



North Rankin Complex Operations Environment Plan Summary

August 2014

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1. INTRODUCTION

Woodside Energy Ltd (Woodside) is operator of the North Rankin Complex (NRC), which is located offshore approximately 135 km North of Dampier, Western Australia, in Production Licence WA-1-L in the Carnarvon basin. The NRC is a single integrated facility which is comprised of two platforms, the North Rankin A (NRA) platform which has been in production since 1984, and the North Rankin B (NRB) platform, which became operational in 2013.

Woodside operates the NRC on behalf of the North West Shelf Joint Venture Partners which include Woodside Energy Ltd, BHP Billiton Petroleum (North West Shelf) Pty Ltd, BP Developments Australia Pty Ltd, CNOOC NWS Private Ltd, Chevron Australia Pty Ltd, Japan Australia LNG (MIMI) Pty Ltd and Shell Development (Australia) Pty Ltd.

The NRC produces dry gas and condensate from the North Rankin and Perseus fields and delivers these hydrocarbons via two trunklines to the onshore Karratha Gas Plant for processing. The NRC consists of platform based production wells, associated topside processing and subsea infrastructure and two gas/condensate export trunklines.

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 NRC Operations EP, which was accepted under the Environment Regulations by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) on 6 August 2014.

2. DESCRIPTION OF THE ACTIVITY

2.1 Location of the Activity

The NRC is located in Commonwealth waters in the Carnarvon Basin, in Production License WA-1-L, approximately 135 km North of Dampier (**Figure 2-1**) and 23 km North East of the Goodwyn Alpha (GWA) facility (**Figure 2-1**). The facility stands in approximately 125 m of water.

Dry gas and condensate is transported to the Karratha Gas Plant via a trunkline system for processing. Approximately 105 km of the trunkline length is located in Commonwealth waters and included in the scope of the NRC EP; the remaining lengths are located in State waters and are the subject of a separate EP.

As part of the proposed Persephone Development, a new tie back flowline, is to run to the Persephone gas field, approximately 6.9 km North-East of NRC. This flowline will transport well fluids back to NRC for processing. The Persephone drilling and subsea installation activities associated with the tie-in of the Persephone field are outside the scope of the NRC EP, while the NRC modifications associated with the Persephone Development, required prior to first gas, are included within the NRC EP.

The closest nearshore sensitive receptors to the NRC are the State boundary of Barrow Island (125 km South West), the Montebello and Lowendal Island groups (95 km South West), the inshore habitats and shoreline of the Dampier Archipelago (125 km South East) and the mainland (135 km South East).

