation, processing, handling and storage facilities and the construction of oil refineries. The Regulations define what is to be addressed within the EIA, how the EIA process should involve the public and outlines the steps to be followed within the process. An outline of the EIA process is provided in *Chapter 1*. These requirements, along with references to relevant sections within the EIS, are provided in *Table 2.1*.

2.3.3 *Environmental Guidelines*

The EPA has issued formal guidance on regulatory requirements and the EIA process. The following documents are relevant to the EIA process and the project.

- *Environmental Assessment in Ghana, a Guide (1996) to Environmental Impact Assessment Procedures (1995)* is an EPA guidance document which outlines procedures to be adhered to when undertaking an EIA.
- *Environmental Quality Guidelines for Ambient Air (EPA)* provides advice on maximum permissible levels of a variety of air pollutants.
- *Sector Specific Effluent Quality Guidelines for Discharges into Natural Water Bodies (EPA)* provides maximum permissible effluent discharge concentrations for a number of parameters.
- *General Environmental Quality Standards for Industrial or Facility Effluents, Air Quality and Noise Levels*. The EPA has published draft standards for industrial or facility effluents, air quality and noise levels. These standards have not been promulgated as of November 2009. Effluent limitations are set out in Schedule 1 while Schedule 2 provides national environmental guidelines for the emission of pollutants from stacks into the atmosphere. Schedule 3 of these draft standards that provides ambient air quality guidelines and ambient noise level standards are outlined in Schedule 4.

Table 2.1 *Required Contents of the EIS*

Reference	Requirement within the EIA Regulations	EIS Reference
a.	A description of the undertaking.	Chapter 3
b.	An analysis of the need for the undertaking.	Chapter 1
c.	Alternatives to the undertaking including alternative situations where the undertaking is not proceeded with.	Chapter 3
d.	Matters on site selection including a statement of the reasons for the choice of the proposed site and whether any alternative site was considered.	Chapter 3
e.	An identification of existing environmental conditions including social, economic and other.	Chapters 4
f.	Information on potential, positive and negative impacts of the proposed undertaking from the environmental, social, economic and cultural aspect in relation to the different phases of development of the undertaking.	Chapter 5
g.	The potential impact on the health of people.	Chapter 5
h.	Proposals to mitigate any potential negative socio-economic, cultural and public health impacts on the environment.	Chapter 5 and 6
i.	Proposals to be developed to monitor predictable environmental impact and proposed mitigating measures.	Chapter 7
j.	Contingency plans existing or to be evolved to address any unpredicted negative environmental impact and proposed mitigating measures.	Chapter 6
k.	Consultation with members of the public likely to be affected by the operations of the undertaking.	Annex A
l.	Maps, plans, tables, graphs, diagrams and other illustrative material that will assist with comprehension of the contents of the environmental impact statement.	Chapters 1-6
m.	A provisional environmental management plan.	Chapter 9
n.	Proposals for payment of compensation for possible damage to land or property arising from the operation of the undertaking.	Chapter 9
o.	An indication whether any area outside Ghana is likely to be affected by the activities of the undertaking.	Chapter 5

Petroleum Legislation

Ghana National Petroleum Corporation Act

The *Ghana National Petroleum Corporation Act (Act 64 of 1983)* established the Ghana National Petroleum Corporation (GNPC) as mandated to:

- promote exploration and planned development of the petroleum resources of the Republic of Ghana;
- ensure the greatest possible benefits from the development of its petroleum resources;
- obtain effective technology transfer relating to petroleum operations;
- ensure the training of citizens and the development of national capabilities; and
- prevent adverse effects on the environment, resources and people of Ghana as a result of petroleum operations.

Apart from allowing the GNPC to engage in petroleum operations and associated research, the law empowers the GNPC to advise the Minister of Energy on matters related to petroleum operations.

The Petroleum (Exploration & Production) Law

The Petroleum (Exploration and Production) Law (Act 84 of 1984) establishes the legal and fiscal framework for petroleum exploration and production activities in Ghana. The Act sets out the rights, duties and responsibilities of contractors; details for petroleum contracts; and compensation payable to those affected by activities in the petroleum sector.

Act 84 gives regulatory authority to the Ministry of Energy on behalf of the State. All petroleum operations are required to be conducted in such a manner as to prevent adverse effects on the environment, resources and people of Ghana.

Act 84 requires that a Plan of Development (PoD) for proposed developments be submitted and approved by the GNPC, The Ministry of Energy and the EPA before development of the field. In addition, an Environmental, Health, and Safety (EHS) Manual, containing details on health, safety, and environmental issues, policies and procedures must be submitted to the GNPC for review before commencement of development activities. The Act further requires that EHS audits of operations be conducted by the EPA and the GNPC.

The Act requires that emergency plans for handling accidents and incidents are discussed and agreed upon with the GNPC and the EPA before the commencement of operations.

National Petroleum Authority Act

The National Petroleum Authority Act (Act 691 of 2005) establishes the National Petroleum Authority (NPA) of Ghana to regulate, oversee and monitor downstream petroleum activities. The Act mandates the NPA to establish a Unified Petroleum Price Fund and provides for the regulation and licensing of storage and selling of petroleum products.

2.3.5 Maritime Legislation

Maritime Zones (Delimitation) Law

The Maritime Zones (Delimitation) Law (PNDCL 159 of 1986) defines the extent of the territorial sea and Exclusive Economic Zone (EEZ) of Ghana. The territorial sea is defined as those waters within 12 nautical miles (approximately 24 km) of the low waterline of the sea. The Act defines the EEZ as the area beyond and adjacent to the territorial sea less than two hundred nautical miles (approximately 396 km) from the low waterline of the sea. The Act also grants the rights, to the extent as permitted by international law, to the government of Ghana for the purposes of:

“exploring and exploiting, conserving and managing the natural resources, whether living or non-living, of the waters superjacent to the sea-bed and of the sea-bed and its subsoil, and with regard to any other activities for the economic exploration and exploitation of the zone, such as the production of energy from the water, currents and winds...”

Fisheries Act

The Fisheries Act (Act 625 of 2002) repeals the *Fisheries Commission Act (Act 457 of 1993)* to consolidate and amend the law on fisheries. The Act provides for the regulation, management and development of fisheries and promotes the sustainable exploitation of fishery resources.

