Pluto Offshore Facility
Environment Plan Summary

August 2014

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1. INTRODUCTION

Woodside Burrup Pty Ltd (Woodside) is operator of the Pluto Offshore Facility, which has been in production since 2012. The facility is located offshore approximately 190 km north west of Karratha and 75 km north of Barrow Island in the Infrastructure License WA-1-IL. The associated subsea wells are located in Production Licence Area WA-34-L, and the associated trunkline (Commonwealth waters) and flowlines are located in Pipeline Licences WA-17-PL and WA-16-PL, respectively.

The Pluto Offshore Facility currently produces gas and condensate from the Pluto gas field which is transported via a trunkline to the onshore gas processing plant.

This Environment Plan (EP)summary has been prepared as per the requirements of Regulation 11 of the *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009* (Commonwealth) (Environment Regulations). This document summarises the Pluto Offshore Facility Operations EP, which was accepted under the Environment Regulations by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) on 30 July 2014.

2. DESCRIPTION OF THE ACTIVITY

2.1 Location of the Activity

The Pluto Offshore Facility is located in Commonwealth waters in the Carnarvon Basin, in Infrastructure License WA-1-IL, approximately 160 km north west of Dampier (Figure 2-1). The associated subsea wells are located in Production License Area WA-34-L, and the associated trunkline (Commonwealth waters) and flowlines are located in Pipeline Licenses WA-17-PL and WA-16-PL, respectively. The platform is located in approximately 85 m of water respectively, with the Pluto wells located in water depths ranging from 300 m to 1,000 m.

The export trunkline and associated 6-inch chemical supply line is covered by Pipeline Licences WA-17-PL (Commonwealth waters) and TPL/19 (State waters). Depths along the length of the trunkline range from 85 m at its western end (platform) sloping gently towards land fall. The proportion of the trunkline and chemical supply line in State waters is subject to a separate EP and is not included in the scope of the Pluto Offshore Facility EP.

The tie-in of the Xena gas field to the Pluto Offshore Facility is proposed in approximately 2015, about 27 km south west of the Pluto facility in Production License Area WA-34-L (**Figure 2-1**). The subsea drilling, installation and commissioning activities associated with this Project are the subject of a separate EP. However, following commissioning, the routine operation, inspection, maintenance and repair of the associated Xena subsea infrastructure is covered under the scope of the Pluto Offshore Facility EP.

The closest nearshore sensitive habitats include the Montebello Commonwealth Marine Reserve, located approximately 0.4 km to the south of the Pluto platform, and the Montebello Islands Marine Park/Barrow Island Marine Management Area (jointly managed) located approximately 35 km to the south. The closest offshore sensitive receptor is the Rankin Bank which is located approximately 30 km to the north east. The surrounding environment and associated sensitive habitats are discussed in detail in Section 3.The potential environmental impacts from planned and unplanned activities are discussed in Section 4.

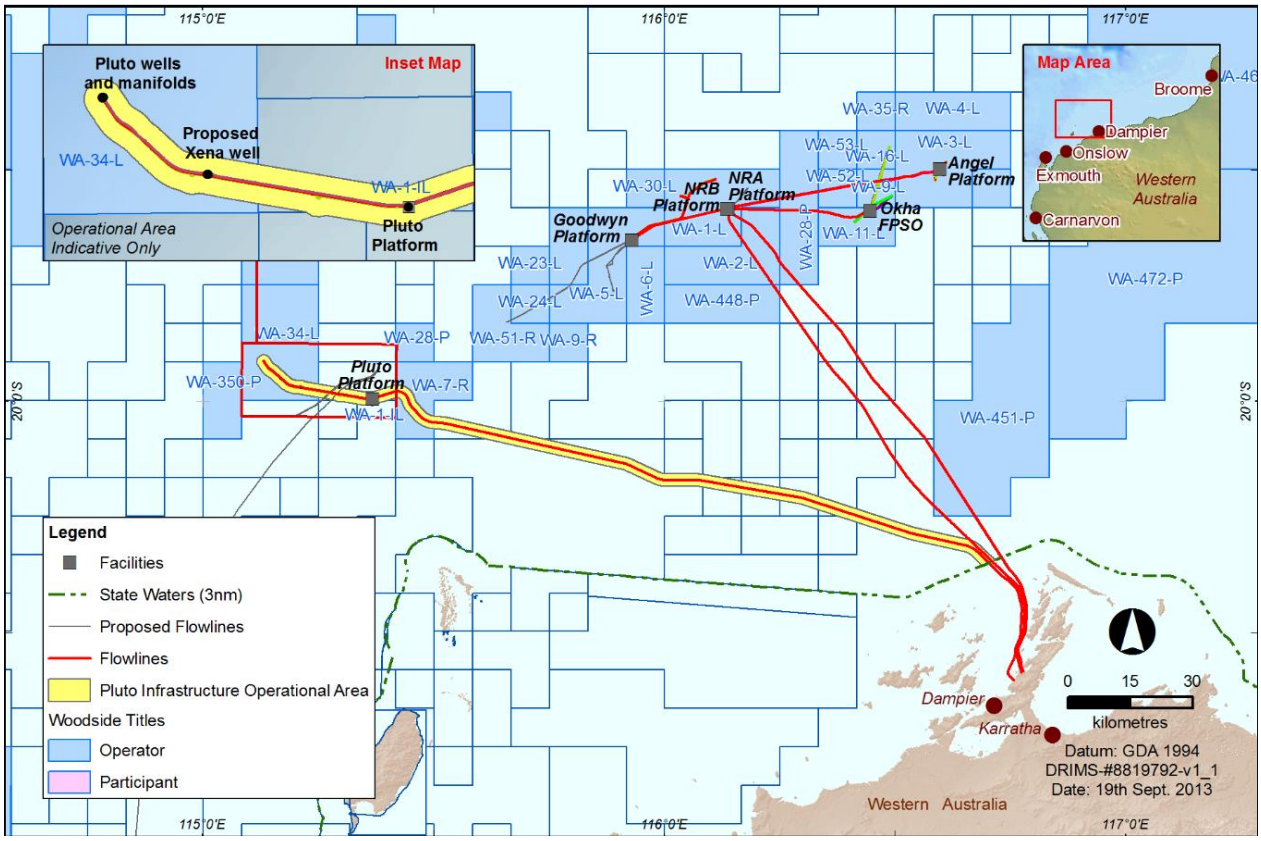

Figure 2-1: Location of the Activity

The coordinates and permit areas of the Pluto Offshore Facility and associated infrastructure are outlined in **Table 2-1**.