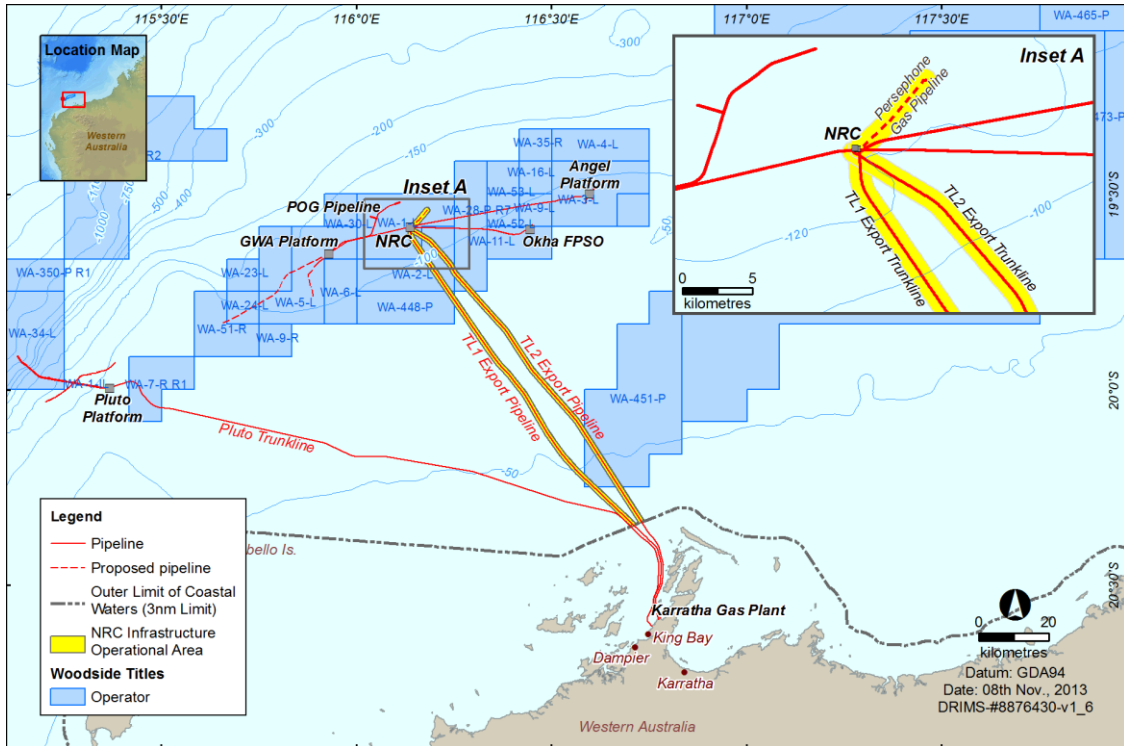


Figure 2-1: Location of the Activity

The coordinates and permit areas of the NRC and associated infrastructure are outlined in Table 2-1.

Table 2-1: NRC and associated infrastructure locations

Structure	Latitude	Longitude	Title
NRA Platform	19° 35' 03.23"S	116° 08' 17.06"E	WA-1-L
NRB Platform	19° 35' 02.52"S	116° 08' 11.32"E	WA-1-L
1TL - First Trunkline tie-in point to NRA	19° 35' 03.12"S	116° 08' 19.88"E	WA-1-PL
2TL - Second Trunkline tie-in point on the GWA Interfield Line	19° 35' 07.94"S	116° 08' 05.06"E	WA-1-L
1TL – First Trunkline at outer limit of West Australian State waters boundary (3nm)	20° 20' 49.49"S	116° 42' 40.80"E	TPL/15
2TL – Second Trunkline at outer limit of West Australian State waters boundary (3nm)	20° 20' 20.26"S	116° 43' 54.17"E	TPL/16
East end of Angel export pipeline (Angel facility) ¹	19°29'52.80"S	116°35'49.40"E	WA-3-L
West end of Angel export pipeline (NRC) ¹	19°35'09.27"S	116°08'24.14"E	WA-1-L
West end of GWA Inter-field Pipeline ² (GWA facility)	19°39'07.68"S	115°55'50.88"E	WA-5-L
East end of GWA Inter-field Pipeline ² (NRA facility)	19°35'04.62"S	116°08'16.50"E	WA-1-L
East end of Okha Export Pipeline ³ (Okha facility)	19°35'20.92"S	116°26'33.75"E	WA-11-L
West end of Okha Export Pipeline ³ (NRA facility)	19°35'07.14"S	116°08'21.88"E	WA-1-L

1: Covered by the Angel Facility Operations EP (Woodside Doc. T1200AH3313618)

2: Covered by the Goodwyn Facility Operations EP (Woodside Doc. A1800RH158693)

3: Covered by the Okha Facility Operations EP (Woodside Doc. EH0005AH0004)

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2.2 Timing of the Activity

The NRA platform commenced production in 1984 and the NRB Platform achieved start-up in October 2013. 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 field. Any additional future decommissioning or tieback plans (excluding the Persephone tie back) will be the subject of a separate EP.

2.3 Operational Area

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

- The NRC and the area within a 500 m exclusion zone around the facility;
- NRC subsea infrastructure and the area within 1500 m around the infrastructure; and
- The first and second trunklines (1TL and 2TL) between the NRC Facility and the State waters boundary (3 nm from the shore) and the area within 1500m around the trunklines.

Vessel-related activities within the Operational Area will comply with the NRC EP.

2.4 Operational Details

The NRC is a single integrated facility which is comprised of two platforms, the NRA platform and the NRB platform, connected by bridges. NRA was commissioned in 1984 as a drilling, production (gas and condensate), utilities and accommodation platform. The NRB Platform achieved start-up in October 2013 and was installed to access additional recoverable reserves of remaining Low Pressure (LP) gas from the North Rankin and Perseus gas fields. The two platforms are now fully integrated and operating as one complex, with low pressure operations from the NRC first commencing in December 2013.

Gas and condensate produced from the facility are exported onshore via two 130km trunklines, for processing. Product can be routed via the 40" first (1TL) trunkline or 42" second trunkline (2TL). Approximately 105 km of the trunkline length is located in Commonwealth waters and included in the scope of the NRC EP; the remaining lengths are located in State waters and are the subject of a separate EP.