Part 1 of the Act deals with the establishment, functioning and responsibilities of the Fisheries Commission, and its mandate to manage national fishery resources. Part 3 regulates the management and development of fishery resources, including conservation measures, while Part 4 relates to jurisdiction and evidence related to non-compliance with the Act.

Section 91 allows for the establishment of marine reserves and prohibits fishing, dredging and removal of sand or gravels and the disturbance of natural habitat without permission of the Minister.

Section 92 prohibits the pollution of water such that there is an adverse effect on aquatic resources and provides details of penalties.

Section 93 requires that the Fisheries Commission be informed of any activities likely to have substantial impact on fishery resources before commencement of the activity and allows the Fisheries Commission to require reports and recommendations by the proponent on the likely impact of the

activity and possible means of preventing or minimising adverse impacts which shall be taken into account in the planning of the activities.

2.3.6 *Water Resources Legislation*

The Water Resources Commission Act

The Water Resources Commission Act (Act 522 of 1996) establishes a commission to regulate and manage the water resources of the Republic of Ghana. The commission is tasked with establishing comprehensive plans for the use, conservation, protection, development and improvement of Ghana's water resources and is able to grant rights for the exploitation of water resources.

No water may be used without the granting of water rights, which may be granted, on application, by the Commission. The Act lays out the requirements and process for the application and subsequent transfer of such rights.

Water and Sewerage Corporation Act (Act 310 of 1965)

Section 14(e) of the *Water and Sewerage Corporation Act (Act 310 of 1965)* establishes a body which is mandated with:

*“(a) The provision, distribution and conservation of the supply of water in Ghana for public, domestic and industrial purposes; and
(b) The establishment, operation and control of sewerage systems for such purposes.”*

The Water and Sewerage Corporation is authorised to make regulations regarding the prevention of water pollution.

2.3.7 *Pollution Control*

There is currently no single integrated pollution legislation in Ghana. Pollution control exists as part of the environmental and water resource legislation and marine pollution is dealt with by the *Oil in Navigable Waters Act (Act 235 of 1964)* (see below). A Marine Pollution Act is currently in draft stages of the legislative process which, when enacted, will empower the GMA to regulate marine pollution.

Section 2(f) of the *Environmental Protection Act (Act 490 of 1994)* enables the EPA to issue pollution abatement notices for:

“controlling the volume, types, constituents and effects of waste discharges, emissions, deposits or other source of pollutants and of substances which are hazardous or potentially dangerous to the quality of the environment or any segment of the environment...”

Section 2(h) of the Act allows the EPA to prescribe standards and guidelines relating to air, water, land and other forms of environmental pollution.

Section 2(j) requires the EPA to co-operate with District Assemblies and other bodies to control pollution.

The Water Resources Commission Act 1996 (see Section 2.3.6 above) also addresses the control of water pollution. Section 24 of the Act prohibits the interference, altering, pollution or fouling of water resources beyond levels prescribed by the EPA and prescribes penalties for non-compliance.

Oil in Navigable Waters Act

The *Oil in Navigable Waters Act (Act 235 of 1964)* is the law which is mostly concerned with the control of water pollution. It was enacted in 1964 to give effect to the *International Convention for the Prevention of Pollution of the Sea by Oil (1954)* and also addresses oil pollution in inland waters.

Section 1 of the Act seeks to regulate the discharge of oil into prohibited areas of the sea. The Act extends the prohibition of pollution to the high seas by ships registered in Ghana and requires that Ghanaian ships be fitted so as to prevent oil fuel leakages or draining of oil into the bilges (unless the oil in the bilges is not discharged).

Section 3 of the Act deals with the discharge of oil into Ghanaian waters, defined by sub-section 2 as:

“(a) the whole of the sea within the seaward limits of the territorial waters of Ghana, and (b) all other waters (including inland waters) which are within those limits and are navigable by sea-going ships.”

The Act makes the discharge of any oil or mixture containing oil from any vessel or from land an offence. The owner or master of the ship, or the occupier of the land, or person in charge of the apparatus from where the oil was discharged, may be charged and found guilty of the offense.

Radiation Protection Instrument

The Radiation Protection Instrument 1993 (LI 1559) establishes the Radiation Protection Board, which licenses importers and users of radioactive material and instrumentation. The Board is responsible for ensuring operations relating to devices that use radioactive materials are carried out without risk to the public health and safety and the installations and facilities are designed, installed, calibrated and operated in accordance with prescribed standards.

2.3.8

Protection of Coastal and Marine Areas

Ghana subscribes to a number of international conservation programmes, however, Ghana has at present no nationally legislated coastal or marine protected areas and there are no international protection programmes specifically covering the project area.

Ramsar Sites

The *Wetland Management (Ramsar Sites) Regulations 1999* are made under the *Wild Animals Preservation Act 1961 (Act 43)* and provide for the establishment of Ramsar sites within Ghana. For designated sites, activities that are not permitted include pollution of water, use of chemicals, hunting wild animals, grazing livestock, fishing using certain gear and in certain seasons and other activities that may have an adverse effect on the environment. Under the regulations the Minister of Forestry can designate areas within the Ramsar site where certain activities can be carried out, eg sand and soil removal.

There are five designated Ramsar wetland sites along the coast of Ghana including: Keta Lagoon Complex; Densu Delta; Muni-Pomadze; Sakumo; and Songor. There is a sixth Ramsar site (Owabi Wildlife Sanctuary) situated inland.

Other Protected Area

Ghana also has one UN Biosphere Reserve and two World Heritage Convention sites. The World Heritage Convention sites include the Asante Traditional Buildings, located near Kumasi, as well as Forts and Castles, most of which are located along the coast in the Central and Western Regions (UNESCO, 2009). According to EarthTrends (2003b), Ghana has more than 1,000 IUCN-management protected areas including 317 Forest Reserves, five Game Production Reserves, seven National Parks, two Resource Reserves, one Strict Nature Reserve, and four Wildlife Sanctuaries (UNEP-WCMC, 2008).

Environmental Strategies, Policies and Plans

A number of government strategies and policies are relevant to the environmental protection of the coastal zone. These include.