Table 2-1: Pluto facility and associated infrastructure locations

Structure	Easting	Northing	Title
Pluto Offshore Facility	329 285 m E	7 788 101 mN	WA-1-IL
Pluto gas field drill centre	304 465 m E	7 796 995 mN	WA-34-L
Pluto Well PLA01ST1	304 443.91 m E	7 796 985.50 mN	WA-34-L
Pluto Well PLA02	304 433.50 m E	7 797 015.97 mN	WA-34-L
Pluto Well PLA03ST1	304 451.31 m E	7 797 016.96 mN	WA-34-L
Pluto Well PLA04	304 481.52 m E	7 797 006.04 mN	WA-34-L
Pluto Well PLA05	304 497.70 m E	7 797 002.28 mN	WA-34-L
Xena tie-in	312 974 m E	7 790 742 mN	WA-34-L
Xena E Well	312 994 m E	7 790 794 mN	WA-34-L
Pluto B Flowlines	-	-	WA-16-PL
Pluto Trunkline (Commonwealth)	-	-	WA-17-PL

2.2 Timing of the Activity

The Pluto Offshore Facility commenced production in 2012. The facility operates 24 hours per day, every day of the year. Supporting operations, such as maintenance activities take place as required.

Tie-back opportunities are continuously being reviewed for Woodside's offshore facilities, which have the potential to extend the life of the fields. Any additional future decommissioning or tieback plans (other than production from the Xena field included in the scope of the Pluto Offshore Facility EP) will be the subject of a separate EP.

2.3 Operational Area

The Operational Area applicable to the scope of the Pluto Offshore Facility EP is shown in **Figure 2-1**. The area includes:

- The Pluto Offshore Facility and the area within a 500 m exclusion zone around the facility;
- The trunkline (P1TL) and associated 6-inch chemical supply line and an area within 1500 m around the infrastructure from the Pluto riser platform to the boundary of the Commonwealth waters (as covered by Pipeline Licence WA-17-PL); and
- Pluto and Xena subsea facilities (including wells, production and pigging manifolds, production jumpers, spools, flowlines and flexible jumpers) and an area within 1500 m around the infrastructure.

Vessel-related activities within the Operational Area will comply with the Pluto Offshore Facility EP.

2.4 Operational Details

The Pluto offshore platform is operated as a not normally manned (NNM) facility, with remote operation from a fixed operator console at the Pluto onshore Central Control Room (CCR) which is constantly manned.

The platform combines accommodation and utilities, but no processing facilities. The well fluids (gas, condensate and other fluids such as produced water) from the production wells is transported to the riser platform via the flowlines, then to the Pluto onshore gas plant for processing via the trunkline. The platform also receives chemicals from the onshore gas plant via a 6-inch chemical supply line, and transports these to the wells via the 4-inch chemical supply flowlines.

Produced Formation Water (PFW) is not separated or disposed from the offshore facility as wet gas is piped directly onshore. When received onshore, the water is separated from the production fluids where it is treated and then discharged in accordance with relevant State Regulatory requirements. As such the discharge of PFW does not form part of the scope of the Pluto Offshore Facility EP.

Operations and Maintenance Technician's routinely visit the Pluto Offshore Facility. When the Pluto Offshore Facility is manned, primary control is retained by the onshore CCR, with personnel on Pluto communicating with the onshore CCR via the radio communication links. Operational control of equipment is handed to 'local control' on the Pluto Offshore Facility on an as required basis. Small teams are routinely deployed to the facility for maintenance. Total maintenance is less than 5,000 man hours per year.

Maintenance activities comprise of:

- Planned operations and maintenance;
- Corrective maintenance and intervention;
- Major/shutdown maintenance;
- Pigging operations; and
- Contingent manning.

Additional operational activities in relation to the EP include:

- Operational and emergency flaring of excess gas.

A number of activities also support the overall operation of the facility, these include:

- Utility systems such as lighting, heating, ventilation and air conditioning, MEG system and power generation;
- Collection, treatment and disposal of sewage and putrescible wastes;
- Lifting operations;
- Transfer of supplies from vessels including food, equipment and fuel;
- Helicopter operations for transporting personnel and urgent freight;
- Subsea inspection, maintenance and repair activities; and
- Well management and maintenance activities.

3. DESCRIPTION OF THE ENVIRONMENT

The Pluto Offshore Facility is located within the Commonwealth waters of the North West Shelf (NWS) province, approximately 43 km north of the Montebello Islands, in water depths of approximately 85 m. The NWS is part of the wider North-West Marine Region (NWMR) (**Figure 3-1**) as defined under the Integrated Marine and Coastal Regionalisation of Australia (IMCRA v4.0).

3.1 Physical Environment

The climate in the region is dry tropical, including hot dry summers and mild winters. Transition periods between summer and winter are characterised by relatively low winds. Cyclonic events may be experienced during summer periods, with cyclones originating closer to the equator and potentially moving through the region.

Water circulation in the NWMR is dominated by the south flowing Leeuwin Current, which originates in Indonesia and flows along the edge of the continental shelf at speeds of up to 0.3 m/s, bringing warm water down the coast. The flow of the Leeuwin Current is strongest in the winter months. The Ningaloo Current flows in the opposite direction to the Leeuwin Current and closer to shore.

The Pluto Offshore Facility is located on the continental shelf in waters of approximately 85 m deep and is situated approximately 25 km to the east of the Pluto Gas Field. The seabed area of the Pluto Offshore Facility is relatively flat (approximately 7°), featureless and made up of soft sediments comprising surface sand 1-4 m thick overlying cemented sands that are typical of the region. The gas trunkline traverses the continental shelf as the seabed slopes up gently from the Pluto Offshore Facility area to the edge of the Dampier Archipelago where depths then decrease relatively rapidly from approximately 30 m, west of Enderby and Rosemary Island.

3.2 Biological Environment

No Critical Habitats or Threatened Ecological Communities, as listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), occur within the Pluto Offshore Facility Operational Area or the Pluto Gas Trunkline Operational Area. Critical life stage activities for a number of EPBC Act Listed Species (for example turtle nesting) occur in the wider region, outside of the Operational Area.

The Commonwealth Protected Matters database includes a total of 58 listed marine species that may occur within or traverse the Pluto Offshore Facility Operational Area. Three additional Listed Marine Species (two seasnake species and the Roseate Tern) were identified in the Pluto Gas Trunkline Operational Area. Of the listed species identified 10 are threatened marine species and 17 are migratory species.

Twenty-five cetacean species may occur within the Pluto Offshore Facility Operational Area with nine categorised as threatened and/or migratory. The Endangered Pygmy Blue Whale (*Balaenoptera musculus brevicauda*) and the Vulnerable Humpback Whale (*Megaptera novaeangliae*) are two whale species that seasonally migrate through the NWS province as they travel between northern breeding grounds and southern feeding grounds. Other cetacean species are likely to occur at low densities and may transverse the Pluto Offshore Facility Operational Area infrequently throughout the year.

Five marine turtle species are recorded for the region and may occur in the Pluto Offshore Facility Operational Area and adjacent waters, however the deepwater environment does not support any critical habitats (including breeding, nesting or foraging habitats).

Whale sharks (*Rhincodon typus*) may traverse the Operational Area during their migrations to and from Ningaloo Reef. However, it is expected that Whale shark presence within the Operational Area would be of a

relatively short duration and not of significant numbers given the main aggregations are recorded in coastal waters, particularly, the edge of the Ningaloo Reef (MPRA, 2005).

