



WOOLLYBUTT ENVIRONMENT PLAN SUMMARY - FIELD MANAGEMENT AND PLUG AND ABANDONMENT

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1. ACRONYMS AND DEFINITIONS USED IN THIS DOCUMENT

NOMENCLATURE	DEFINITION
AIS	Automatic Identification System
ALARP	As Low As Reasonably Practicable
AMP	Australian Marine Park
AMSA	Australian Maritime Safety Authority
BOD	Biological Oxygen Demand
dB	decibels
DSPM	Disconnectable Single Point Mooring
Eni	Eni Australia Limited
EP	Environment Plan
EPBC Regulations	Environment Protection and Biodiversity Conservation Regulations 2000
FPSO	Floating Production, Storage and Offloading
g/m ²	Grams per square metre
HXT	Horizontal Christmas Tree
IUCN	International Union for Conservation of Nature and Natural Resources
KEF	Key Ecological Feature
km	kilometre
MARPOL 73/78	International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto
LWIV	Light Well Intervention Vessel
µPa	Micropascals
MODU	Mobile Offshore Drilling Unit
NOPSEMA	National Offshore Petroleum Safety and Environmental Management Authority
NWMR	North-West marine region
NWS	North West Shelf
NWXA	North West Australia Exercise Area
OPEP	Oil Pollution Emergency Plan
OPGGS(E) Regulations	Offshore Petroleum & Greenhouse Gas (Environment) Regulations 2009
OSMP	Operational and Scientific Monitoring Plan
P&A	Plug and Abandonment
%	percent
ppb	Parts per billion
ppm	Parts per million
RMR	Riserless mud recovery
ROV	Remote Operated Vehicle
SCM	Subsea Control Modules
SOPEP	Shipboard Oil Pollution Emergency Plan
SUTU	Subsea Umbilical Termination Unit

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NOMENCLATURE	DEFINITION
WBM	Water based muds
WHA	World Heritage Area
ZPI	Zone of Potential Impact


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2. INTRODUCTION

The Woollybutt Field is located approximately 65 km off the northwest coast of Western Australia in Lease Area WA-25-L. During production, the field development consisted of four subsea wells (WB1, WB2A, SB1 and WB4) that produced through subsea wellheads and flexible flowlines to a Floating Production, Storage and Offloading (FPSO) facility. Production at the field ceased in May 2012 with the FPSO departing from the field in June 2012. The field is now being prepared for decommissioning.

Eni Australia Limited (Eni) will undertake ongoing field management, intervention and Plug and Abandonment (P&A) activities of up to six wells within the field. Wellhead and remaining subsea equipment will be subject to final decommissioning, which will be covered under future EP submissions.

An EP for passive field management activities and P&A activities (including well intervention where required) was prepared in accordance with the requirements of the Offshore Petroleum & Greenhouse Gas (Environment) Regulations 2009 (OPGG(E) Regulations). The EP was reviewed and accepted by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) on 19 July 2019. This EP summary document has been prepared and submitted to NOPSEMA in accordance with Regulation 11(7) of the OPGGS(E) Regulations.

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3. LOCATION OF ACTIVITY

The Woollybutt Field is located in Production Licence WA-25-L (Operational Area), approximately 65 km north of Onslow and 35 km west of Barrow Island, as shown in Figure 3.1. It lies on the continental shelf in 100 m water depth.