- **The National Biodiversity Strategy.** Ghana signed (1992) and ratified (1994) the Convention on Biological Diversity and developed a National Biodiversity Strategy in 2002 for the sustainable use of its biological resources. Forest reserves, national parks and other wildlife reserves including various traditional forms of conservation have been set established to protect biological conservation. These areas occupy approximately 16% of Ghana's land surface. It is recognised that there is a lack of information on biological resources in Ghana and there is a need to address these data gaps. It is further recognised that for sustainable development there is a need to integrate biodiversity issues into national development planning programmes. The strategy recommends the establishment of a National Biodiversity Commission to coordinate policy and the implementation of the strategy among the relevant agencies under the Ministries as well as NGOs, CBOs and local communities.
- **The National Environment Policy:** The National Environment Policy was set out from the National Environmental Action Plan (NEAP). The Plan seeks to redirect national development into more environmentally sustainable programmes and practices through: i) the protection and

preservation of the resource base, ii) prior assessment of the potential environmental impacts of development projects, iii) alternative or multi-purpose uses of land and water resources, and iv) the promotion of popular participation in planning, evaluating, and implementing environmental and development strategies.

- **National Wetlands Policy:** The policy promotes the conservation of wetlands included on the Ramsar List and use of wetlands to ensure their “sustainable utilisation for the benefit of humankind in a way compatible with the maintenance of natural properties of the ecosystem”. The policy recognises wetlands as environmental conservation areas and precludes certain activities within its boundaries (eg mining, waste disposal and infrastructure development).
- **Tourism Development Policy:** Ghana’s National Tourism Policy focuses on promoting in-bound international tourism, regional tourism and domestic tourism.
- **Land Management Policy:** This policy seeks to promote the judicious use of the nation’s land and all its natural resources by all sectors of the Ghanaian society in support of various socioeconomic activities undertaken in accordance with sustainable resource use and maintenance of viable ecosystems. The policy indicates that land for private use must be accessed either through negotiation or compulsory acquisition.
- **Forest and Wildlife Conservation Policy:** This policy is aimed at conservation and sustainable development of the nation's forest and wildlife resources for maintenance of environmental quality and perpetual flow of optimum benefits to all segments of society. The policy provides for additional basis to develop a national forest estate and a timber industry that provides the full range of benefits required by society in a manner that is ecologically sustainable and that conserves the environmental and cultural heritage.

A number of national plans have been formulated to address these areas of coastal management. All the plans and programs are meant to provide for the preservation and sustainable use of fragile ecosystems, such as those that include mangroves or coral reefs. These plans and studies include the following:

- The Coastal Zone Management Indicative Plan (1990);
- The National Environmental Action Plan (1994);
- The Integrated Tourism Development Plan (ITDP) (1996-2010);
- The Draft Integrated Coastal Zone Plan (1998); and
- The National Oil Spill Contingency Plan (2002, Revised Draft 2009).

Labour Act

The *Labour Act (Act no 651 of 2003)* consolidates and updates the various pieces of former legislation, and introduces provisions to reflect International Labour Organisation (ILO) Conventions ratified by Ghana (see *Section 2.4.6*). The Labour Act covers all employers and employees except those in strategic positions such as the armed forces, police service, prisons service and the security intelligence agencies.

Major provisions of the Labour Act include the following:

- establishment of public and private employment centres;
- protection of the employment relationship;
- general conditions of employment;
- employment of persons with disabilities;
- employment of young persons;
- employment of women;
- fair and unfair termination of employment;
- protection of remuneration;
- temporary and casual employees;
- unions, employers' organisations and collective agreements;
- strikes;
- establishment of a National Tripartite Committee;
- forced labour;
- occupational health and safety;
- labour inspection; and
- establishment of the National Labour Commission.

Part XV of the *Labour Act* contains provisions relating specifically to occupational health, safety and environment. These include general health and safety conditions, exposure to imminent hazards, employer occupational accidents and diseases reporting.

Children's Act

The *Children's Act (Act No. 560 of 1998)* defines a child as a person below the age of eighteen years. Sections 12 and 87 prohibit engaging a child in exploitative labour, defined to mean labour depriving the child of its health, education or development.

Commission on Human Rights and Administrative Justice Act

The *Commission on Human Rights and Administrative Justice Act (Act No. 456 of 1993)*, establishes a Commission on Human Rights and Administrative Justice to investigate complaints of violations of fundamental human rights and freedoms, injustice and corruption, abuse of power and unfair treatment of

persons by public officers in the exercise of their duties, with power to seek remedy in respect of such acts or omissions.

National Vocational Training Act

The *National Vocational Training Act (Act No. 351 of 1970)* and the *National Vocational Training Regulations (Executive Instrument 15)* oblige employers to provide training for their employees for the attainment of the level of competence required for the performance of their jobs and to enhance their career.

Labour Provisions of the Shipping Act

The *Shipping Act (Act No. 645 of 2003)* regulates the engagement and welfare of seafarers, in particular with respect to crew agreements, wages, occupational safety and health, required provisions and water on board, protection of seafarers from imposition and relief and repatriation. Part VII regulates safety of life at sea. The Act applies to Ghanaian ships wherever they may be and other ships while in a port or place in or within the territorial and other waters of Ghana (section 480).

2.4 STATE, CONVENTIONS AND CLASSIFICATION REQUIREMENTS

The regulatory requirements for an FPSO are generally set out by the coastal state or shelf state, the flag state, international conventions and the classification society. An FPSO needs to satisfy all of the requirements from these authorities before it is approved fit for purpose. This section provides an overview of the principal relationships between and requirements of these regulators.

2.4.1 Coastal State Regulations

All countries have full sovereignty to regulate activities on their continental shelves. As the Jubilee FPSO will be located on Ghana's continental shelf, Ghana regulations, as administered by the Ghana Maritime Authority, are the governing regulations and take precedence over all flag state and class requirements. However, many jurisdictions, including Ghana, refer to maritime codes, rules and standards related to flag and classification requirements and technical standards for FPSO design and operation. In the case of the Jubilee FPSO, GMA refers to the regulations of the nominated flag state which is the Bahamas Maritime Authority (BMA).

2.4.2 Flag State Regulations

Ships or offshore facilities trading internationally have to comply with the safety regulations of the maritime authority from the country whose flag the unit is flying. An FPSO does not need a flag unless required by the coastal state (ie GMA in Ghana) or when in transit through international waters. The Jubilee FPSO will be flagged and use the Bahamas as the flag state. Flag states

require classification and implementation of the safety regulations such as those of the International Maritime Organisation (IMO).