Two species of seabirds may occur within the Pluto Offshore Facility Operational Area, including the Southern Giant Petrel (Endangered) and Roseate Tern (Migratory). Critical habitat for the southern giant petrel includes the summer breeding grounds on the Antarctic continent, Antarctic Peninsula and remote islands in Antarctic and sub-Antarctic waters (DSEWPaC, 2012d). Roseate Tern breeding grounds are associated with coastal regions with the largest colony located on the Montebello Islands (MPRA, 2007a). As such, the Pluto Offshore Facility Operational Area is not critical habitat for these birds, nor is the species likely to be present in the area.

The dugong (*Dugong dugon*), is listed as migratory under the EPBC Act and was identified as potentially occurring within the Operational Area. Given the offshore location and deep water depths, the Operational Area does not support primary producer habitat for grazing and is not critical habitat for dugongs. Dugongs may transit the Operational Area, but is considered unlikely given the offshore location.

The short-nosed seasnake (*Aipysurus apraefrontalis*) is listed as critically endangered and was identified as occurring within the Pluto Offshore Facility Operational Area by the EPBC Act Protected Matters Search Tool. This species of sea snake inhabits shallow reefs and has been recorded from Exmouth Gulf to the reefs of the Sahul Shelf (DSEWPaC, 2012b). Given the deep water location of the Pluto Offshore Facility, it is unlikely sea snakes will be present within the Operational Area. If present they are likely to only be transiting through the region between breeding and foraging grounds.

3.3 Socio-Economic Environment

There are no known sites of Indigenous or European cultural or heritage significance within the vicinity of the Operational Area.

No tourism activities take place specifically within the Pluto Offshore Facility Operational Area, however, it is acknowledged that there are growing tourism and recreational sectors in Western Australia and these sectors have expanded in area over the last couple of decades. Potential for growth and further expansion in tourism and recreational activities in the Pilbara and Gascoyne regions is recognised, particularly with the development of regional centres and a workforce associated with the resources sector (Gascoyne Development Commission, 2012).

The Operational Area is located within an area of established oil and gas operations. The closest subsea infrastructure includes flowlines, umbilicals, manifolds and wellheads associated with the Apache operated John Brook and East Spar platforms to the south-west, and the Woodside operated Goodwyn and North Rankin platforms to the north east.

The Operational Areas are located within/adjacent to four Commonwealth and five State fisheries.

The region supports significant commercial shipping activity, mostly associated with the mining and oil and gas industries. Major shipping routes in the area are utilised for entry to the Port of Dampier and Barrow Island.

The Operational Area is not located within any designated Defence practice areas.

The Operational Area near the Pluto Offshore Facility partially overlaps the Multiple Use Zone of the Montebello Commonwealth Marine Reserve and a portion of the trunkline to shore also traverses this zone (**Figure 3-1**). No other overlap occurs with established or proposed marine protected areas. The marine protected areas within close proximity to the operational area are the Montebello Commonwealth Marine Reserve, Montebello Islands Marine Park/ Barrow Island Marine Management Area and Lowendal Islands Nature Reserve.

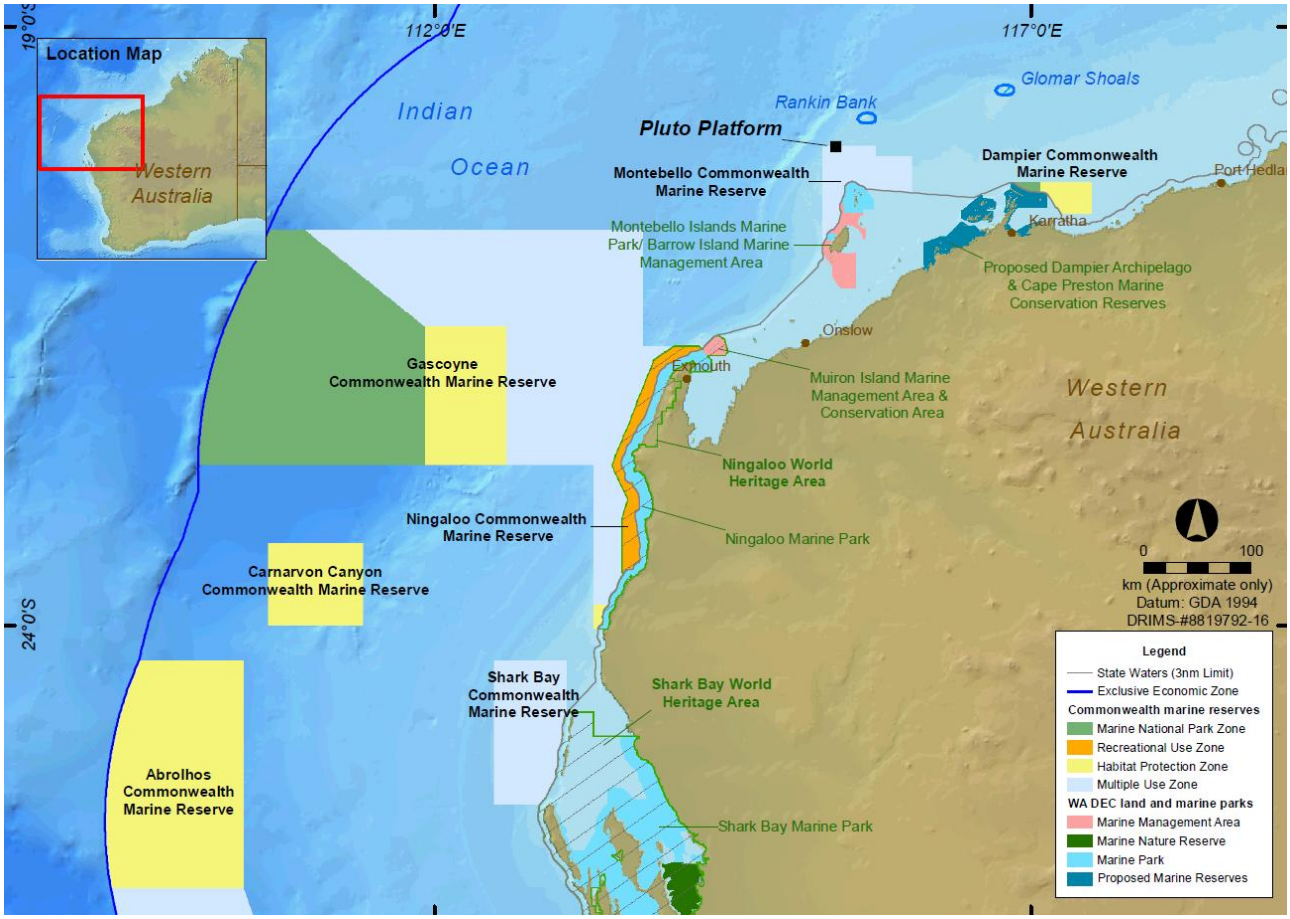

Figure 3-1: Established and Proposed Commonwealth and State Marine Protected Areas in relation to the Operational Areas.

4. ENVIRONMENTAL HAZARDS AND CONTROLS

4.1.1 Risk identification and evaluation

Woodside recognises that risk is inherent to its business and that effective risk management is vital to delivering objectives, success and continued growth. Woodside is committed to managing all environmental risks in a proactive and effective manner.