The proposed Persephone Development comprises a two well subsea tieback to the NRC and remains subject to a final investment decision by the North West Shelf Project. When implemented, this development will include a flowline running from the subsea wells located at the Persephone field approximately 6.9 km to the North East of NRC. Well fluids will be transported back to NRC for processing and transported onshore along with other processed gas and condensate from existing wells.

Normal operations at NRC fall under the following modes of operation:

- Production and maintenance;
- Production and well maintenance;
- Subsea IMR activities;
- Production and major projects; and
- Remote operations.

Additional operational activities in relation to the EP include:

- Operational and emergency flaring of excess gas through independent NRA and NRB flare systems;
- Processing and discharge of drainage, cooling and brine water; and
- Processing and discharge of Produced Formation Water (PFW) within discharge limits.

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

- Utility systems such as lighting, heating, ventilation and air conditioning, water systems 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
- Platform Well Management and Maintenance Activities.

2.4.1 Interaction with other Facilities

The NRC is central to Woodside's NWS facilities and has interactions with the following facilities:

- GWA platform via a 23 km, 30" inter-field pipeline (IFL);
- KGP via two 130 km, 40" (ITL) and 42" (2TL) export trunklines;
- Angel platform via a 50 km, 30" pipeline and power umbilical. NRC also has full remote control of Angel when it is not manned; and
- Okha FPSO via a 33 km, 12" export pipeline.

Interaction with the Angel Facility

The Angel facility can be operated, monitored, controlled, restarted and diagnosed remotely from the NRC or an onshore Remote Operation Station (ROS). This is achieved via a dedicated operating console that communicates to Angel via the fibre optic link contained in the submarine power cable that also supplies electrical power to Angel.

The operation of the Angel Facility is covered by the Angel Facility Operations EP.

3. DESCRIPTION OF THE ENVIRONMENT

The NRC and associated infrastructure is located in Commonwealth waters on the North West Shelf (NWS), approximately 135 km North West of Dampier, in water depths of approximately 125 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). The NRC Operational Area does not overlap with any established or proposed marine protected areas.

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. Tropical cyclone activity can occur between November and April and is most frequent in the area during January to March, with an annual average of approximately one storm per month.

The large-scale ocean circulation of the NWS is primarily influenced by the Indonesian throughflow (ITF) (Meyers *et al*, 1995; Potemra *et al*, 2003), and the Leeuwin Current (Godfrey and Ridgway, 1985; Holloway and Nye, 1985; Batteen *et al*, 1992; James *et al*, 2004). The currents are driven by pressure differences between the equatorial waters, and the higher density, cooler and more saline waters of the Southern Ocean. The ITF and Leeuwin Current are strongest during late summer and winter (Holloway and Nye, 1985; James *et al*, 2004). The Ningaloo Current flows in the opposite direction to the Leeuwin Current and closer to shore.

The NRC is located in waters approximately 125 m deep on the outer shelf of the NWS. The NRC wells are located in depths from approximately 80 to 125 m and the export pipeline is in 80 m of water at its Eastern end, and 125 m at its Western end. Broad-scale surveys confirm that the seabed is flat and relatively featureless and no areas of hard outcropping are known within 2 km to 3 km of NRC. The seabed in the vicinity of the NRC is typical of deeper offshore areas (>150 m water depth) on the NWS, being characterised by deep (>5 m) soft, silty sediments derived primarily from calcium carbonate, which become deeper, softer and finer with increasing depth.

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 NRC Operational Area or within the NRC 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 47 listed marine species that may occur within or traverse the NRC Operational Area. Of the listed species identified, eight are threatened marine species and 15 are migratory species. Fourteen additional Listed Marine Species were identified in the NRC Trunklines Operational Area. Of these species, two were threatened and four were migratory species.

Twenty-two cetacean species may occur within the NRC Operational Area, with five categorised as threatened and/or migratory. The Endangered Pygmy Blue Whale (*Balaenoptera musculus breviceauda*) 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 traverse the NRC Operational Area infrequently throughout the year.