The Bahamas Maritime Authority requires all commercial vessels registered in the Bahamas to be surveyed, certified and undergo verification by Bahamas Recognised Organisations (eg Det Norske Veritas, Bureau Veritas and American Bureau of Shipping). The *Bahamas Merchant Shipping Act Section 172* requires that the FPSO is to be satisfactorily inspected on an annual basis.

2.4.3 *International Conventions*

The IMO is the marine affairs organisation of the United Nations and develops and maintains conventions that provide safety regulations for ships and mobile offshore units operating internationally.

Of the conventions defined by IMO the following are relevant to FPSOs.

- *International Convention for the Safety of Life at Sea.*
- *International Convention for the Prevention of Pollution from Ships (MARPOL).*
- *International Convention on Load Lines.*
- *International Convention on Tonnage Measurement of Ships.*

The degree to which these are enforced depends on the flag state. Further details on the international conventions relevant to the EIA (eg MARPOL) are provided in *Section 2.5*.

2.4.4 *Classification Societies*

Classification provides assurance that a ship or offshore installation has been designed, constructed and maintained in accordance with sound principles. Major class societies (eg Bureau Veritas, American Bureau of Shipping and Det Norske Veritas and Lloyd's Register) have developed dedicated FPSO rules and standards. Flag states require flagged units to be classed and most coastal states refer to class as the recognised standard for maritime aspects of FPSOs. The Jubilee FPSO will undergo classification as an FPSO according to the American Bureau of Shipping (ABS) classification society rules. Further details on classification are provided in *Chapter 3, Section 3.4.2*.

2.5 *RELEVANT INTERNATIONAL AGREEMENTS AND CONVENTIONS*

2.5.1 *United Nations Convention on the Laws of the Sea*

Ghana is signatory to the United Nations Convention on the Laws of the Sea (UNCLOS). Under this convention Ghana claims rights within 12 nautical miles (nm) of territorial water and a 200 nm Exclusive Economic Zone (EEZ). The Jubilee Field is located approximately 32 nm offshore and therefore outside Ghana's territorial water but inside the 200 nm EEZ. Clearance for project vessels travelling into the territorial waters (eg to and from the onshore

base) must be obtained from the Ghana Maritime Authority (GMA) and notification should also be made to the Ghanaian Navy.

2.5.2 *International Maritime Organisation Conventions*

Ghana is signatory to the following International Maritime Organisation (IMO) Conventions:

- *International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties (Intervention Convention), 1969;*
- *Convention on the International Regulations for Preventing Collisions at Sea (COLREGs), 1972;*
- *International Convention for the Safety of Life at Sea (SOLAS), 1974.*
- *Convention on Limitation of Liability for Maritime Claims (LLMC), 1976;*
- *International Convention on Standards of Training, Certification, and Watchkeeping for Seafarers (STCW), 1978;*
- *International Convention for the Prevention of Marine Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78); and*
- *International Convention of Oil Preparedness, Response and Co-operation (OPRC), adopted 1990.*

Further details of the MARPOL Convention and the OPRC Convention are provided below.

The MARPOL Convention

The *International Convention for the Prevention of Pollution from Ships (MARPOL 73/78)* contains a number of the provisions relevant to the project. These include general requirements regarding the control of waste oil, engine oil discharges as well as grey and black waste water discharges.

The MARPOL Convention initially comprised *Regulations for the Prevention of Pollution by Oil (Annex I)* and *Regulations for the Control of Pollution by Noxious Liquid Substances in Bulk (Annex II)*. Another four annexes have subsequently been added. Ratified parties must accept Annexes I and II, but the other four are voluntary. *Table 2.2* provides a list of MARPOL provisions relevant to oil and gas developments. Ghana has ratified Annexes I and II only and a draft Marine Pollution Bill has been prepared to adopt the remaining four annexes of the MARPOL standards into Ghanaian legislation. It is the intent of the project to comply with the relevant annexes that are not yet ratified. The World Bank's International Finance Corporation (IFC) EHS guidelines for offshore oil and gas development (*Section 2.5.3*) also require compliance with MARPOL and its annexes. MARPOL Annex I also designates 'special areas' where there are stricter controls on discharge of oily wastes. Waters offshore Ghana are not within a MARPOL special area.

Table 2.2 *MARPOL 1973/1978 Provisions Relevant to FPSO Oil and Gas Developments*

Environmental Aspect	Provisions of MARPOL 1973/1978	Annex	Annex
Drainage water	Ship must be proceeding en route, not within a 'special area' and oil must not exceed 15 ppm (without dilution). Vessel must be equipped with an oil filtering system, automatic cutoff and an oil retention system.	I	Ratified
Accidental oil discharge	Shipboard oil pollution emergency plan (SOPEP) is required.	I	Ratified
FPSO hull configuration	Revisions to Annex I issued under IMO Resolution MEPC.139 (53) exclude FPSOs from the definition of an oil tanker. It further stipulates that in the case of a new purpose-built FPSO hulls, the vessel must be configured with double sides, but for an FPSO based on a conversion a single hull may be utilised provided that "appropriate measures" are taken to mitigate the risk of low energy collisions between the FPSOs and other vessels.	I	Ratified
Bulked chemicals	Prohibits the discharge of noxious liquid substances, pollution hazard substances and associated tank washings. Vessels require to undergo periodic inspections to ensure compliance. All vessels must carry a Procedures and Arrangements Manual and Cargo Record Book.	II	Not yet Ratified
Sewage discharge	Discharge of sewage is permitted only if the ship has approved sewage treatment facilities, the test result of the facilities are documented, and the effluent will not produce visible floating solids nor cause discoloration of the surrounding water.	IV	Not yet Ratified
Garbage	Disposal of garbage from ships and fixed or floating platforms is prohibited. Ships must carry a garbage management plan and shall be provided with a Garbage Record Book.	V	Not yet Ratified
Food waste	Discharge of food waste ground to pass through a 25-mm mesh is permitted for facilities more than 12 nautical miles from land.	V	Not yet Ratified
Air pollutant emissions	Sets limits on sulphur oxide and nitrogen oxide emissions from ship exhausts and prohibits deliberate emissions of ozone-depleting substances including halons and chlorofluorocarbons. Sets limits on emissions of nitrogen oxides from diesel engines. Prohibits the incineration of certain products on board such as contaminated packaging materials and polychlorinated biphenyls.	VI	Not yet Ratified

The OPRC Convention

The OPRC convention came into force in 1995 and requires Parties to establish measures for dealing with major incidents or threats to marine pollution, either nationally or in co-operation with other countries. Ships are required to carry a shipboard oil pollution emergency plan and to report incidents of pollution to coastal authorities. Offshore operators are required to have oil pollution emergency plans or similar arrangements which must be co-ordinated with national systems for responding promptly and effectively to oil pollution incidents.