Woodside undertook an environmental risk assessment to understand the potential environmental risks associated with the Pluto Offshore Facility to ensure they are reduced to As Low As Reasonably Practicable (ALARP) and will be of an acceptable level.

The key steps of Woodside's Risk Management Framework are shown in **Figure 4-1**. A summary of each step and how it is applied to operation of the Pluto Offshore Facility is provided below.

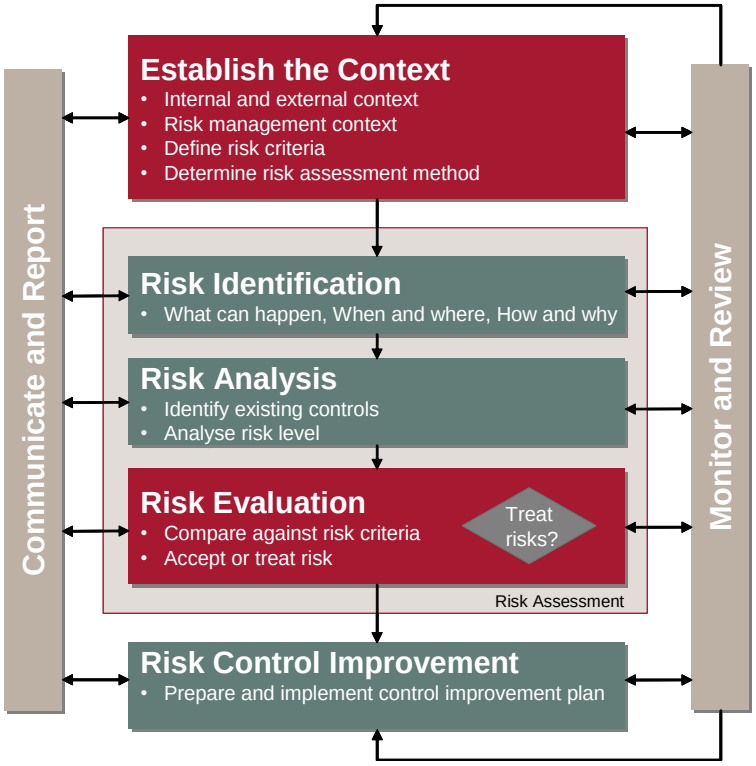

Figure 4-1: Key Steps in Woodside's Risk Management Framework

1. Establish the Context

The objective of a risk assessment is to assess identified risks and apply appropriate control measures to eliminate, control or mitigate the risk to ALARP and to determine if the risk is acceptable.

Hazard identification workshops aligned with NOPSEMA's Hazard Identification Guidance Note (N-04300-GN0107) were undertaken by multidisciplinary teams made up of relevant personnel with sufficient breadth of knowledge, training and experience to reasonably assure that risks and associated impacts were identified and assessed.

2. Risk Identification

The risk assessment workshops for the Pluto Offshore Facility were used to identify risks with the potential to harm the environment. Risks were identified for both planned (routine and non-routine) and unplanned (accidents/incidents) activities.

3. Risk Analysis

Risk analysis further develops the understanding of a risk by defining the impacts and assessing the appropriate controls. Risk analysis for the Pluto Offshore Facility considered previous risk assessments for the facility, review of relevant studies, review of past performance, external stakeholder consultation feedback and review of the existing environment.

4. Risk Evaluation (Decision Support Framework)

To support the risk assessment process, Woodside applied the UKOOA (1999) *Industry Guidelines on a Framework for Risk Related Decision Support* (HS006) during the workshops to determine the level of supporting evidence that may be required to draw sound conclusions regarding risk level and whether the risk is acceptable and ALARP.

This is to ensure:

- Activities do not pose an unacceptable environmental risk;
- Appropriate focus is placed on activities where the risk is anticipated to be tolerable and demonstrated to be ALARP; and
- Appropriate effort is applied to the management of risks based on the uncertainty of the risk, the complexity and risk rating.

5. Identification of Control Measures

Woodside applies a hierarchy of control measures when considering Good Practice and Professional Judgement. The hierarchy of control is applied in order of importance as follows; elimination, substitution, engineering control measures, administrative control measures and mitigation of consequences/impacts.

6. Risk Rating Process

The risk rating process is undertaken to assign a level of risk to each impact measured in terms of consequence and likelihood. The assigned risk level is the residual risk (i.e. risk with controls in place) and is therefore undertaken following the identification of the decision type and appropriate control measures.

The environmental risk assessment for the Pluto Offshore Facility identified 23 sources of environmental risk. These risks are divided into two broad categories: planned (routine and non-routine); and unplanned (accidents/incidents) activities.

4.1.2 Planned (Routine and Non-Routine) Activities

The majority of the sources of environmental risk identified for the Pluto Offshore Facility relate to those activities which are planned and either undertaken on a routine or non-routine basis. These sources of risk include:

- Physical presence of the platform generating light and noise emissions;
- Routine atmospheric emissions from gas flaring and fuel combustion;
- Routine discharges to the marine environment, including subsea chemicals, sewage and putrescible wastes;
- Storage, handling and disposal of waste; and
- Chemical selection and use.

Generally, the sources of risk from planned activities present a lower environmental consequence compared to the potential impact from unplanned accident or incident events. However, as these sources of risk related to planned activities which occur routinely or more frequently, the EP contains a variety of mitigation and control measures which ensure potential impacts and risks will be reduced to ALARP and will be of an acceptable level. A summary of the key environmental hazards and control measures have been presented in **Appendix A**.

4.1.3 Unplanned (Accidents/Incidents) Activities

During the risk assessment process a number of potential environmental impacts which may occur from unplanned activities were also identified. These sources of risk range from small scale chemical spills with a low environmental consequence to large scale hydrocarbon spill events with high environmental consequence.

Other unplanned activities with a lower source of risk include:

- Introduction of invasive marine species;
- Unplanned venting and release of atmospheric emissions;
- Chemical spills;
- Hydrocarbon release during bunkering operations; and
- Hydrocarbon release during topside loss of containment.

The risk assessment for the Pluto Offshore Facility identified that of these unplanned activities, there are five which would be considered a Major Environment Event (MEE). The classification of a MEE is based on the potential for a higher level of environmental consequence if a credible worst case scenario was to occur.

Due to the potential consequence of a MEE a further level of rigour is applied to the assessment, including analysis using the 'Bowtie Technique'. This process assists in identifying the critical barriers to prevent the event occurring as well as mitigation measures to limit the potential consequence.

The MEEs identified for the Pluto Offshore Facility are:

- Hydrocarbon release caused by a well loss of containment;
- Hydrocarbon release caused by a subsea loss of containment;
- Hydrocarbon release caused by a loss of structural integrity;
- Hydrocarbon release caused by loss of marine vessel separation; and
- Hydrocarbon release caused by loss of control of suspended load.

A summary of the key environmental hazards and control measures for the Pluto Facility is presented in **Appendix A**.

5. MANAGEMENT APPROACH

Operation of the Pluto Offshore Facility will be managed in compliance with the *Pluto Offshore Facility Operations Environment Plan* accepted by NOPSEMA under the Environment Regulations, other relevant environmental legislation and Woodside's Management System (e.g. Woodside Environment Policy).