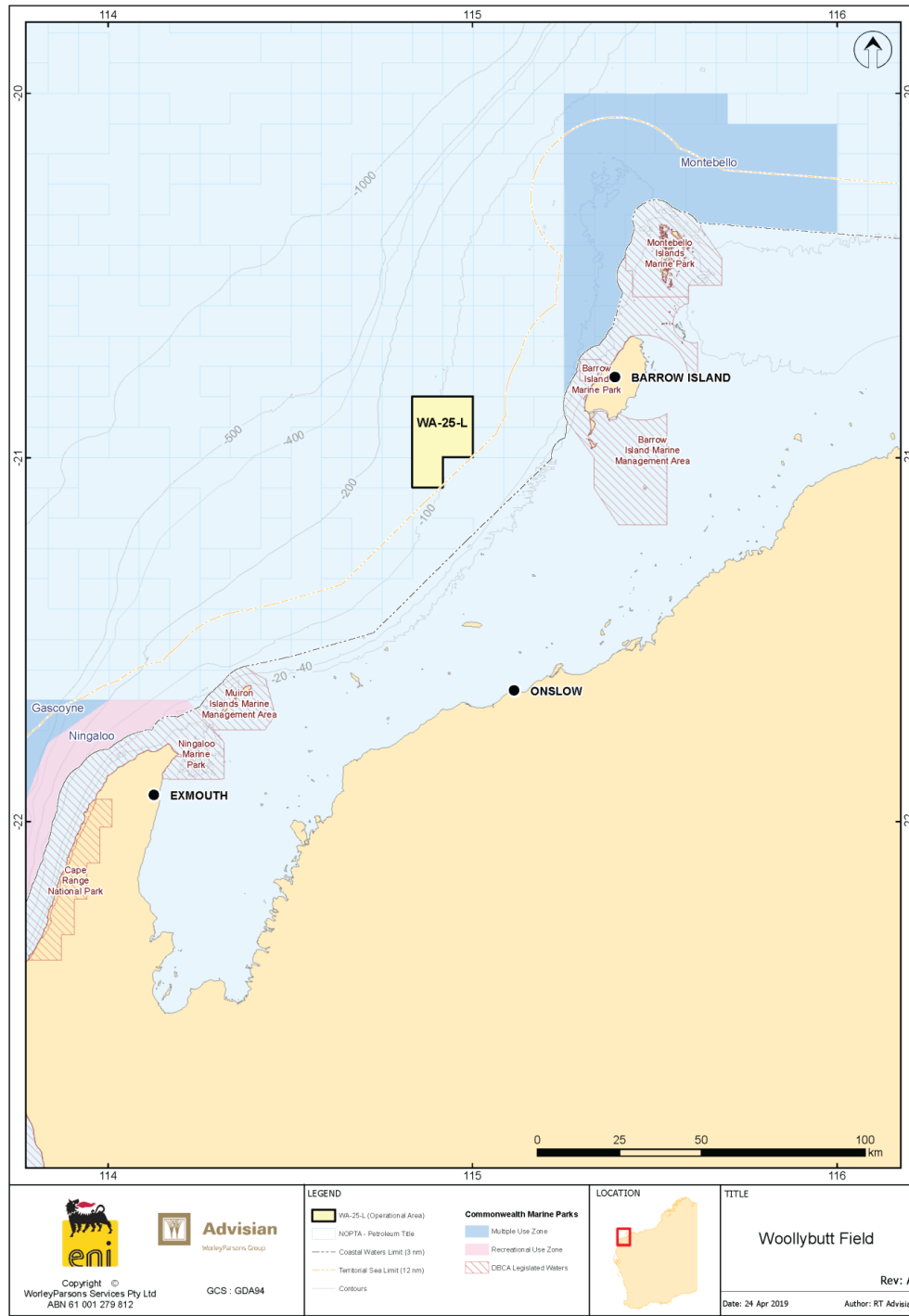



Figure 3.1: Location of the Woollybutt Field in WA-25-L

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3.1 Operational Area

The Operational Area defines the spatial boundary of the Petroleum Activities Program, as described, risk assessed and managed by the EP. The area encompasses Production Licence WA-25-L.

Support vessels conducting related activities within the Operational Area will be required to comply with the EP. Outside the Operational Area, maritime regulations and other requirements will apply to the vessels.

The infrastructure within the Woollybutt field includes:

- production wells (shut-in and suspended)
- control modules, umbilicals and manifolds
- subsea infrastructure.

3.2 Production Wells

Four production wells within the Woollybutt field (Table 3.1) are shut in: Scalybutt-1ST1, Woollybutt-4ST1, Woollybutt-2A-ST3 and Woollybutt-1ST2.


Two additional wells (Woollybutt-3A2 and Woollybutt-5A3) are plugged, and may require additional P&A pending investigation on the initial four shut-in production wells.

Table 3.1: Woollybutt production well coordinates

Shut-in production wells - Confirmed wells to be plug and abandoned		
Well	Easting	Northing
Scalybutt-1ST1 (SB1)	280,636	7,685,490
Woollybutt-4ST1 (WB4)	278,357	7,681,413
Woollybutt-2A-ST3 (WB2A)	282,241	7,685,527
Woollybutt-1ST2 (WB1A)	282,483	7,687,011
Suspended wells - May require additional P&A		
Well	Easting	Northing
Woollybutt-3A2	278,903	7,679,994
Woollybutt-5A3	277,733	7,676,363

3.3 Control Modules, Umbilicals and Manifolds

The WB1 control system is direct hydraulic. WB2A, WB4 and SB1 wells were controlled using a multi-plexed production control system via electro-hydraulic Subsea Control Modules (SCM) located on the SB1 and Woollybutt Manifolds.

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The control umbilicals contain cores for hydraulic fluid, chemical injection and power and signal cores for control and data recovery from the Xmas Trees and down hole gauges. The system used water based hydraulic fluid. The umbilicals run from the dis-connectable single point mooring (DSPM) to the manifolds and to the wells.

There are two umbilical baskets with approximate dimensions of 3.6 m x 2.5 m x 1.4 m. These are skid structures where the end of the infield umbilical is terminated to a Subsea Umbilical Termination Unit (SUTU).


Control modules, umbilicals and manifolds are no longer operational. Manifolds are flushed to seawater. Controls and umbilicals remain on the seabed.

The Woollybutt-3A2 and Woollybutt-5A3 wells were not producing wells, hence they have no control modules, umbilicals or manifolds. Only wellheads remain on the seabed for Woollybutt-3A2 and Woollybutt-5A3.

3.4 Subsea Infrastructure

Subsea infrastructure is shown in Figure 3.2.

Flowlines have been flushed with sea water and remain isolated between the HXT valves and the DSPM buoy. The FPSO was disconnected from the DSPM buoy, which was lowered to an approximate water depth of 35 m prior to the FPSO departing the field.

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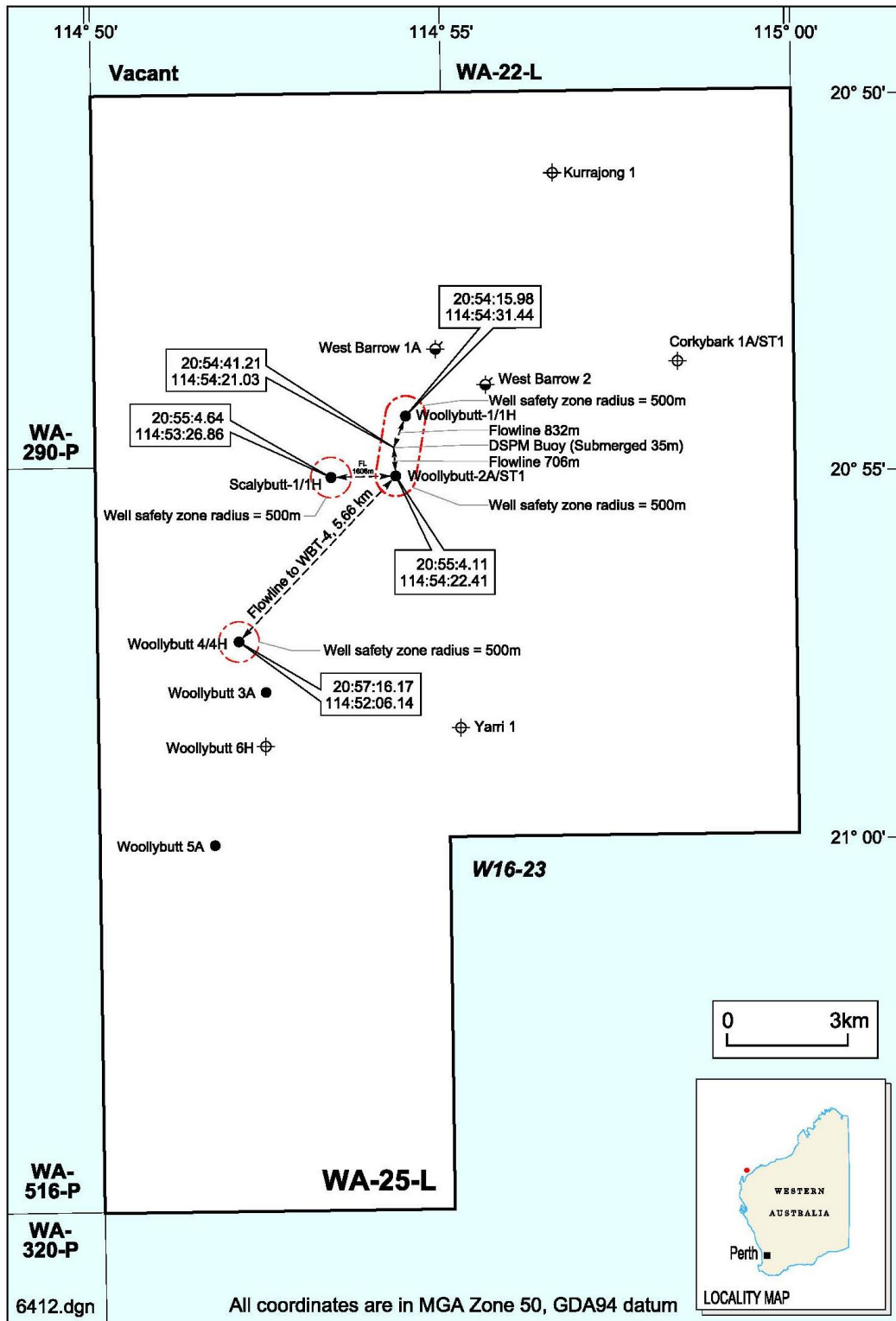