Five marine turtle species are recorded for the region and may occur in the NRC Operational Area and adjacent waters. The marine turtles identified were: the Green Turtle (*Chelonia mydas*), Leatherback Turtle (*Dermochelys coriacea*), Loggerhead turtle (*Caretta caretta*), Hawksbill Turtle (*Eretmochelys imbricata*), and the Flatback Turtle (*Natator depressus*). With consideration of the distance offshore (approximately 106 km

North of the Montebello Islands), depth range of surrounding offshore waters (approximately 85 m to 1000 m), and absence of potential nesting or foraging sites (i.e. no emergent islands, reef habitat or shallow shoals), the NRC Operational Area is not considered an important habitat for marine turtles. Furthermore, while it is acknowledged that there are significant nesting sites along the mainland coast and islands of the region, the primary nesting locations (such as Montebello Islands) are at least 56 km from the NRC Operational Area.

Migratory marine fish species that may occur within the NRC Operational Area include Whale Sharks and the two species of Mako Shark. Whale Sharks (*Rhincodon typus*) may traverse the NRC Operational Area during their migrations to and from Ningaloo Reef. However, it is expected that Whale Shark presence within the NRC 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 Ningaloo Reef edge (MPRA, 2005). There is very little information about Mako sharks in Australia, with no available population estimates or distribution trends. Longfin and Shortfin Mako Sharks may be encountered within the NRC Operational Area but occurrences are likely to be of short duration with individuals transiting the area.

Two species of seabirds were identified by the EPBC Act protected matters searches for the NRC Trunklines Operational Area, including the Southern Giant Petrel (Endangered) and Roseate Tern (Migratory). No roosting or nesting habitat exists within the NRC Operational Area, and there are no Ramsar Convention protected sites in the surrounding area (DEWHA, 2010a). The nearest Ramsar sites, Eighty Mile Beach and Roebuck Bay, are located over 669 km to the North East. 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 NRC Trunklines Operational Area is not critical habitat for these birds, and the species are likely to be uncommon.

The dugong (*Dugong dugon*), is listed as Migratory under the EPBC Act and was identified as potentially occurring within the NRC Trunklines Operational Area. Given the offshore location and deep water depths, the NRC Operational Area does not support primary producer habitat for grazing and is not a critical habitat for Dugongs. Dugongs may transit the NRC Operational Area, but this 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 NRC 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 NRC 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 or known shipwreck sites within the vicinity of the NRC Operational Area, however, it is noted that there are a number of historic shipwreck protected places in Commonwealth waters of the North West Region.

No tourism activities take place specifically within the NRC 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 NRC 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 Woodside operated Goodwyn and Pluto platform to the South West.

The Operational Areas are located within/adjacent to four Commonwealth and seven State fisheries. Due to water depths and distance offshore, recreational fishing is unlikely to occur in the NRC Operational Area and recreational fishing vessels will be subject to a 500 m exclusion zone around the NRC.

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 NRC Operational Area does not overlap with any established or proposed marine protected areas. The marine protected areas within close proximity to the operational area are the Montebello Commonwealth Marine Reserve (56 km), Montebello Islands Marine Park/ Barrow Island Marine Management Area (106 km) and Lowendal Islands Nature Reserve (130 km).