The convention calls for the establishment of stockpiles of oil spill combating equipment, the holding of oil spill combating exercises and the development of detailed plans for dealing with pollution incidents. Parties to the convention are required to provide assistance to others in the event of a pollution emergency and provision is made for the reimbursement of any assistance provided.

2.5.3 *The Abidjan Convention*

The International Convention for the Co-operation in the Protection and Development of the Marine and Coastal Environment of the West and Central African Region (the Abidjan Convention), 1981 was signed in March 1981 and came into force in 1984. In compliance with a number of other regional conventions, the Abidjan Convention deals with pollution from ships, via incidental discharges and dumping, by referring the contracting parties to the applicable global conventions.

2.5.4 *International Convention for the Control and Management of Ships' Ballast Water and Sediments*

This convention aims to prevent, minimise, and ultimately eliminate the transfer of harmful aquatic organisms and pathogens through the control and management of ships' ballast water and sediments. Ghana is not currently a signatory to this convention.

Ports and terminals where cleaning or repair of ballast tanks occur will have adequate reception facilities to receive sediments. Ships are required to be surveyed and certified, and may be inspected by Port State Control officers and/or surveyors who can inspect the Ballast Water Record Book and/or sample the ballast water.

The ship can be prevented from discharging its ballast if it is deemed to present a threat to the environment, without the ship thereby being unduly detained or delayed. Ships are required to have onboard and implement a Ballast Water Management Plan approved by the Administration. Whenever possible, all ships using ballast water exchange should do so at least 200 nautical miles from nearest land in water at least 200 metres deep, the absolute minimum being 50 nautical miles from the nearest land.

2.5.5

Basel Convention

The Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (Basel Convention) aims to protect human health and the environment against the adverse effects resulting from the generation, management, movement and disposal of hazardous waste. The Convention regulates the transboundary movement of hazardous waste using the Prior Informed Consent Procedure such that shipments without prior consent are illegal.

The Convention obliges producers of hazardous waste to therefore dispose of their waste in an environmentally responsible manner close to where it is generated. Strong controls on the movement, storage, transport, treatment, reuse, recycling, recovery and final disposal of hazardous waste are imposed.

Transboundary movements would generally be approved, if:

- (a) the state of export does not have the capability of managing or disposing of the waste in an environmentally sound manner, such as may be the case in Ghana, or
- (b) the receiving state has appropriate, environmentally sound facilities, and agrees to accept the waste.

Ghana gained accession to the Basel Convention on 30 May 2003 (accession has the same legal effect as ratification) which means that it must comply with all the requirements of the Convention. Therefore, certain wastes generated in Ghana, or within its territorial waters, that are exported to another country, will be subject to the provisions of the Basel Convention. Wastes generated from 'normal operations of a ship' are specifically excluded from the Basel Convention, the management of which is covered by MARPOL.

2.5.6

Bamako Convention

Ghana is a signatory to the *1991 Convention on the Ban of the Import into Africa and the Control of Transboundary Movement of Hazardous Wastes within Africa (Bamako Convention)*. This convention is supplementary to the Basel Convention and covers movement of hazardous waste into or between signatory African countries. The Convention has many provisions virtually identical, or analogous, to the Basel Convention provisions.

2.5.7

International Labour Organisation Conventions Ratified by Ghana

Ghana joined the International Labour Organisation (ILO) in 1957 and has ratified 46 ILO Conventions, including the following core Conventions:

- ILO Convention 29 on Forced Labour;
- ILO Convention 87 on Freedom of Association and Protection of the Right to Organise;
- ILO Convention 98 on the Right to Organize and Collective Bargaining;

- ILO Convention 100 on Equal Remuneration;
- ILO Convention 105 Concerning the Abolition of Forced Labour;
- ILO Convention 111 on Discrimination (Employment and Occupation);
and
- ILO Convention 148 on Working Environment (Air Pollution, Noise and Vibration) Convention, 1977.

Other ILO Conventions that were also ratified included Conventions on hours of work in industry, weekly rest, minimum wage fixing, labour inspection, underground work by women, employment service, night work by women, social policy, working environment, child labour, and labour administration.

2.5.8

Other Conventions and Treaties

Ghana has also ratified the following international conventions and treaties which may be applicable to the project (dates of ratification are shown):

- *Africa Convention on the Conservation of Nature and Natural Resources (15 September 1968);*
- *International Convention on Civil Liability for Oil Pollution Damage (29 November 1969);*
- *International Convention on the Establishment of an International Fund for Compensation of Oil Pollution Damage (18th December 1971);*
- *Convention on Wetlands of International Importance, Especially as Waterfowl Habitats (2 February 1971);*
- *Convention Concerning the Protection of World Cultural and Natural Heritage (16 November 1972);*
- *Convention on the Conservation of Migratory Species of Wild Animals (23 June 1979);*
- *International Convention for the Conservation of Atlantic Tunas (4 May 1966);*
- *Convention for the Cooperation in the Protection and Development of the Marine and Coastal Environment of the West and Central African Region, 1981 (Abidjan Convention);*
- *Montreal Protocol on Substances that Deplete the Ozone Layer (24 July 1989);*
- *Framework Convention on Climate Change (June 1992);*
- *Convention on Biological Diversity, 1992;*
- *Supplementary Convention on the Abolition of Slavery, the Slave Trade, and Institutions and Practices Similar to Slavery (1956);*
- *International Covenant on Economic, Social and Cultural Rights (7 September 2000);*
- *International Covenant on Civil and Political Rights (7 September 2000); and*
- *African Charter on Human and Peoples' Rights (Acceded 24 January 1989).*

2.6 *GOOD PRACTICE STANDARDS AND GUIDELINES*

2.6.1 *Introduction*

There are a number of industry good practice standards and guidelines for offshore oil and gas developments. In addition several participants in the Jubilee JV have sought funding from the IFC from which there are a number of specific project requirements that the Jubilee JV partners must adhere to. This includes a series of eight Performance Standards (PS) that the IFC require applicants for funding to adopt and comply throughout the implementation of the project. This section describes relevant IFC Performance Standards and other relevant best practice guidelines.