Figure 3.2: Woollybutt Field layout

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4. DESCRIPTION OF ACTIVITY

The activity involves

- field management,
- intervention and
- P&A.

It is planned that all four shut-in production wells will be P&A. An additional two suspended wells (Woollybutt-3A2, Woollybutt-5A3) may require P&A pending investigation on the initial four shut-in production wells. Current barriers in the suspended wells meet international standards in terms of P&A of the main reservoir.

4.1 Field Management Activities

Field management activities include cathodic protection surveys and visual inspections; these are undertaken using remotely operated vehicles (ROV), deployed from a vessel. The methods used by Eni are well understood and do not represent any novel techniques or equipment. Details of the frequencies and durations of field management activities are provided in Table 4.1.

Cathodic protection and visual surveys will include evaluation of infrastructure integrity at all of the Woollybutt production wells and subsea infrastructure. Any potential corrective actions or maintenance works arising from these surveys will be undertaken during subsequent well intervention or P&A activities.

Table 4.1: Proposed field management activities with indicative frequencies and durations


Activity	Frequency	Approx. Duration (days)
ROV survey - Cathodic protection and visual surveys	Annually until WB-4 is plugged Every 2 years after P&A of WB-4, until decommissioning	3-7 days per well

4.2 Well Intervention Activities

Well intervention is required at WB-4. Intervention of WB-1A well may also be undertaken should the Light Well Intervention Vessel (LWIV) schedule allow.

Table 4.2: Proposed well intervention activities with indicative duration

Activity	Details	Approx. Duration (days)
Well Intervention at WB-4 and WB-1A	Well intervention with a LWIV	7-15 days

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4.3 Plug and Abandon Activities

P&A activities will be conducted from a semisubmersible Mobile Offshore Drilling Unit (MODU).

A maximum of three activity support vessels will support the P&A activities. An overview of the proposed P&A activity is provided in Table 4.3.

Table 4.3: P&A activity overview


Item	Description
Exploration Area	WA-25-L
Water Depth	100 m
Number of Wells	4 – 7
Vessel / MODU Type	Semi-submersible MODU
Support Vessels	3
Approx. Duration	20-30 days per well

P&A activities of all the shut-in wells will be completed by 2021.

4.4 Chemical Assessment Process

All chemicals used in Woollybutt activities will be considered within the scope of the chemical assessment and selection process. These include all downhole operational chemicals used during P&A and intervention (cement, Water Based Mud, Blow-Out Preventer Control Fluids). Chemicals required for maintenance activities (e.g. paints, lubricants and greases), portable water treatment chemicals, emergency response chemicals and those chemicals used for domestic purposes are considered out of scope. The scope follows the same principles as applied in the UK under the Offshore Chemical Regulations 2002 (as Amended 2011), including consideration of the following:

- Existing assessments for chemicals registered on the Centre for Environment, Fisheries and Aquaculture Science (CEFAS) Offshore Chemical Notification Scheme (OCNS) list;
- Ecotoxicity;
- Biodegradation;
- Bioaccumulation;
- Chemical Assessment to ensure the risk is as low as reasonably practicable (ALARP) and Justification for use/discharge.

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4.5 Vessels

4.5.1 Project/Support Vessels

Project and support vessels will be selected based on the activity that will be undertaken. Only one project vessel will be in the Operational Area at any one-time undertaking field management. A maximum of three support vessels will be utilised to support the MODU during P&A activities.

All vessels will be commercial vessels with a suitable survey class for activities in the Operational Area. All project vessels will run on marine diesel; no intermediate or heavy fuel oils will be used. Vessel specifications for support and project vessels are provided in Table 4.4.

Table 4.4: Support and project vessel details


Parameter	Description
Draft (max)	3.25 m (max)
Gross tonnage	1475 Gt
Hull	Steel hull
Fuel type	Marine diesel
Total fuel volume	138.2 m ³
Volume of largest fuel tank	30.4 m ³

4.5.2 Intervention Vessel

A Light Well Intervention Vessel (LWIV) will be used to conduct the well intervention activities at WB-4 and potentially WB-1A. The specifications of the vessel that will be used are provided in Table 4.5.