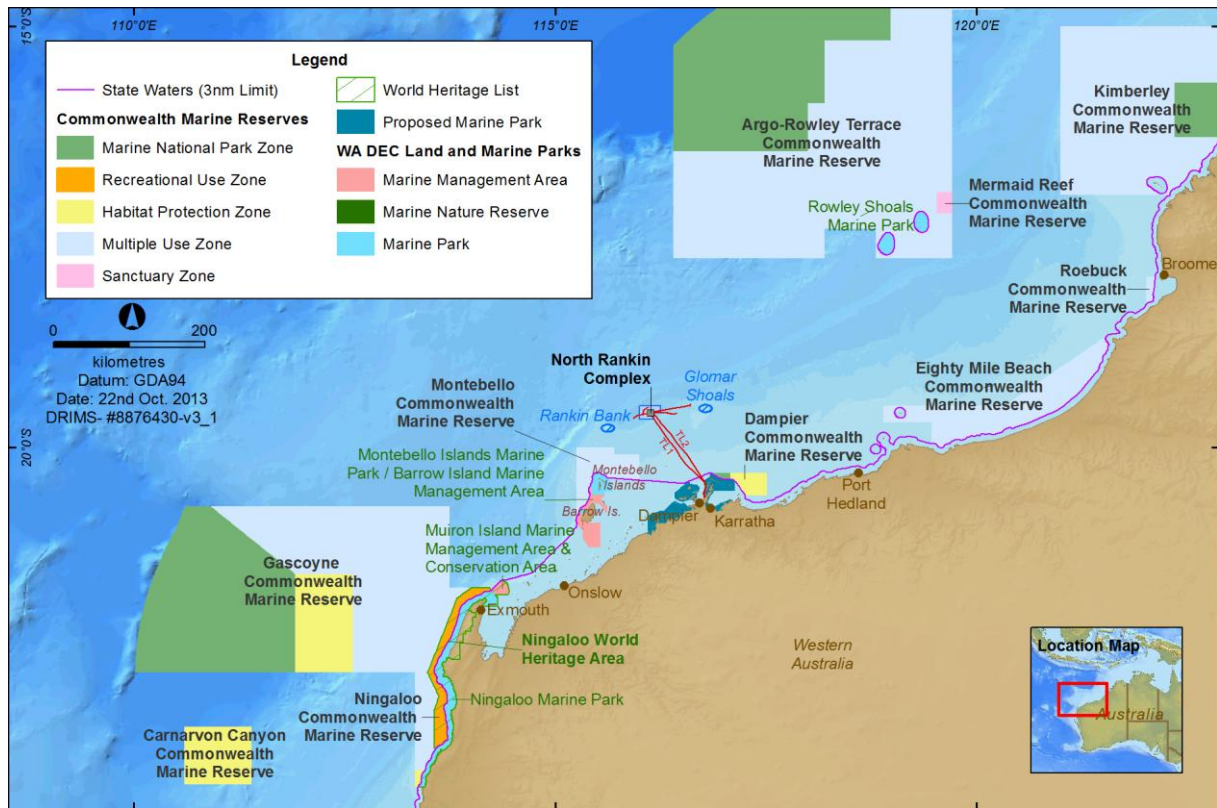


Figure 3-1: Established and Proposed Commonwealth and State Marine Protected Areas in relation to the Operational Areas.

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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 NRC 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 NRC is provided below.

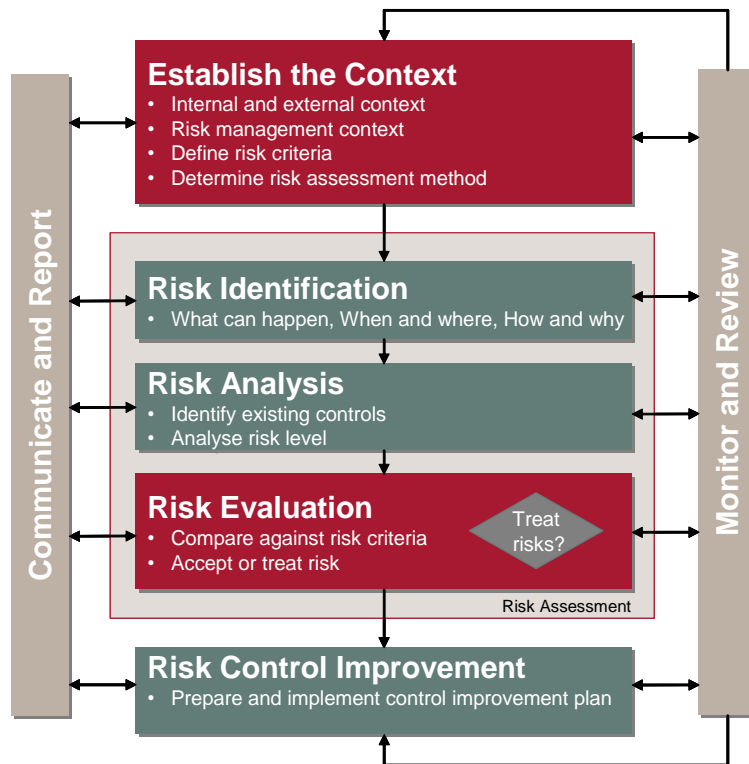


Figure 4-1: Key Steps in Woodside’s Risk Management Framework

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 NRC 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 NRC 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 NRC identified 27 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 NRC 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;
- Atmospheric emissions from routine gas flaring and fuel combustion;
- Discharge of Produced Formation Water (PFW), drainage, cooling and brine water;
- 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 relate to planned activities which occur routinely or more frequently, the EP contains a variety of control and mitigation 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.

Unplanned activities with a lower source of risk include:

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

The risk assessment for the NRC identified that there are six unplanned activities which would be considered a Major Environment Event (MEE), should they occur. 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.