The objective of the EP is to ensure that potential adverse impacts on the environment associated with the Operation of the Pluto Offshore Facility, during both routine and non-routine operations, are identified, will be reduced to ALARP and will be of an acceptable level.

The Pluto EP details for each environmental aspect (identified and assessed in the Environmental Risk Assessment – *Section 5 of the EP*) specific performance objectives and standards and control/mitigation measures (controls are summarised in **Appendix A**) to be implemented and measurement criteria to demonstrate performance objectives are achieved.

The implementation strategy detailed in the *Pluto Offshore Facility Operations Environment Plan* identifies the roles/responsibilities and training/competency requirements for all personnel (Woodside and its contractors) in relation to implementing controls, managing non-conformance, emergency response and meeting monitoring, auditing, and reporting requirements during the activity.

The EP also details the types of monitoring and auditing that will be undertaken to ensure environmental performance outcomes and standards are being met, key systems include:

- Annual Environmental Compliance and Performance Reports which are submitted to NOPSEMA to assess and confirm compliance with the accepted environmental performance objectives, standards and measurement criteria outlined in the EP;
- Annual site based inspections undertaken by the environment function to review compliance against the Pluto Offshore Facility EP, verify effectiveness of the EP implementation strategy and to review environmental performance;
- Performance Assessment Tool (PAT) reviews and self assessments related to the management of environmental risks and impacts of the Pluto Offshore Facility which are completed to verify competency and compliance;
- Environmental performance is also monitored daily by key personnel via the Production Accounting System; and
- Senior management regularly monitors and reviews environmental performance of the Pluto Offshore Facility via a variety monthly report which detail environmental performance and compliance with Woodside standards.

Environment Plan Revisions

Revision of the Pluto Offshore Facility EP will be undertaken in accordance with the requirements outlined in Regulation 17, Regulation 18 and Regulation 19 of the Environment Regulations. Woodside will submit a proposed revision of the Pluto Offshore Facility EP to NOPSEMA including as a result of the following:

- When any significant modification or new stage of the activity that is not provided for in the EP is proposed;
- Before, or as soon as practicable after, the occurrence of any significant new or significant increase in environmental risk or impact not provided for in the EP;
- At least 14 days before the end of each period of five years commencing on the day in which the original and subsequent revisions of the EP is accepted under Regulation 11 of the Environment Regulations; and
- As requested by NOPSEMA.

6. OIL SPILL CONTINGENCY PLANNING

6.1 Oil Pollution Environment Plan

Woodside's Oil Pollution Emergency Plan (OPEP) for the Pluto Offshore Facility consists of the following documents:

6.1.1 Woodside Corporate Oil Spill Contingency Plan

This document outlines the emergency and crisis management incident command structure (ICS) and Woodside's response arrangements to competently respond to and escalate an oil spill event. The document interfaces externally with Commonwealth, State and industry response plans and internally with Woodside's ICS.

The Corporate Oil Spill Contingency Plan describes Woodside's role as a Control agency and details the following support arrangements:

- Master services agreement with Australian Marine Oil Spill Centre (AMOSC) for the supply of experienced personnel and equipment, including a subsea first response toolkit and national dispersant stockpiles;
- Access to Wild Well Control's capping stack, SFRT equipment and experienced personnel for the rapid deployment and installation of a capping stack, where feasible.
- Participating membership with Oil Spill Resources Limited (OSRL), which allows access to OSRL's international holding of response equipment and response capabilities, including incident management expertise and specialist personnel;
- The Woodside and Australian Maritime Safety Authority (AMSA) Memorandum of Understanding (MoU) whereby AMSA, as managers of the National Plan for Maritime Environmental Emergencies, will provide support to Woodside such as response equipment from national stockpiles. The equipment stockpiles are located around Australia in strategic locations such as the ports of Dampier, Darwin and Fremantle.
- Other support services such as 24/7 oil spill trajectory modelling and satellite monitoring services as well as 'on-call' aerial, marine, logistics and waste management support.
- Mutual Aid Agreements with other oil and gas operators in the region for the provision of assistance in an oil spill response.

6.1.2 Dampier Regional Oil Spill Response Plan

The Dampier Regional Oil Spill Response Plan summarises the regional hydrocarbon types, response resources and response strategies to be employed during an oil spill event. The document includes response guidelines for key regional receptors which may be potentially impacted from an oil spill.

6.1.3 Pluto Facility First Strike Plan

The Pluto Facility First Strike Plan is a facility specific document providing details on the tasks required to mobilise a first strike response for the first 24 – 48 hours of a hydrocarbon spill event. These tasks include key response actions and regulatory notifications. The intent of the document is to provide immediate oil spill response guidance to the Incident Management Team until a full Incident Action Plan specific to the oil spill event is developed.

In accordance with the *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009*, Woodside's oil spill arrangements are tested at least annually.

6.2 Oil Spill Preparedness and Response Mitigation Assessment for the Dampier Region

Woodside has developed its oil spill preparedness and response position for the Dampier Region in order to demonstrate that risks and impacts associated with loss of containment from the Pluto facility

are mitigated and managed to as low as reasonably practicable (ALARP) and would be of an acceptable level.

Woodside's oil spill mitigation and control evaluation process is summarised as:

- Description of the credible scenarios for the Dampier region and identification of the response performance parameters;
- Definition of Woodside's response objectives for the level of preparedness and response;
- Identification and analysis of appropriate oil spill mitigation controls;
- Evaluation of delivery options for each mitigation control and development of an ALARP position;
- Identification of performance requirements by which the oil spill response plans can be tested; and
- Evaluation of the acceptability of the overall oil spill response plans.

6.2.1 Response Strategies

The following oil spill response strategies were evaluated and subsequently pre-selected for a significant oil spill event (level 2 or 3 under the National Plan) from the Pluto facility. Implementation of these response strategies will again be assessed during a spill event, with consideration of the size of spill, weather conditions and other constraints:

Monitor and Evaluate - To gain an understanding of the spill event, its movement and to direct mitigation activities to the optimal locations, the following operational monitoring programs are available for implementation:

- Predictive modelling of hydrocarbons to assess resources at risk;
- Surveillance and reconnaissance to detect hydrocarbons and resources at risk;
- Monitoring of hydrocarbon presence, properties, behaviour and weathering in water;
- Pre-emptive assessment of sensitive receptors at risk; and
- Monitoring of contaminated resources and the effectiveness of response and clean-up operations.

Source Control (Well intervention) - Woodside's strategy is to minimise the volume of hydrocarbons released from an oil spill event. Woodside plans to deploy the following possible control specific to well loss of containment scenarios at the Pluto facility:

- Well intervention (relief well drilling).

Open Water Containment and Recovery - Suitable vessels would be drawn from Woodside's integrated fleet, other operators in the region and from the charter market. Open water containment and recovery equipment would be sourced from Woodside owned equipment, AMSA, AMOSC and OSRL stockpiles.

Shoreline Protection – Shoreline protection equipment would be deployed from either a vessel or from the shore, depending on the prevailing conditions, shoreline type and access. Additional resources would be mobilised depending on the scale of the event to increase the number of shorelines being protected.