Table 4.5: Intervention vessel details

Parameter	Description
Draft (max)	7.11 m (max)
Length	115 m
Berths	98 persons
Gross tonnage (International)	8842 GRT
Hull	Steel hull
Fuel type	Marine diesel
Total fuel volume	1355-m ³ (fuel oil)
Volume of largest fuel tank	186.3 m ³

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4.5.3 MODU

A semi-submersible Mobile Offshore Drilling Unit (MODU) will be used for the P&A activities. Selection of the MODU will be based on Eni's rig selection criteria which considers technical and HSE suitability for the P&A activity.

Table 4.6: Specification of a typical semi-submersible MODU

Specification	
Rig type	Semi-submersible MODU
Accommodation	130
Station Keeping	Optional – MODU will be moored
Mud and cement storage capacity	750 m ³
Fuel oil storage capacity	2700 m ³

The MODU, whilst operating in Australian Commonwealth waters, and operating for Eni, will do so in accordance with a NOPSEMA accepted Vessel Safety Case.

The MODU will typically operate on marine diesel for the duration of the activity.

4.5.4 MODU Mooring

The MODU will moor using a system of chains and anchors. A mooring analysis will be undertaken to determine the appropriate mooring system for each P&A well location. Anchoring operation will be conducted before the MODU arrival (pre-lay anchors). This is to assure that the anchors are placed away from the field subsea infrastructure and to set them in place with adequate tension applied prior to the rig arrival.

Installation and proof tensioning of pre-laid mooring involves some disturbance to the seabed prior to the MODU arrival. Anchor handling vessels are used in the deployment and recovery of the mooring system and may be used to assure the mooring.


4.6 MODU, LWIV and Vessel Operations

This section describes the scope of the field management and P&A activities used for consideration of the environmental risks and impacts presented in Section 5.

4.6.1 Discharges

Operational discharge streams from the MODU, LWIV and vessels are likely to include the following:

- Deck drainage / storm water;
- Putrescible waste and sewage/grey water;

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- Oily water;
- Cooling water;
- Desalination plant effluent (brine) and backwash water discharge; and
- Ballast water.

4.6.2 Solid and liquid waste

Non-hazardous solid wastes including paper, plastics and packaging; and hazardous solid wastes such as batteries, fluorescent tubes, medical wastes and aerosol cans will be generated during the Activity. Liquid waste such as, but not limited to, used engine oil, hydraulic fluids, solvents, paints, etc. may also be produced during the drilling activity. All of these wastes are disposed of onshore.

4.6.3 Refuelling

At sea refuelling may be required during P&A activities, however will not be required during field management surveys or well intervention.

4.6.4 Helicopters

Crew changes will only be required on during the intervention and P&A activities and will be undertaken using helicopters as required (approximately 3-5 trips per week during P&A). Helicopter operations within the Operational Area is limited to helicopter take-off and landing on the MODU or LWIV helideck.


4.6.5 ROV

ROV will be utilised throughout the field management and P&A activities. Cathodic protection surveys and visual inspections of subsea structures will be undertaken using ROVs, deployed from a project vessel. Cathodic protection surveys are undertaken as part of asset integrity.


The ROV will also be used for subsea operations and observations during P&A. It will also be utilised for emergency BOP control functioning, in the event there is an issue with the control system on the MODU.

4.6.6 Emergency Disconnect Sequence

An Emergency Disconnect Sequence (EDS) may be implemented if the MODU is required to rapidly disengage from the well. The EDS closes the BOP (i.e. shutting in the well) and disconnects the riser to break the conduit between the wellhead and MODU. Common examples of when this system may be initiated include the movement of the MODU outside of its operating circle (e.g. due to a failure of one or more of the moorings) or the movement of the MODU to avoid a vessel collision (e.g. third-party vessel on collision course with the MODU). EDS aims to leave the wellhead in a secure condition but will result in the loss of the drilling fluids/cuttings in the riser following disconnection.

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The EDS will be part of the response for the emergency situations, while in the case of a cyclone event, the weather forecasting will provide sufficient time to disconnect and make the well secure before leaving the location away from the approaching cyclone.

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5. DESCRIPTION OF RECEIVING ENVIRONMENT

The receiving environment is described in terms of the Operational Area (Section 2) and the Zone of Potential Impact. The Zone of Potential Impact (ZPI) is based on the largest credible spill scenarios identified and modelled during the risk assessment process. The spill risk assessment process and results are presented in Section 5.

The key characteristics of the existing receiving environment are outlined below.

5.1 Physical Environment


WA-25-L lies on the continental shelf within the North-west marine region (NWMR), which covers the Commonwealth Marine Area extending from the Western Australian–Northern Territory border to Kalbarri, south of Shark Bay in Western Australia. The North West Commonwealth Marine Area covers approximately 1.07 million square kilometres and is characterised by tropical and sub-tropical marine areas and includes shallow waters on the continental shelf at the state water's boundary 3 nautical miles (5.5 km) from shore, to deep ocean habitat 200 nautical miles (370 km) from shore (Commonwealth of Australia 2012).

5.2 Biological Environment

The outer continental shelf of the NWMR, where the ZPI is located, is predominantly flat and featureless and comprised of carbonate sands (Baker et al. 2008). Primary productivity in the Northwest Shelf Province is thought to occur predominantly in pelagic environments, where phytoplankton plays an important primary producer role, rapidly multiplying when nutrients become available. Although the region has generally low productivity, there are pockets of high species richness and diversity, in particular at the tropical reef sites, such as Ningaloo Reef and around Barrow Island and the Montebello Islands.

The marine habitat within the Operational Area mainly consists of soft sediment in deep water. Unconsolidated sediments support benthic fauna living both in the sediments (infauna) and on the surface (epifauna). The broader region, including areas within the ZPI, contains a diverse range of other habitats, including seagrasses, hard corals, mangroves, intertidal mudflats and sandflats, sandy beaches and rocky shores.

Marine growth also occurs on the subsea infrastructure. A survey in 2014 (Neptune 2014) found sparse to patchy coverage on wellheads and Xmas trees, consisting of hydroid/bryozoan turf, barnacles and encrusting sponges. Marine growth was also observed on buried, partially buried and exposed sections of the subsea flow-lines. Growth observed on or adjacent to the subsea flow-lines of the Woollybutt Field included hydroids, bryozoans, soft corals, sponges, gorgonians (sea whips and sea fans), ascidians and other filter feeders.