Although the likelihood of such an event occurring is extremely low, a further level of rigour is applied to the assessment due to the potential consequence of a MEE. The process used in the assessment 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 NRC are:

- Hydrocarbon release caused by a well loss of containment;
- Hydrocarbon release caused by a subsea loss of containment;
- Hydrocarbon release caused by a topside 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 NRC are presented in **Appendix A**.

5. MANAGEMENT APPROACH

Operation of the NRC will be managed in compliance with the *NRC 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 NRC Facility, during both routine and non-routine operations, are identified, will be reduced to ALARP and will be of an acceptable level.

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

The implementation strategy detailed in the *NRC 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 outcomes, standards and measurement criteria outlined in the EP;
- Annual site based inspections undertaken by Woodside's Environment Function to review compliance against the NRC 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 NRC 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 monitor and review environmental performance of the NRC via a variety of monthly reports which detail environmental performance and compliance with Woodside standards.

Environment Plan Revisions

Revision of the NRC EP will be undertaken in accordance with the requirements outlined in Regulation 17 and Regulation 19 of the Environment Regulations. Woodside will submit a proposed revision of the NRC 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 5 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 Woodside's Oil Spill Response Arrangements

Woodside's Oil Pollution Emergency Plan (OPEP) for the NRC 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 documents include response guidelines for key Pilbara regional receptors which may be potentially impacted from an oil spill.

6.1.3 NRC First Strike Plan

The NRC 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 an 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 NRC are

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

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 NRC. Implementation of these response strategies would 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 NRC:

- 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. Other open water containment and recovery equipment (e.g. booms and skimmers) would be sourced from AMSA, AMAOSC and OSRL stockpiles.

Shoreline Protection – Shoreline protection equipment would be deployed either from 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 benthic 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 an assessment for potentially affected stakeholders, based on activities associated with operation of the NRC. This included location of the facility, timing of the activities and potential environmental and social impacts.

Consideration was given to stakeholder feedback (comments and information) provided to Woodside in preparation for a number of recent NWS Project production facility EPs including the Goodwyn A and Angel platforms.

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

Table 7-1: Stakeholders Engaged for the NRC Facility

Organisation	Relevance
Department of Resources, Energy and Tourism	Department of relevant Commonwealth Minister
DMP	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)	Fisheries management
Commonwealth Fisheries: <ul style="list-style-type: none"> Western Tuna and Billfish; Western Skipjack Tuna Fishery; and Southern Bluefin Tuna. 	Commercial fishery – Commonwealth
Western Australian Fisheries <ul style="list-style-type: none"> Western Australian Mackerel Fishery. Pilbara NCDSF Fishery Onslow Prawn Fishery 	Commercial fishery – State
Department of Transport (Western Australia)	Marine pollution response
Department of Environment	Matters of National Environmental Significance and Department of Commonwealth Environment Minister
Department of Defence – Defence Property Services Group	Defence estate management
Department of Parks and Wildlife	State environment and wildlife
Department of Environmental Regulation	State environment regulation
Australian Maritime Safety Authority (marine pollution)	Commonwealth marine pollution response
Australian Hydrographic Office	Marine safety (navigation and charts)
Australian Customs Service – Border Protection Command	Boarder protection
Department of Broadband, Communication and the Digital Economy	Telecommunications infrastructure
Department of Agriculture, Fisheries and Forestry	Commonwealth commercial fisheries policy
Commonwealth Fisheries Association	Commercial fishery representation
Western Australian Fishing Industry Council	Commercial fishery representation
Pearl Producers Association	Pearl fishery representative
RecfishWest	Recreational fishery representation
Dampier Port Authority	State port authority
World Wildlife Fund	Non-government organisations (environment)
Australian Conservation Foundation	Non-government organisations (environment)

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Wilderness Society	Non-government organisations (environment)
International Fund for Animal Welfare	Non-government organisations (environment)
Conservation Council of Western Australia	Non-government organisations (environment)
Australian Petroleum Production and Exploration Association	Oil and gas industry representation
AMOSOC	Oil spill response – industry contractor
Federal Member for Durack	Relevant Federal Member of Parliament
State Member for Pilbara	Relevant State Member of Parliament
Charter boat operators and Recreational Fishers <ul style="list-style-type: none"> • Nickol Bay Sport Fishing Club • King Bay Game Fishing Club • Hampton Harbour Boat & Sailing Club • Port Walcott Yacht Club • Port Walcott Volunteer Marine Rescue • West Pilbara Volunteer Sea Search & Rescue Group • Discovery Cruising • Andro Charters • Warrior Princess Charters 	Charter boat operators and recreational fishers
Other petroleum operators <ul style="list-style-type: none"> • BHP Billiton Petroleum • BP • Shell • Mimi • Chevron 	Joint venture partners