Shoreline Cleanup – Woodside has access to equipment stockpiles to support initial response requirements and would supplement resources, depending on the type of cleanup required, through contractors. Some equipment maybe procured locally on the day with additional equipment being sourced within Western Australia, interstate and internationally, commensurate with the scale and progressive nature of shoreline impact.

Oiled Wildlife Response – Staging sites will be established for shoreline or vessel based oiled wildlife response teams. Once recovered to a staging site, wildlife will be transported to the designated oiled wildlife facility for stabilisation and treatment.

Waste Management – The objectives of Woodside's waste management response are:

- To mobilise waste storage and transport resources on day one of a potential oil spill event to support containment and recovery and shoreline protection responses; and
- Arrange for sufficient waste storage, handling, transport and disposal capability to support continuous response operations.

To achieve these objectives, Woodside has access to waste storage in Exmouth and Karratha as well as waste storage equipment from AMOSC, AMSA and OSRL.

6.2.2 Scientific Monitoring

In addition to the above response strategies, a scientific monitoring program (SMP) will be activated following a significant oil spill (defined as a level 2 or 3 spill). The nature and scale of the spill event would dictate the implementation and operational timing of the SMP. Ten targeted scientific monitoring programs may be implemented to address a range of physical-chemical (water and sediment) and biological receptors (species and habitats) including EPBC Act listed species, environmental values associated with Protected Areas and socio-economic values such as fisheries. The SMPs to be activated are as follows:

- Desk-based review and assessment of hydrocarbons in marine waters;
- Assessment of the presence, quantity and character of hydrocarbons in marine sediments;
- Assessment of impacts and recovery of subtidal and intertidal benthos;
- Assessment of impacts and recovery of mangroves / saltmarsh;
- Assessment of impacts and recovery of seabird and shorebird populations;
- Assessment of impacts and recovery of nesting marine turtle populations;
- Assessment of impacts to pinniped (seal and sea lion) colonies including haul-out site populations;
- Desk-based assessment of impacts to other non-avian marine megafauna;
- Assessment of impacts and recovery of marine fish associated with sm03 habitats; and
- Assessment of physiological impacts to commercially important fish and shellfish species (fish health and seafood quality/safety) and recovery.

7. CONSULTATION

Woodside conducted a stakeholder assessment for the proposed activity to identify stakeholders based on the location, proposed activities and timing.

For the purposes of the Pluto EP and consistent with Section 11A of the Environment Regulations, Woodside consulted with stakeholders that it considered relevant to the operation of the Pluto Offshore Facility. The stakeholder's engaged are listed in **Table 7-1**.

Table 7-1: Stakeholders Engaged for the Pluto Offshore Facility

Organisation	Relevance
Department of Resources, Energy and Tourism	Department of relevant Commonwealth Minister
Department of Mines and Petroleum	Department of relevant State Minister
Australian Maritime Safety Authority (maritime safety)	Maritime safety
Australian Fisheries Management Authority	Commercial fishery management
Department of Fisheries (Western Australia)	Commercial fishery management
Commonwealth fisheries - Western Tuna and Billfish Fishery - Southern Bluefin Tuna Fishery	Commercial fishery – Commonwealth
Western Australian Fisheries - Mackerel - State Pilbara Trap Fishery (part of the Northern Demersal Scalefish Fishery) - Onslow Prawn	Commercial fishery – State
Department of Defence – Defence Property Services Group	Defence estate management
Australian Hydrographic Office	Maritime safety
Department of Sustainability, Environment, Water, Population and Communities	Environmental values of Commonwealth marine reserves
Department of Parks and Wildlife	Environmental values of State marine reserves
Australian Maritime Safety Authority (marine pollution)	Marine pollution response
Department of Transport	Marine pollution response
Australian Customs Service – Border Protection Command	Maritime security
Department of Broadband, Communication and the Digital Economy	Telecommunications infrastructure
Department of Agriculture, Fisheries and Forestry	Commercial fisheries policy
Commonwealth Fisheries Association	Commercial fishery representation
Western Australian Fishing Industry Council	Commercial fishery representation
Pearl Producers Association	Commercial fishery
Recfishwest	Recreational fishing
WWF	Marine traffic
Australian Conservation Foundation	Environmental non-government organisation
Wilderness Society	Environmental non-government organisation
International Fund for Animal Welfare	Environmental non-government organisation
APPEA	Environmental non-government organisation
AMOSC	Oil and gas industry representation
Department of Sustainability, Environment, Water, Population and Communities	Environmental values of Commonwealth marine reserves

A consultation fact sheet was sent electronically to all identified stakeholders prior to lodgement of the Pluto Offshore Facility EP with NOPSEMA for assessment and acceptance. Consultation following distribution of the Fact Sheet included engagement with potentially affected stakeholders, Regulators and industry associations. Published data was also reviewed on other user activity in the vicinity of the facility to determine those stakeholders most relevant to the proposed activities. In support of the Pluto EP, Woodside has sought to:

- Ensure that all relevant stakeholders have been identified and communicated to in a timely and effective manner;
- Develop communications material in response to stakeholder needs; and
- Analyse stakeholder feedback to inform decision making and planning.

No objections or claims about the potential adverse impacts of the activity were raised by relevant persons. Woodside received only minor feedback on the proposed activity from stakeholders and responded appropriately to ensure queries about the continued operation of the activity were adequately addressed and resolved. Feedback was considered in the development of management measures specific to the activity and if relevant, incorporated in the Pluto Offshore Facility EP. Stakeholder feedback and Woodside responses are summarised in **Table 7.2**.

Woodside will continue to accept feedback from stakeholders during the activity via the contact details provided below in Section 8.

Table 7-2: Stakeholder Feedback and Woodside Responses

Stakeholder Feedback	Woodside's Assessment of Feedback
Stakeholder acknowledged Woodside's advice regarding the Environment Plan revision and sought incident notification under the various circumstances that will impact on land or water under State jurisdiction.	Woodside acknowledged the advice on incident notification. Woodside noted the recent submission of an EP for Pluto (State Waters) on addressing notification requirements under State jurisdiction.
Stakeholder noted that in addition to the facility being marked on charts, the 2.5 nautical mile charted Cautionary Area around the facility will appear on hardcopy charts and ENCs. Stakeholder also sought to be kept appraised about possible Xena Tie-in activities in advance of the mob/demob phase of this extension to allow for assessment and advice on navigational safety matters.	Woodside acknowledged the advice. The scope of the Pluto EP does not include commissioning activities for Xena development and these will be the subject of a separate EP.
• Stakeholder noted that the Pilbara Line and Trap Fishery had reported fishing effort in the permit area. • Stakeholder noted that customary and recreational fishing may occur within the proposed operational area. • Stakeholder recommended that Woodside maintain ongoing consultation with WAFIC, Recfishwest and directly with fishers. • Stakeholder provided contact details in the event of a hydrocarbon spill. • Stakeholder requested that Woodside collect baseline data in developing its Oil Spill Contingency Plan (OSCP) for the proposed activity and that this data should be made available to the Stakeholder. • Stakeholder requested that spawning grounds and nursery areas for key fish species are included in the OSCP and that Woodside develop strategies to mitigate possible impacts of a spill in these areas. • Stakeholder requested that discharges of hazardous substances are recorded according to approved	Woodside acknowledged the following in response to the feedback from the Stakeholder: • Active and in-active State fisheries have been noted in the Environment Plan. • Woodside sought to engage with relevant known commercial operators for this activity, as well as providing advice to licence holders, WAFIC, Recfishwest. • Woodside notes requests for baseline data collection when developing its Oil Spill Contingency Plan (OSCP) for the proposed activity. • Woodside has an appropriate OSMP • Spawning grounds and nursery areas for key species are noted in the Environment Plan. • Woodside has appropriate record and notification processes in place for a loss of containment. • Woodside has in force an Invasive Marine Species Management Plan.