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5.3 Threatened and Migratory Species

Searches for protected species listed under the EPBC Act were undertaken on 22 March 2019 (DoEE 2019) using areas that covered the full extent of the Operational Area and ZPI respectively. Through this search forty-nine species listed as 'Migratory' were identified to occur in the ZPI, with thirty-four within the Operational Area. Twenty-nine threatened species were also identified in the ZPI, four of which had a critically endangered status. Of those twenty-nine threatened species, twenty were identified within the Operational Area including two that were critically endangered. Twenty of the twenty-nine threatened species identified in the ZPI were also listed as migratory species. All of the species listed as 'Threatened' under the EPBC Act are also 'Protected' under State legislation under the *Wildlife Conservation Act 1950*. There are no listed threatened ecological communities within the Operational Area or the ZPI (DoEE 2019).


The threatened / migratory species identified using the EPBC Act Protected Matters Search Tool are listed in Table 5.1.

Table 5.1: EPBC Act listed species within the ZPI (DoEE 2019)


Species	Common Name	Status	Presence in Operational Area	Presence in ZPI
Birds				
<i>Calidris canutus</i>	Red Knot, Knot	Endangered/ Migratory	Species or species habitat may occur within area	Species or species habitat known to occur within area
<i>Calidris ferruginea</i>	Curlew Sandpiper	Critically Endangered/ Migratory	Species or species habitat may occur within area	Species or species habitat known to occur within area
<i>Limosa lapponica baueri</i>	Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit	Vulnerable/ Migratory	NA	Species or species habitat may occur within area
<i>Limosa lapponica menzbieri</i>	Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit	Critically Endangered/ Migratory	NA	Species or species habitat may occur within area
<i>Macronectes giganteus</i>	Southern Giant-Petrel, Southern Giant Petrel	Endangered/ Migratory	Species or species habitat may occur within area	Species or species habitat may occur within area

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Species	Common Name	Status	Presence in Operational Area	Presence in ZPI
<i>Numenius madagascariensis</i>	Eastern Curlew, Far Eastern Curlew	Critically Endangered/ Migratory	Species or species habitat may occur within area	Species or species habitat known to occur within area
<i>Pterodroma mollis</i>	Soft-plumaged Petrel	Vulnerable	NA	Foraging, feeding or related behavior likely to occur within area
<i>Sternula nereis</i>	Australian Fairy Tern	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	Breeding known to occur within area
<i>Thalassarche cauta</i>	Tasmanian Shy Albatross	Vulnerable	NA	Species or species habitat may occur within area
<i>Thalassarche impavida</i>	Campbell Albatross, Campbell Black-browed Albatross	Vulnerable	NA	Species or species habitat may occur within area
<i>Anous stolidus</i>	Common Noddy	Migratory	Species or species habitat may occur within area	Species or species habitat likely to occur within area
<i>Apus pacificus</i>	Fork-tailed Swift	Migratory	NA	Species or species habitat likely to occur within area
<i>Ardenna carneipes</i>	Flesh-footed Shearwater, Fleshy-footed Shearwater	Migratory	NA	Species or species habitat likely to occur within area
<i>Ardenna pacifica</i>	Wedge-tailed Shearwater	Migratory	NA	Breeding known to occur within area Overlap with breeding BIA
<i>Calonectris leucomelas</i>	Streaked Shearwater	Migratory	Species or species habitat likely to occur within area	Species or species habitat likely to occur within area
<i>Fregata ariel</i>	Lesser Frigatebird, Least Frigatebird	Migratory	Species or species habitat likely to occur within area	Species or species habitat known to occur within area
<i>Fregata minor</i>	Great Frigatebird, Greater Frigatebird	Migratory	NA	Species or species habitat may occur within area

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Species	Common Name	Status	Presence in Operational Area	Presence in ZPI
<i>Sterna dougallii</i>	Roseate Tern	Migratory	NA	Breeding known to occur within area Overlap with breeding BIA
<i>Actitis hypoleucos</i>	Common Sandpiper	Migratory	Species or species habitat likely to occur within area	Species or species habitat known to occur within area
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	Migratory	Species or species habitat likely to occur within area	Species or species habitat known to occur within area
<i>Calidris melanotos</i>	Pectoral Sandpiper	Migratory	Species or species habitat likely to occur within area	Species or species habitat may occur within area
<i>Charadrius veredus</i>	Oriental Plover, Oriental Dotterel	Migratory	NA	Species or species habitat may occur within area
<i>Glareola maldivarum</i>	Oriental Pratincole	Migratory	NA	Species or species habitat may occur within area
<i>Limosa lapponica</i>	Bar-tailed Godwit	Migratory	NA	Species or species habitat known to occur within area
<i>Pandion haliaetus</i>	Osprey	Migratory	Species or species habitat likely to occur within area	Breeding known to occur within area
<i>Tringa nebularia</i>	Common Greenshank, Greenshank	Migratory	NA	Species or species habitat likely to occur within area
<i>Thalassarche cauta steadi</i>	White-capped Albatross	Vulnerable	NA	Species or species habitat may occur within area
Fish, Sharks and Rays				
<i>Milyeringa veritas</i>	Blind Gudgeon	Vulnerable	NA	Species or species habitat known to occur within area
<i>Ophisternon candidum</i>	Blind Cave Eel	Vulnerable	NA	Species or species habitat known to occur within area