A consultation Fact Sheet was sent electronically to all identified stakeholders prior to lodgement of the NRC 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 NRC 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 regarding 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 NRC were adequately addressed and resolved. Feedback from stakeholders was considered in the development of management measures specific to the activity and, where relevant, was incorporated in the NRC 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 in Section 8.

Table 7-2: Summary of Stakeholder Feedback and Woodside Responses

Stakeholder Feedback	Woodside Response
<p>Stakeholder noted the NRC Operations EP, will be assessed under the <i>Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009</i>, by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA).</p> <p>Stakeholder noted a separate EP is required for the petroleum activity in State waters, and does not form part of the scope of the NRC Operations EP to be assessed by NOPSEMA under the abovementioned regulations.</p>	<p>Noted – Woodside is preparing relevant EP/s for its State waters activities.</p>
<p>Stakeholder verbally requested further information on the NRC activities and following this provided a response noting that they believed they were a ‘relevant’ stakeholder.</p> <p>The Stakeholder provided the following advice:</p> <ul style="list-style-type: none"> • Six State fisheries have interest in the area • Ongoing consultation with fisheries and representative bodies should continue • An Operational and Scientific Monitoring Program (OSMP) should be in place • Key fish species (including spawning events) should be included in the EP • Discharges are managed and recorded as per procedures • Invasive marine species management plan in place • Information provided by the Stakeholder is acknowledged in the EP 	<p>As per the Stakeholders feedback, Woodside has acknowledged in the EP:</p> <ul style="list-style-type: none"> • The active and in-active State fisheries in the EP (inactive fisheries have been noted and ongoing consultation with fisheries representative bodies will ensure any activity by those parties is identified) • Woodside has an appropriate OSMP • Spawning grounds and nursery areas for key species are noted • Woodside has appropriate record and notification processes in place for a loss of containment • Woodside has in force an Invasive Marine Species Management Plan

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8. CONTACT DETAILS

Under Regulation 15, the Nominated Liaison Person for this activity is:

Roland Hamp
Asset Manager
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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

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

Source of Risk	Key Potential Environmental Impact	Controls/Mitigation Measures
PLANNED (ROUTINE AND NON-ROUTINE) ACTIVITIES		
Physical presence of the Platform and light and noise emissions	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • 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 NRC at all times. • Interactions between support vessels/helicopters and cetaceans and whale sharks will be consistent with Commonwealth environment Regulations and relevant code of conduct. • A stakeholder fact sheet will be distributed during scheduled EP reviews; stakeholder feedback will also be assessed throughout the duration of the approved NRC 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.
Routine atmospheric emissions from gas flaring and fuel combustion	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • 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. • Fuel gas and diesel consumption will be monitored at all times. • Compliance with relevant national emissions reporting legislation and maritime air pollution legislation (where relevant). • Routine monitoring of the process plant will be undertaken by operators to identify, isolate and repair leaks. • 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.
Routine discharges to the marine environment, including subsea chemicals, sewage and putrescible wastes	<ul style="list-style-type: none"> • Localised water column pollution or eutrophication; and • Localised adverse effect to marine biota. 	<ul style="list-style-type: none"> • Compliance with Woodside's Environment Procedure for Offshore Chemical and Selection. • Production Offshore Process and Subsea Chemical Register Maintained for the NRC Facility which contains details of chemical assessments and annual reviews. • Subsea Inspection, Maintenance and Repair activities adhere to relevant procedures;