2.6.2 *IFC Performance Standards*

All eight of the IFC Performance Standards need to be applied to funded projects, however, for the Jubilee Phase 1 project the following are considered to be the directly relevant Performance Standards:

- PS1: Social and Environmental Assessment and Management Systems;
- PS2: Labour and Working Conditions;
- PS3: Pollution Prevention and Abatement;
- PS4: Community Health, Safety and Security; and
- PS6: Biodiversity Conservation and Sustainable Natural Resource Management.

Additional guidance is contained in the Guidance Notes to the Performance Standards and the following IFC documents:

- Policy on Social and Environmental Sustainability; and
- Policy on Disclosure of Information.

The IFC's set of Guidance Notes corresponds to the Performance Standards and provide guidance on the requirements contained in the Performance Standards, including reference materials and on good sustainability practices to improve project performance.

2.6.3 *IFC Environmental, Health and Safety (EHS) Guidelines*

The EHS Guidelines are technical reference documents that address IFC's expectations regarding the industrial pollution management performance of projects. They are designed to provide relevant industry background and technical information. This information supports actions aimed at avoiding, minimising, and controlling EHS impacts during the construction, operation, and decommissioning phase of a project or facility.

When host country regulations differ from the levels and measures presented in the EHS Guidelines, projects will be expected to achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of

specific project circumstances, a justification for any proposed alternative is needed as part of the site-specific environmental assessment. This justification needs to demonstrate that the choice for any alternate performance level is consistent with the overall requirements of the relevant IFC Performance Standards.

The updated EHS Guidelines serve as a technical reference source to support the implementation of the IFC Performance Standards, particularly in those aspects related to Performance Standard 3: Pollution Prevention & Abatement, as well as certain aspects of occupational and community health and safety.

The general EHS Guidelines contain information on cross-cutting environmental, health, and safety issues potentially applicable to all industry sectors and should be used together with the relevant IFC industry sector guidelines. For the Jubilee Phase 1 project, the relevant EHS Guidelines that would apply are:

- Environmental, Health, and Safety General Guidelines (April 2007);
- Environmental, Health, and Safety Guidelines for Offshore Oil and Gas Development (April 2007);
- Environmental, Health, and Safety Guidelines for Shipping (April 2007); and
- Environmental, Health, and Safety Guidelines for Crude Oil and Petroleum Product Terminals (April 2007).

2.6.4 *Oil Industry Exploration and Production Forum*

The International Association of Oil & Gas Producers (OGP) (former E&P Forum) was formed in 1974 and is the international association of oil companies and petroleum industry organisations. The OGP is concerned with all exploration and production operations and has sought to establish industry positions on environmental protection and personnel safety. The guidance provided in *Table 2.3* is of relevance to the project and has been adopted by the project as industry good practice standards for environmental assessment and management.

2.6.5 *International Petroleum Industry Environmental Conservation Association*

The International Petroleum Industry Environmental Conservation Association (IPIECA) has produced several volumes of guidance on spill response and contingency planning for the marine environment. As part of this, they have developed the 'Tiered Response' approach, which categorises the appropriate response to a spill incident based on size and proximity to operations. Additional relevant guidance on oil spills is provided by IPIECA within:

- IPIECA, 1991: A Guide to Contingency Planning for Oil Spills on Water.
- IPIECA, 1991: Guidelines on Biological Impacts of Oil Pollution.

Table 2.3 Oil Industry Exploration and Production Forum Guidelines

Organisation	Standard	Key Element
E&P Forum	Exploration and Production Waste Management Guidelines	The guidelines were prepared for oil and gas exploration and production companies who require information on the range of waste management options available for wastes generated by their activities. Sections of the document provide a general description of waste management principles, an identification and overview of E&P activities and associated wastes and options for waste reduction, recycling, treatment and responsible disposal.
Exploration and Production (E&P) Forum / United Nations Environment Programme (UNEP)	Environmental Management in Oil and Gas exploration and Production	This document provides both a single point overview of environmental issues and management approaches in oil and gas exploration and production operations. It defines the framework for environmental management against a background of existing information developed by industry, the United Nations Environmental Programme, and a variety of non-governmental organisations. It gives a brief overview of the oil and gas exploration and production process and examines potential environmental effects or impacts and discusses environmental protection measures. Section 6 describes how impacts can be avoided or minimised.
OGP	Principles for Impact Assessment - the Environmental and Social Dimension	This guidance focuses on increasing the coverage of social and community impacts in EIA, together with such factors as public consultation and access to local knowledge.
OGP	Aromatics in produced water	The report focuses on the topic of aromatic substances in produced water, covering occurrences of individual substances, fate and potential effect in the marine environment, and the techniques available for treating produced water that will generally and specifically reduce their concentrations in produced water discharges to the marine environment.

2.7 PROJECT ENVIRONMENTAL STANDARDS

The following water, air and noise standards are based on MARPOL, good industry practice such as OSPAR and IFC EHS Guidelines, and the EPA’s regulations.

2.7.1 Water Quality

Table 2.4 below provides industry good practice standards applied to effluent levels from offshore oil and gas development. These are based on MARPOL, IFC and OSPAR standards and are proposed by Tullow for this project.

Limits for effluents associated with drilling fluids and cuttings are outlined in *Annex B*.