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Species	Common Name	Status	Presence in Operational Area	Presence in ZPI
<i>Anoxypristis cuspidata</i>	Narrow Sawfish, Knifetooth Sawfish	Migratory	Species or species habitat may occur within area	Species or species habitat likely to occur within area
<i>Manta alfredi</i>	Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray	Migratory	Species or species habitat may occur within area	Species or species habitat known to occur within area
<i>Manta birostris</i>	Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray	Migratory	Species or species habitat likely to occur within area	Species or species habitat known to occur within area
<i>Carcharias taurus (west coast population)</i>	Grey Nurse Shark (west coast population)	Vulnerable	Species or species habitat may occur within area	Species or species habitat known to occur within area
<i>Carcharodon carcharias</i>	White Shark, Great White Shark	Vulnerable/ Migratory	Species or species habitat may occur within area	Species or species habitat known to occur within area
<i>Pristis clavata</i>	Dwarf Sawfish, Queensland Sawfish	Vulnerable/ Migratory	Species or species habitat known to occur within area	Species or species habitat known to occur within area
<i>Pristis zijsron</i>	Green Sawfish, Dindagubba, Narrowsnout Sawfish	Vulnerable/ Migratory	Species or species habitat known to occur in area	Species or species habitat known to occur within area
<i>Lamna nasus</i>	Porbeagle, Mackerel Shark	Migratory	NA	Species or species habitat may occur within area
<i>Rhincodon typus</i>	Whale Shark	Vulnerable/ Migratory	Foraging, feeding or related behaviour likely to occur within area Overlap with foraging BIA	Foraging, feeding or related behaviour known to occur within area Overlap with foraging BIA

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Species	Common Name	Status	Presence in Operational Area	Presence in ZPI
<i>Isurus oxyrinchus</i>	Shortfin Mako, Mako Shark	Migratory	Species or species habitat likely to occur in area	Species or species habitat likely to occur within area
<i>Isurus paucus</i>	Longfin Mako	Migratory	Species or species habitat likely to occur in area	Species or species habitat likely to occur within area
Marine Mammals				
<i>Balaenoptera borealis</i>	Sei Whale	Vulnerable/ Migratory	Species or species habitat likely to occur within area	Foraging, feeding or related behaviour likely to occur within area
<i>Balaenoptera musculus</i>	Blue Whale	Endangered/ Migratory	Species or species habitat likely to occur within area Overlap with migratory and presence BIA	Migration route known to occur within area Overlap with foraging, migratory and presence BIA
<i>Balaenoptera physalus</i>	Fin Whale	Vulnerable/ Migratory	Species or species habitat likely to occur within area	Foraging, feeding or related behaviour likely to occur within area
<i>Eubalaena australis/Balaena glacialis australis</i>	Southern Right Whale	Endangered/ Migratory	Species or species habitat may occur within area	Species or species habitat likely to occur within area
<i>Megaptera novaeangliae</i>	Humpback Whale	Vulnerable/ Migratory	Species or species habitat known to occur within area Overlap with migratory BIA	Congregation or aggregation known to occur within area Overlap with migratory BIA
<i>Balaenoptera bonaerensis</i>	Antarctic Minke Whale, Dark-shoulder Minke Whale	Migratory	NA	Species or species habitat likely to occur within area
<i>Balaenoptera edeni</i>	Bryde's Whale	Migratory	Species or species habitat may occur within area	Species or species habitat likely to occur within area
<i>Dugong dugon</i>	Dugong	Migratory	NA	Breeding known to occur within area

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Species	Common Name	Status	Presence in Operational Area	Presence in ZPI
<i>Orcinus orca</i>	Killer Whale, Orca	Migratory	Species or species habitat may occur within area	Species or species habitat may occur within area
<i>Physeter macrocephalus</i>	Sperm Whale	Migratory	Species or species habitat may occur within area	Species or species habitat may occur within area
<i>Sousa chinensis</i>	Indo-Pacific Humpback Dolphin	Migratory	NA	Species or species habitat known to occur within area
<i>Tursiops aduncus</i> (Arafura/Timor Sea populations)	Spotted Bottlenose Dolphin (Arafura/Timor Sea populations)	Migratory	Species or species habitat known to occur within area	Species or species habitat known to occur within area
Reptiles				
<i>Aipysurus apraefrontalis</i>	Short-nosed Seasnake	Critically Endangered	NA	Species or species habitat known to occur within area
<i>Caretta</i>	Loggerhead Turtle	Endangered/ Migratory	Species or species habitat known to occur within area	Breeding known to occur within area Overlapping with internesting BIA
<i>Chelonia mydas</i>	Green Turtle	Vulnerable/ Migratory	Species or species habitat known to occur within area	Breeding known to occur within area Overlapping with foraging, nesting and internesting BIA
<i>Dermochelys coriacea</i>	Leatherback Turtle, Leathery Turtle, Luth	Endangered/ Migratory	Species or species habitat likely to occur within area	Foraging, feeding or related behavior known to occur within area Overlapping with foraging, nesting and interesting BIA
<i>Eretmochelys imbricata</i>	Hawksbill Turtle	Vulnerable/ Migratory	Species or species habitat known to occur within area	Breeding known to occur within area Overlapping with foraging, nesting and internesting BIA

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Species	Common Name	Status	Presence in Operational Area	Presence in ZPI
<i>Natator depressus</i>	Flatback Turtle	Vulnerable/ Migratory	Congregation or aggregation known to occur within area	Breeding known to occur within area Overlapping with foraging, nesting and interesting BIA

5.4 Values and Sensitivities

There are a number of key sensitive areas that overlap the Operational Area and/or ZPI. These are summarised in Table 5.2 and further described in the following sections.

Table 5.2: Key sensitive areas within Operational Area and/or ZPI

Key sensitive area	IUCN category*	Overlaps ZPI	Overlaps Operational Area	Distance from Operational Area (km)
World Heritage Areas				
Ningaloo Coast	Not applicable	Yes	No	72
National Heritage Areas				
Ningaloo Coast	Not applicable	Yes	No	72
Commonwealth Heritage Areas				
Ningaloo Marine Area – Commonwealth Waters	Not applicable	Yes	No	91
Wetlands of International or National Significance				
None present within the Operational Area or ZPI				
Australian Marine Parks (AMP)				
Gascoyne AMP	IV (II, IV and VI)**	Yes	No	109
Ningaloo AMP	IV (II and IV)**	Yes	No	91
Montebello AMP	VI (VI)**	Yes	No	26
State Marine Protected Areas				
Marine Parks				
Ningaloo	IA, II and IV	Yes	No	91
Barrow Island	IA, IV and VI	Yes	No	31
Montebello Islands	IA, II, IV and VI	Yes	No	55
Marine Management Areas				
Muiron Islands	IA and VI	Yes	No	72
Barrow Island	IV and VI	Yes	No	26
Key Ecological Features				
Ancient coastline at 125m depth contour	Not applicable	Yes	Yes	0