Stakeholder Feedback	Woodside's Assessment of Feedback
environmental standards. • Stakeholder also notes that all vessels undertaking activities in Western Australian waters to undertake measures to minimise the risk of translocating aquatic pests and diseases. Policy is that vessel hulls be cleaned before the trip starts. Stakeholder also requests vessel owners and operators to immediately report known or suspected introduced aquatic pests or diseases detected in Western Australian waters. • Stakeholder requested that all potential impacts to fisheries, fish and fish habitat provided to Woodside are acknowledged in this Plan and the OSCP and strategies undertaken by Woodside to mitigate or minimise these impacts are defined.	Woodside notes that existing Pluto facilities have been in place for some time and that there are no additional activities in the scope of this Plan that would be likely to impact commercial fishing operators. In the event of an emergency Woodside will assess and engage stakeholders that may be affected depending on the nature and scale of the crisis or emergency.
Stakeholder advised by letter that it had no objection to the proposed activities. Stakeholder advised that the Australian Hydrographic Office (AHO) would need to be advised of any drilling or seismic activity, as well as the status of wells once drilled.	Woodside acknowledged stakeholder advice. There are no petroleum activities in the scope of this Plan that would be likely to require advice to the AHO.
Stakeholder advised that their managed interests were unlikely to be affected the operations, unless there is a significant hydrocarbon release. Stakeholder provided advice on a range of topics in the event of significant hydrocarbon release.	Woodside noted that the stakeholders managed interests are not impacted during routine production activities at Pluto. Woodside also noted requests with respect to significant hydrocarbon release, these being: - Baseline ecological data collection - Oiled wildlife responsibilities - Monitoring and cleanup - Department notification

8. CONTACT DETAILS

For further information about this activity, please contact:

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Please direct email enquiries to our website;
http://www.woodside.com.au/Investors-Media/resources/Pages/Contact-Us.aspx

Toll free: 1800 442 977

9. REFERENCES

Department of Sustainability, Environment, Water, Populations and Communities (DSEWPaC). 2012d. Macronectes giganteus – Southern Giant Petrel. Viewed 10 December 2012. http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=1060

Marine Parks and Reserves Authority (MPRA). 2007a. Management Plan for the Montebello/Barrow Islands Marine Conservation Reserves, Marine Parks and Reserves Authority, Kensington.

Gascoyne Development Commission. 2012. Economic Development Opportunities for the Gascoyne Region associated with the Resource Sector Investment and Expansion. Gascoyne Pilbara Project, January 2012. SGS Economics and Planning. Pp. 95.

APPENDIX A: Key environmental risks, impacts and control measures identified for the Pluto Offshore Facility

Source of Risk	Key Potential Environmental Impact	Controls/Mitigation Measures
PLANNED (ROUTINE AND NON-ROUTINE) ACTIVITIES		
Physical presence of the Platform generating light and noise emissions	• Exclusion of other users including shipping and fishing; • Collision with marine fauna resulting in injury or fatality; • Provision of artificial habitat; • Seabed disturbance including localised mortality/disturbance of benthos; • Disturbance to marine fauna, particularly seabird's marine turtles and fish as a result of light emissions; and • Disturbance to marine fauna, particularly whales, marine turtles and fish, potentially as direct physical damage or as a behavioural effect resulting from noise emissions.	• Opportunistic light spill inspections will verify that lighting is limited to that required for safe working conditions, with corrective actions implemented. • A 500 m safety exclusion zone will be maintained around the Pluto Offshore Facility at all times. • Interactions between support vessels and cetaceans will be consistent with *EPBC Regulations 2000 – Part 8 Division 8.1 (Regulation 8.05) Interacting with cetaceans*. • Interactions between support vessels and whale sharks will be consistent with the *Whale Shark Code of Conduct* (DEC, 2012). • Interactions between helicopters and cetaceans will be consistent with *EPBC Regulations 2000 – Part 8 Division 8.3 (Regulation 8.07) Interacting with cetaceans.* • A stakeholder fact sheet will be distributed during scheduled EP reviews; stakeholder feedback will also be assessed throughout the duration of the approved Pluto EP. • Systems and equipment will detect and alert facility personnel of a potential collision with the facility. • Anchoring in the facility exclusion zone will be prohibited except in emergency situations or under issuing of a specific permit. • Lifting and lifted equipment will be in a safe and serviceable condition and lifting operations will be safely performed minimise the potential for dropped objects. • A lift plan, specific to the operation, will be developed by a trained and competent person; and • Operators of powered lifting equipment will be trained and competent for that specific equipment and location.
Routine atmospheric emissions from gas flaring and fuel combustion	• Temporary reduction in air quality beyond localised area; • Contribution to global greenhouse gas emissions; • Consumption of non-renewable natural resources; and • Visual impact from flare flame and possibly dark smoke.	• Flared gas will be combusted in an efficient manner and monitored at all times. • Flaring must be controlled by each facility in line with annual limits set within the internal operating plan and performance agreements. • Where a Deviation from this annual limit cannot be reasonably avoided, a business case shall be prepared and approved by Vice President Environment. • Compliance with *National Greenhouse and Energy Reporting Act (2007).* • Low sulphur fuel will be used, subject to engine compatibility (based on engine manufacturer specifications), whenever available. • The sulphur content of fuel oil used by marine vessels shall meet a maximum sulphur content of 4.5% mass/mass of 1.5% m/m if the vessel is required to do so by regulation. • Compliance with MARPOL 73/78 Annex VI (*Prevention of Air Pollution from Ships*) requirements as defined in the Marine Order 97 (*Marine Pollution Prevention, Air Pollution*) (pursuant to the Commonwealth *Navigation Act 1912).*