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Source of Risk	Key Potential Environmental Impact	Controls/Mitigation Measures
		<ul style="list-style-type: none"> 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. Sewage and putrescible wastes will be macerated prior to discharge to sea. For support vessels, compliance with MARPOL 73/78 Annex IV: Sewage (as implemented in Commonwealth waters by the <i>Protection of the Sea (Prevention of Pollution from Ships) Act 1983</i>); Marine Orders - Part 96: Marine Pollution Prevention – Sewage.
Discharge of PFW, cooling, brine and drainage water	<ul style="list-style-type: none"> Acute and chronic toxicity to marine biota; Accumulation of toxicants in sediments affecting biota; Alteration of physiological processes; Localised water column pollution; and Bioaccumulation of organic toxicants. 	<ul style="list-style-type: none"> The concentration of petroleum in any produced formation water discharged into the sea will not exceed an average of 30 mg/L over any daily (24 hour) period. PFW discharge volume and OIW concentration will be monitored and controlled. Routine assessment of potential PFW discharge impacts, including representative field based monitoring, will be undertaken. Additional verification assessment or monitoring will be initiated should there be potential for a change to discharge characteristics, which may alter existing compliance with the performance standard. PFW discharges will be assessed to meet 'no effect concentration' within an approved mixing zone around the facility. PFW chemical composition and toxicity shall be characterised to support this assessment. Chemical dosage of the reverse osmosis and cooling water systems is undertaken in a controlled manner to minimise dosage to the minimum required to achieve treatment efficiency. In relation to cooling water discharges, assessments will be undertaken to ensure localised temperature increases remain within an approved mixing zone. Drainage systems will be inspected and in a safe and serviceable condition to manage potential leaks and spills.
Storage, handling and disposal of waste	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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. Training will be provided to relevant operational personnel to educate on the correct waste management requirements i.e. storage, handling, segregation and disposal. Support vessels will comply with relevant marine pollution prevention legislation. Management measure will be in place to identify any Naturally Occurring Radioactive Materials (NORMs), and if so manage the handling, storage and disposal appropriately.
Chemical selection and use	<ul style="list-style-type: none"> Localised water column pollution; and Localised adverse effect to marine life. 	<ul style="list-style-type: none"> 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.

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Source of Risk	Key Potential Environmental Impact	Controls/Mitigation Measures
		<ul style="list-style-type: none"> Facilities will maintain a hazardous chemicals register.
UNPLANNED ACTIVITIES (ACCIDENTS / INCIDENTS)		
Introduction of invasive marine species	<ul style="list-style-type: none"> Introduction of invasive marine species, possibly resulting in alteration of the natural ecosystem. 	<ul style="list-style-type: none"> 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 NRC that propose to enter and operate within nearshore waters around Australia. Compliance with the <i>Australian Quarantine Regulations (2000)</i>.
Unplanned venting and release of atmospheric emissions	<ul style="list-style-type: none"> Contribution to global greenhouse gas emissions; and Ozone depletion and contribution to atmosphere of gases with high global warming potential and atmospheric lifetime. 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Pollution of the marine environment; and Adverse effects on marine life (sea floor and open water) 	<ul style="list-style-type: none"> 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. Subsea equipment utilising hydrocarbons will be maintained to reduce the risk of loss of hydrocarbon containment to the marine environment. In ocean equipment (subsea equipment and towed equipment) utilising hydrocarbons will be inspected to ensure equipment is not leaking and critical hydraulic hoses are in good working order prior to deployment. 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: <ul style="list-style-type: none"> Bunkering Operations 	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> Compliance with facility bunkering procedure and operators competent in the activity. Support vessels will have onboard a current Shipboard Oil Pollution Emergency Plan (SOPEP) for responding to small diesel spills.
Major Environmental Events (MEE) - Hydrocarbon Releases caused by: <ul style="list-style-type: none"> Well loss of containment Subsea loss of containment 	<ul style="list-style-type: none"> Biological and ecological impacts to megafauna, plankton, deepwater benthic communities, offshore fish species, fisheries, coral reefs, mangroves, subtidal flats and sandy 	<p>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 NRC, a summary of which is provided below:</p> <ul style="list-style-type: none"> 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

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Source of Risk	Key Potential Environmental Impact	Controls/Mitigation Measures
<ul style="list-style-type: none"> • Topside loss of containment • Loss of structural integrity • Loss of marine vessel separation • Loss of control of suspended load. 	<p>beaches and seagrass communities.</p>	<p>systems and shut down plant and equipment.</p> <ul style="list-style-type: none"> • 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. • Relief systems will protect pressurised equipment, equipment exposed to high pressures and piping from a loss of containment. • Integrity of pressure vessels, heat exchangers and tanks will be maintained to safely contain liquids and gases as per design requirements. • Nav aids 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. • Satellite tracking drifter buoy will monitor the movement of significant hydrocarbon spills to sea.

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