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Key sensitive area	IUCN category*	Overlaps ZPI	Overlaps Operational Area	Distance from Operational Area (km)
Continental Slope Demersal Fish Communities	Not applicable	Yes	No	10
Canyons Linking the Cuvier Abyssal Plain and the Cape Range Peninsula	Not applicable	Yes	No	44
Commonwealth Waters adjacent to Ningaloo Reef	Not applicable	Yes	No	91

* IUCN categories and objectives:

IA: Strict nature reserve – To conserve regionally, nationally or globally outstanding ecosystems, species (occurrences or aggregations) and/or geodiversity features: these attributes will have been formed mostly or entirely by non-human forces and will be degraded or destroyed when subjected to all but very light human impact.

II: National park – To protect natural biodiversity along with its underlying ecological structure and supporting environmental processes, and to promote education and recreation.

IV: Habitat/species management area – To maintain, conserve and restore species and habitats.

VI: Protected area with sustainable use of natural resources – To protect natural ecosystems and use natural resources sustainably, when conservation and sustainable use can be mutually beneficial.

** IUCN category for the Australian Marine Park (AMP) is provided and in brackets the IUCN categories for specific zones within each Marine Park as assigned under the The North-west Marine Parks Network Management Plan 2018

5.4.1 World Heritage Areas

There are no World Heritage Areas (WHA) within the Operational Area. There is one WHA within the ZPI, the Ningaloo Coast, which is also a National Heritage Place (NHP) and State Marine Protected Area (DoEE 2018).


The Ningaloo WHA encompasses the Ningaloo Marine Park and Muiron Islands Marine Management Area which sustain and protect a series of interconnected habitats. The landscapes and seascapes of the property are comprised of mostly intact and large-scale marine, coastal and terrestrial environments.

5.4.2 Australian Marine Parks

The Operational Area does not overlap with any Australian Marine Parks (AMPs), however three occur within the ZPI:

Gascoyne

The Gascoyne AMP is included in the North-West Marine Park Network Management Plan 2018 (DNP 2018) and covers approximately 81,766 km² and includes waters from less than 15 m depth to 6,000 m depth. The Gascoyne Marine Park contains habitats, species and ecological communities associated with the Central Western Shelf Transition, Central Western Transition, and Northwest Province.

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Ningaloo

The Ningaloo AMP covers 2,435 km² and adjoins the State managed Ningaloo Marine Park. The Ningaloo reef, which lies in State waters within the Marine Park, is further protected by the Ningaloo AMP. Water depths range from shallow water of 30 m depth to oceanic waters at 1,000 m deep. The Ningaloo Marine Park contains habitats, species and ecological communities associated with the Central Western Shelf Transition, Central Western Transition, Northwest Province, and Northwest Shelf Province.

Montebello

The Montebello Marine Park is located offshore of Barrow Island and 80 km west of Dampier extending from the Western Australian state water boundary, and is adjacent to the Western Australian Barrow Island and Montebello Islands Marine Parks. The Marine Park covers an area of 3413 km² and water depths from less than 15m to 150m.

5.4.3 State Marine Protected Areas

The Operational Area does not overlap with any State-managed Marine Parks, however two occur within the ZPI:

Ningaloo Marine Park and Muiron Islands Marine Management Area


The Ningaloo Marine Park was established in 1987 and stretches 300 km from the North West Cape to Red Bluff. It encompasses the State waters covering the Ningaloo Reef system and a 40-m strip along the upper shore. The Muiron Islands Marine Management Area is managed under the same management plan as the Ningaloo State Marine Park (CALM 2005). The Ningaloo Marine Park and Muiron Islands Marine Management Area are part of the Ningaloo Coast WHA.

Considering the Operational Area does not overlap the Ningaloo Marine Park and Muiron Islands Marine Management Area, potential impacts would only relate to potential hydrocarbon spills reaching these areas and activities associated with any hydrocarbon spill response.

Barrow Island Marine Park/Marine Management Area and Montebello Marine Park

The Management Plan for the Montebello/Barrow Islands Marine Conservation Reserves 2007 - 2017 (DEC 2007) directs management for three reserves, the Montebello Islands Marine Park, Barrow Island Marine Park and Barrow Island Marine Management Area. The reserves are located, approximately 26 km east from the PAA within the ZPI, and cover areas of approximately 58,331 ha, 4,169 ha and 114,693 ha respectively.

Considering the Operational Area does not overlap these areas, potential impacts would only relate to potential hydrocarbon spills reaching these and activities associated with any hydrocarbon spill response.

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5.5 Socio-economic Environment

Given the offshore nature of the location the level of human activity in the vicinity of the field is low. Most shipping that occurs in the vicinity of the Field is associated with the oil and gas industry.

5.5.1 Shipping

The Operational Area is located inshore of major shipping lanes between Australia and Asia. Automatic Identification System (AIS) data from AMSA suggests that most traffic that could be encountered within the Operational Area and ZPI would be offshore support vessels (AMSA 2018). Traffic is relatively light within the proposed Operational Area, with the exception of the southern region. AIS data indicates that a number of tankers transit through this area, most likely on their way into and out of the ports of Ashburton and Onslow.

5.5.2 Defence

The field exists within Sectors R852A and R852B of the North West Australia Exercise Area (NWXA), a Defence Practice Area. Each of these is declared as a military flying training area activated by NOTAM (Notice to Airmen), existing in height blocks from 10,000 ft to 28,000 ft and 28,000 ft to 60,000 ft, respectively.

5.5.3 Oil and Gas Activities


The NWS is a well-developed petroleum region, supporting a large number of operating oil and gas fields, along with a number of proposed developments under construction and exploration and appraisal of prospective areas.

The Operational Area is located approximately 35 km west of Barrow Island.