Table 2.4 *Industry Good Practice Standards for Effluent Discharges*

Source	Industry Good Practice Standards
Completion and Workover Fluids	Oil and grease not to exceed 42 mg/l daily maximum and 29 mg/l monthly average. Any spent acids will be neutralised (to attain a pH of 5 or more) as per IFC EHS Guidelines.
Cooling Water	The effluent should result in a temperature increase of no more than 3°C at the edge of the zone where initial mixing and dilution take place. Where the zone is not defined, use 100 m from point of discharge as per IFC EHS Guidelines.
Produced water	Oil and grease not to exceed 42 mg/l daily max and 29 mg/l monthly average as per IFC EHS Guidelines.
Produced sand	No discharge unless residual oil less than 1% by weight on dry sand as per IFC EHS Guidelines.
Sewage	Treat with approved marine sanitation unit (achieves no floating solids, no discolouration of surrounding water) as per MARPOL Annex IV requirements. Minimum residual chlorine of 1 mg/l as per IFC EHS Guidelines.
Food Waste	Macerate to acceptable levels and discharge in compliance with MARPOL 73/78 Annex V requirements.
Bilge Water	Treat to 15 ppm oil concentration as per MARPOL 73/78 Annex I requirements.
Storage Displacement Water (Ballast Water)	Treat to 15 ppm oil concentration as per MARPOL 73/78 Annex I requirements.
Deck Drainage	Treat to 15 ppm oil concentration as per MARPOL 73/78 Annex I requirements.
Desalination brine	Mix with other discharge streams if feasible

Note: MARPOL 1973/1978 = International Convention for the Prevention of Pollution from Ships

2.7.2 *Air Quality*

Key provisions of the IFC EHS guidelines for offshore oil and gas developments relating to air emissions are outlined in *Table 2.5*.

Table 2.5 Key IFC Provisions for Point Source Air Emissions

Source	Guideline
General	All reasonable attempts should be made to maximise energy efficiency and design facilities for lowest energy use. The overall objective should be to reduce air emissions and evaluate cost effective options for reducing emissions that are technically feasible.
Exhaust gases	<p>Guidance for the management of small combustion sources with a capacity of up to 50 megawatt hours thermal, including standards for exhaust emissions, is provided in the IFC’s General EHS Guidelines. For engines using liquid fuels:</p> <ul style="list-style-type: none"> • Particulate matter: 50 mg/Nm³ (up to 100 if justified by project-specific conditions) (approximately 24 and 49 ppm respectively) • Sulphur dioxide: 1.5% of sulphur (up to 3% if justified by project-specific conditions). Consideration to using low sulphur fuels or secondary treatment to meet 1.5% sulphur. • Nitrogen oxides: 1,460 mg/Nm³ if bore size diameter <400 mm (up to 1,600 mg/Nm³ if justified to maintain high energy efficiency) and 1,850 mg/Nm³ if bore size diameter >400 mm. (These normalised ppm concentrations equate to approximately 711, 779 and 901 ppm respectively) • Dry gas, excess oxygen content: 15% <p>For gas-fired engines:</p> <ul style="list-style-type: none"> • Nitrogen oxides: 200 mg/Nm³ for spark ignition, 400 mg/Nm³ for dual fuel and 1,600 mg/Nm³ for compression ignition. • Dry gas, excess oxygen content: 15%
Greenhouse gases	Significant (>100,000 tons CO ₂ equivalent per year) greenhouse gas (GHG) emissions from all facilities and offshore support activities should be quantified annually as aggregate emissions in accordance with internationally recognized methodologies and reporting procedures.
Venting and flaring	Measures consistent with the Global Gas Flaring and Venting Reduction Voluntary Standard (part of the World Bank Group’s Global Gas Flaring Reduction Public-Private Partnership should be adopted when considering venting and flaring options for offshore activities). The standard provides guidance on how to eliminate or achieve reductions in the flaring and venting of natural gas. Continuous venting of associated gas is not considered current good practice and should be avoided.
Well testing	During well testing, flaring of produced hydrocarbons should be avoided, especially in environmentally sensitive areas. Feasible alternatives should be evaluated for the recovery of these test fluids, while considering the safety of handling volatile hydrocarbons, for transfer to a processing facility or other alternative disposal options. An evaluation of alternatives for produced hydrocarbons should be adequately documented and recorded.
Fugitive emissions	Methods for controlling and reducing fugitive emissions should be considered and implemented in the design, operation, and maintenance of offshore facilities. The selection of appropriate valves, flanges, fittings, seals, and packings should consider safety and suitability requirements as well as their capacity to reduce gas leaks and fugitive emissions.

2.7.3 Noise Levels

The EPA draft noise standards are summarised in *Table 2.6*.

Table 2.6 *Ghana Draft Ambient Noise Level Standards*

Zone	Description of Noise Reception	Permissible Noise Level in dB(A)	
		Day (06h00 -22h00)	Night (22h00 - 06h00)
A	Residential areas with low or infrequent transportation	55	48
B1	Educational (school) and health (hospital, clinic) facilities	55	50
B2	Areas with some commercial or light industry	60	55
C1	Areas with some light industry, places of entertainment or public assembly and places of worship located in this zone	65	60
C2	Predominantly commercial areas	75	65
D	Light industrial areas	70	60
E	Predominantly heavy industrial areas	70	70

Permissible adjustment to measures noise levels for intermittent noise as per Schedule 4 of the draft standards is provided in *Table 2.7*.

Table 2.7 *Permissible Adjustment to Measured Noise Level for Intermittent Noise*

Cumulative period for which intermittent noise is present in any hour	Maximum allowable adjustment above the permissible ambient level (dBA)
More than 15 minutes	± 5
5 minutes - 15 minutes	- 1
1 minute - 5 minutes	- 10
Less than 1 minute	- 15

Note: These duration adjustments are not applicable when noise being assessed includes discrete noise impulses or consists of repetitive noise with an impulsive character eg hammering or riveting.

Underwater Noise Levels

The IFC guidelines for minimising underwater noise are applicable to the offshore oil and gas production operations including production activities and offshore and near shore structural installations, eg seismic surveys, pile driving, construction activities and marine traffic. These guidelines recommend the following measures to reduce the risk of noise impact to marine species:

- identifying and avoiding areas sensitive for marine life such as feeding, breeding, calving, and spawning areas;
- planning seismic surveys and offshore construction activities around sensitive times of the year (eg breeding season);

- identifying fishing areas and reducing disturbance to these areas by planning for seismic surveys and construction activities to be undertaken at less productive times of the year, where possible;
- reducing operation time, where possible; and
- monitoring the presence of sensitive species (if expected to be in the project area) before the onset of noise creation activities and throughout the seismic program or construction. Experienced observers should be used where significant impacts to sensitive species are anticipated.