Source of Risk	Key Potential Environmental Impact	Controls/Mitigation Measures
		• Routine monitoring of the process plant will be undertaken by operators to identify, isolate and repair leaks (when manned). • Systems will be leak tested prior to the introduction of hydrocarbons, such that systems are proved for leak tightness prior to commissioning or re-commissioning. • Fugitive emissions shall be estimated and reported annually for each facility (this is done as part of Woodside's reporting under the NGER Act).
Routine discharges to the marine environment, including subsea chemicals, sewage and putrescible wastes	• Localised water column pollution or eutrophication; and • Localised adverse effect to marine biota.	• Compliance with Woodside's Environment Procedure for Offshore Chemical and Selection. • Subsea Investigation, Maintenance and Repair activities adhere to procedures • Subsea control fluid use will be monitored and recorded and any discrepancies will be investigated to identify unplanned use and possible integrity issues. During subsea activities, any operational chemical use and discharge from the support vessel will be recorded. • Woodside will comply with a Waste Management Plan relevant to the Pluto Offshore Facility for the discharge of sewage and putrescible wastes. • For support vessels, compliance with MARPOL 73/78 Annex IV: Sewage (as implemented in Commonwealth waters by the *Protection of the Sea (Prevention of Pollution from Ships) Act 1983*); Marine Orders - Part 96: Marine Pollution Prevention – Sewage.
Storage, handling and disposal of waste	• Pollution of the marine environment and potentially chronic and acute toxicity impacts on marine flora and fauna; • Secondary impacts on marine fauna (e.g. entanglement); and • Pollution of the terrestrial environment and potentially chronic and acute toxicity impacts on terrestrial flora and fauna.	• Waste will be stored and segregated, and handling equipment kept in good working order, to prevent accidental loss to the environment. • Records of waste transport, treatment, recycling or disposal will be maintained. • Wastes, including hazardous wastes, will be transported and disposed of in a safe and environmentally responsible manner that prevents accidental loss to the environment and pollution or contamination of soil and water. • Waste contractors will be audited to ensure they have the facilities and systems to be able to dispose of the waste in an environmentally responsible manner. • For support vessels, compliance with MARPOL 73/78 Annex III: Packaged Harmful Substances (as implemented in Commonwealth waters by the *Protection of the Sea (Prevention of Pollution from Ships) Act 1983*), Marine Orders - Part 94: Marine Pollution Prevention – Packaged Harmful Substances. • For support vessels, compliance with MARPOL 73/78 Annex V: Garbage (as implemented in Commonwealth waters by the *Protection of the Sea (Prevention of Pollution from Ships) Act 1983*), Marine Orders - Part 95: Marine Pollution Prevention – Garbage. • Naturally Occurring Radioactive Materials (NORMs) will be stored in a designated labelled radioactive storage bin and transported by a licensed carrier to an appropriate onshore disposal facility. • Should it become necessary to dispose of waste containing NORMs, a specific risk assessment will be undertaken addressing disposal methods and fate that is consistent with regulatory guidelines and best practice. • NORMs will be identified using Woodside NORM Material Management Plan.

Source of Risk	Key Potential Environmental Impact	Controls/Mitigation Measures
Chemical selection and use	• Localised water column pollution; and • Localised adverse effect to marine life.	• Selection of operational process chemicals will include consideration of technical, commercial, health, safety and environment parameters. • Compliance with Woodside's Environment Procedure for Offshore Chemical and Selection. • Chemicals will be stored safely and handled to prevent the release to the marine environment. • Facilities will maintain a hazardous chemicals register.
UNPLANNED ACTIVITIES (ACCIDENTS / INCIDENTS)		
Introduction of invasive marine species	• Introduction of invasive marine species, possibly resulting in alteration of the natural ecosystem.	• Compliance with AQIS Australian Ballast Water Management Requirements. • Compliance with Woodside's Invasive Marine Species Management Procedure, where an IMS Risk Assessment is undertaken on support vessels for the Pluto Offshore Facility that propose to enter and operate within nearshore waters around Australia. • Compliance with the *Australian Quarantine Regulations (2000).*
Unplanned venting and release of atmospheric emissions	• Contribution to global greenhouse gas emissions; and • Ozone depletion and contribution to atmosphere of gases with high global warming potential and atmospheric lifetime.	• Compliance with Woodside operating procedure to ensure flare system is operated within design specifications. • Woodside will hold a valid Refrigerant Trading Authority. • Records of refrigerant inventories and equipment maintenance will be documented.
Chemical spills	• Pollution of the marine environment; and • Adverse effects on marine life (sea floor and open water)	• Selection of operational process chemicals will include consideration of technical, commercial, health, safety and environment parameters. • Compliance with Woodside's Environment Procedure for Offshore Chemical and Selection. • Chemicals will be stored safely and handled to prevent the release to the marine environment. • Facilities will maintain a hazardous chemicals register. • Support vessels will have onboard a current Shipboard Oil Pollution Emergency Plan (SOPEP) to respond to chemical spills.
Hydrocarbon Releases caused by: • Bunkering Operations • Topside loss of containment	• Biological and ecological impacts to megafauna, plankton, deepwater benthic communities, offshore fish species, fisheries, coral reefs, mangroves, subtidal flats and sandy beaches and seagrass communities.	• Compliance with facility bunkering procedure. • Support vessels will have onboard a current Shipboard Oil Pollution Emergency Plan (SOEP) for responding to small diesel spills. • Facility design and procedures shall prevent spills beyond secondary containment; and • Product and chemical tank inventories shall be monitored to detect leakage.
Hydrocarbon Releases caused by: • Well loss of containment • Subsea loss of	• Biological and ecological impacts to megafauna, plankton, deepwater benthic communities, offshore fish species, fisheries, coral reefs, mangroves, subtidal flats and sandy beaches and seagrass communities.	Many of the critical barriers in place to prevent a hydrocarbon release from occurring are relevant across all MEE's and hydrocarbon release scenarios identified for the Pluto facility, a summary of which is provided below: • Critical communication systems will facilitate prevention and response to accidents and emergencies. • Emergency Shutdown (ESD) valves and systems will isolate hazardous inventories within pipework and riser systems and shut down plant and equipment.

Source of Risk	Key Potential Environmental Impact	Controls/Mitigation Measures
containment • Loss of structural integrity • Loss of marine vessel separation • Loss of control of suspended load.		• Reservoir isolation valves will isolate the reservoir from the facility. • All primary and secondary barriers within the wells will isolate hydrocarbons from the reservoir. • Acoustic sand detectors will ensure the integrity of pressure equipment is not compromised by the presence of sand. • Subsea isolation valves will isolate the inventory in the pipeline from the riser and topsides affecting the riser. • Pipeline and riser system will contain associated liquids and gases. • Fire and gas detection systems will facilitate prevention and response to fire or gas hazards. • Critical blowdown valves will safely depressurise inventories to avoid, or prevent the escalation of a loss of containment. • Facility drain systems will contain leaks and spills of hazardous liquids. • Structural integrity of topsides, surface structures and substructures will be maintained to ensure availability of critical systems during a major accident or environment event. • Integrity of tanks will be maintained to safely contain liquids and gases as per design requirements. • Management of potentially flammable atmospheres either by inert gas blanketing or constant purge. • Navaids and warning lights will alert marine vessels and aircraft of the position of the facility. • Ship Intrusion Detection Systems and equipment will detect and alert facility personnel of a potential collision with the facility and respond to a potential collision with the facility. • Crane lifting operations will be safely performed to minimise potential for dropped objects. • Lifting and lifted equipment will be in a safe and serviceable condition to prevent dropped objects. • Rotating equipment maintained to safely contain liquids and gasses as per design requirements. • Corrosion inhibitor injection systems will prevent internal damage to equipment, piping and pipelines.