It is noted that a number of these measures are intended for noisy operations such as seismic surveys and pile driving that are not part of the activities being assessed in this EIA.

2.8 *PROJECT HSE POLICIES AND STANDARDS*

2.8.1 *Jubilee Joint Venture EHS Management System*

The execution of the Jubilee Field development will be governed by the expectations and operating philosophy of the EHS Management System (EHS-MS). The EHS-MS has been built from Tullow's EHSMS and applies equally to project development and operational phases to ensure a seamless transition. Appropriate procedures, plans and programs will be implemented during the course of the project to ensure that these management expectations are met. These will be based on industry best practice and the JV partners' own company EHS policies and standards. Applicable elements expected of subcontractors will be communicated and explicitly included in all contracts. The key elements of the Jubilee Joint Venture EHSMS are outlined in *Box 2.1*.

The Jubilee EHS plan and the EHS plans of the project contractors will adopt the key element of the project EHS. The provisional Environmental Management Plan (EMP) for the project is presented in *Chapter 9*.

Box 2.1 Key Elements of the Jubilee Joint Venture EHS Management System

1. **Policy & Leadership** - The Unit Operator and IPT Technical Operator leadership will establish policy, provide perspective, set expectations and provide the resources for responsible EHS management of the Jubilee Field development.
2. **Risk Management** - Appropriate risk management techniques will be employed throughout the project to protect employees, subcontractors, communities and the environment, and to preserve assets, investor value and the reputation of the Unit Operator and the IPT Technical Operator. A Safety Case is also being developed for the Jubilee development by the Unit Operator in conjunction with the project team and major subcontractors. As part of the Safety Case, formal safety assessments (FSAs) are being conducted during the design phase of the project. From these, recommendations are being made for reducing risk both in the design and in the operations phases to as low as reasonably practical (ALARP).
3. **Facilities Design & Construction** - Sound standards, procedures and management systems will be utilized for facility design, construction, commissioning and startup activities to ensure safety and minimize risk to health and the environment. Examples of typical international standards that will be applied have been provided in the facilities description section.

4. **Information & Documentation** - Information on the design, configuration and capabilities of processes and facilities and infrastructure, potential environment, health, and safety hazards and all legal and regulatory requirements will be documented and maintained, and made readily accessible for review to acceptably manage the risks associated with the development.
5. **Personnel & Competence** - The success of development operations depends on competent people. Effective selection, placement, ongoing assessment and competence of employees and subcontractors executing the development will be ensured. Proven designs will be used and reputable service providers employed.
6. **Operations & Maintenance** - The development will deliver facilities which have effective operating and maintenance procedures and practices in place with reliable safety and control facilities, and competent personnel who consistently execute these procedures and practices. The installation safety case will identify the "safety critical elements" (SCEs) of the process scheme and ensure that appropriate performance standards for these SCEs are in place and tested at regular intervals; these will be built into the FPSO subcontractors (MODEC) maintenance management system. The strategy is also to keep the topsides in ABS Class (American Bureau of shipping) during the operations phase as a further verification step to ensure that the asset is being appropriately maintained by the subcontractor. The FPSO will be classed, as a minimum, by ABS. ABS will use their Guides for Classing which do provide minimum specifications for marine equipment and structures, safety systems, and process areas. The selected FPSO subcontractor, MODEC, has their own well established maintenance philosophy to meet HSE and operational efficiency targets common to their world-wide operations.
7. **Health & Safety** - The development activities will be conducted in accordance with health and safety standards and practices that are adopted in the international E&P industry. Key Performance Indicators (KPIs) will be established to monitor performance and where possible to benchmark against the rest of the industry.
8. **Environment Protection** - The JV partners and their subcontractors will operate in accordance with sound environmental practices and will respect the customary rights, cultural heritage, social values and resource utilisation patterns of the countries where development activities occur. This will include key impact mitigation such as disposal of any produced water in an environmentally acceptable manner to meet prevailing regulatory requirement as a minimum standard, the minimisation of chemical use in all activities, disposal of waste in an appropriate manner, and avoidance of any routine flaring during steady-state production.
9. **Incident Reporting & Investigation** - An incident reporting system will be established to ensure management is notified and that incidents are properly investigated with the goal of preventing recurrence.
10. **Emergency Response** -Emergency Response plans will be developed that reflect the reasonably foreseeable emergency events that could be associated with development activities including oil spill clean-up equipment and resources.
11. **Community Relations & Outreach** - Open and honest communications will be established with the communities impacted by the development to build trust and confidence in the integrity of the Contractors and their parent companies, and their operations. A strong Corporate Social Responsibility (CSR) program will be developed and implemented.
12. **Continuous Improvement** - We will establish a process to measure the performance relative to the expectations established in this management system and to ensure that any lessons are learned and communicated to sustain or improve performance as appropriate. Audits are included in the Project EHS Plan. Audits include design verification audits, construction site audits (both onshore and offshore), and Pre-start-up Review. EHS is also a core element of the Ready for Operations programme to ensure implementation of the EHS philosophies and objectives.

2.8.2 *Community Development and Corporate Social Responsibility Policies*

The Jubilee Joint Venture has developed a Corporate Social Responsibility (CSR) policy and strategy that requires all project activities to be undertaken to best industry standards and in a socially responsible manner. As part of the CSR strategy, the Jubilee Joint Venture will implement a plan to support community and social responsibility projects and initiatives. The key elements of the CSR strategy are provided in *Box 2.2*.

Box 2.2 Key Elements of the CSR Strategy

CSR Values:

- To respect the people of Ghana and its socio-cultural diversity.
- To contribute to and support local communities.
- To ensure environmental sustainability.
- To empower and support the individual.
- To value and foster long-term relationships.
- To be transparent in our activities and reporting.

CSR Strategy - Core Elements

- Promote an effective community inclusive approach in planning and execution of our CSR programme and projects.
- Effective partnership with local communities, Traditional Authorities, District Assemblies, NGOs and Development Partners.
- Use internationally recognised best practices to minimise impacts on the environment.
- Investing in people and resource governance.

CSR Strategy - Key Focus Areas

- Health.
- Education.
- Employment.
- Natural Resource Governance