5.5.4 Tourism and Recreational Fishing

There are no tourism operations within the Operational Area. Tourism may occur in the ZPI, in particular around Barrow/Montebello islands, Muiron Islands and the Ningaloo coast. Most popular marine tourism activities include recreational fishing and diving/snorkelling. Ningaloo is the most significant area in North-West Shelf (NWS) region for nature based tourism. Popular activities around Ningaloo include swimming with whale sharks and manta rays and snorkelling scuba diving along the Ningaloo Reef. Ningaloo Reef is closely adjoined by Cape Range National Park, a significant area for land-based tourism such as bushwalking. Occasional tourist and fishing charter vessels may however pass through the ZPI in transit between Exmouth and the Montebello Islands.

Recreational fishing mainly occurs near coastal islands including Thevenard island located approximately 40 km south of the Operational Area and lies within the ZPI. No recreational fishing is known to occur in the deep waters of the Operational Area.

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5.5.5 Commercial Fishing

Commercial fisheries that operate in the waters of the NWS are centred in Onslow, 65 km to the south of the field; Exmouth, 120 km to the southwest, and Dampier, approximately 180 km to the east. The focus of commercial fishing activity mainly the inner continental shelf and waters surrounding the offshore islands to depths of about 30 m. Commonwealth and State Managed Fisheries that overlap the ZPI are summarised below.


Commonwealth fisheries within the ZPI include:

- North-west Slope Trawl Fishery
- Southern Bluefin Tuna Fishery
- Western Deepwater Trawl Fishery
- Western Skipjack Fishery
- Western Tuna and Billfish Fishery.

State managed fisheries within the ZPI include:

- West Coast Rock Lobster Managed Fishery
- West Coast Deep Sea Crustacean Managed Fishery
- Specimen Shell Managed Fishery
- South West Coast Salmon Fishery
- Pilbara Trap Managed Fishery
- Pilbara Fish Trawl Interim Managed Fishery
- Mackerel Managed Fishery
- Abalone Managed Fishery
- Onslow Prawn Managed Fishery
- Pilbara Demersal Scalefish Fishery
- Pilbara Line Fishery
- Pearl Oyster Fishery
- Aquarium Managed Fishery.

Consultation with stakeholder, including commercial fishing, is summarised in Section 8.

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6. ENVIRONMENTAL IMPACTS AND RISKS

6.1 Risk assessment methodology

The Eni philosophy to manage environmental risks is to eliminate or mitigate the risk during the planning phase. Managing risks through design is contingent upon identifying, at an early stage in the project, the sources and pathways by which environmental impacts can occur and the sensitivities of the receiving environment in which the project is situated.

The expected or potential impacts associated with the Activity were assessed using the Eni procedure *ENI-HSE-PR-001 Risk Management and Hazard Identification*. This procedure is consistent with the Australian Standard for Risk Management: *AS/NZS ISO 31000:2009 Risk management – Principles and guidelines* and provides a systematic process for:

1. identifying each project activity and its associated environmental aspects
2. identifying the environmental values within and adjacent to the area
3. defining the potential environmental effects (impacts) of aspects identified in Step 1 above on the values identified in Step 2 above
4. identifying the potential environmental consequences and severity of the impact (Table 6.2)
5. identifying the likelihood of occurrence of the consequence, according to a 6-level scale (Table 6.1)
6. evaluating overall environmental risk levels using the Eni environmental risk matrix
7. identifying mitigation measures, assigning management actions and further recommended risk reduction measures according to risk levels (Table 6.3) in order to reduce the risk to ALARP.

Table 6.1: Likelihood scale

ID	Likelihood	Description
0	Non-credible	Theoretically possible but not known/reasonably expected to have occurred in the exploration and production industry.
(A)	Rare	Reported for exploration and production industry (Freq 10^{-6} to 10^{-4} /years)
(B)	Unlikely	Has occurred at least once in Company (Freq 10^{-4} to 10^{-3} /years)
(C)	Credible	Has occurred several times in Company (Freq 10^{-3} to 10^{-1} /years)
(D)	Probable	Happens several times per year in Company (Freq 10^{-1} to 1/year)
(E)	Almost certain/ will occur	Several times per year at one location (Freq >1/year)




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Table 6.2: Environmental consequence descriptors

Descriptor	Description
(1) Slight	<p>Aspect not subject to compliance with legal and/or regulatory prescriptions in force or with prescriptions voluntarily subscribed by the Organisation/no breach.</p> <p>Temporary impact on a non-sensible area.</p> <p>Impacted area <0.1 square mile (0.26 km²).</p> <p>Onshore spill <0.1 m³.</p> <p>Minimum and short term impact in the interested community/no problem with stakeholders.</p> <p>Slight damage and no interruption of activities or business.</p>
(2) Minor	<p>Limits occasionally exceeded.</p> <p>An impact on localized areas/an impact on a reduced number of non-compromised species.</p> <p>Impacted area <1.0 square mile (2.6 km²).</p> <p>Onshore spill <10 m³.</p> <p>A reduced damage to the company's image in the area that has to be repairable/problems with local stakeholders.</p> <p>Minor damage resulting in:</p> <ul style="list-style-type: none"> • a brief interruption of activities or business • repair cost <\$200,000, and/or • loss of production <1 day.
(3) Local	<p>Possible temporary suspension of activities and/or administrative sanctions.</p> <p>An impact on protected natural areas/damage for some species.</p> <p>Impacted area <10 square mile (26 km²).</p> <p>Onshore spill <100 m³.</p> <p>A potential significant damage to the Company's reputation in the region (local impact) problems with regional stakeholders.</p> <p>Local damage resulting in:</p> <ul style="list-style-type: none"> • the unit requiring repair/replacement to resume the activity • repair cost <\$2,500,000, and/or • loss of production <1 week.

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Descriptor	Description
(4) Major	<p>Impact on permits to carry out the works.</p> <p>An impact on key areas for science/damage to the biodiversity.</p> <p>Impacted area <100 square mile (260 km²).</p> <p>Onshore spill <1,000 m³.</p> <p>A serious and permanent damage to the Subsidiary's capacity to maintain its business position in the area with some wider implications for the subsidiary/problems with national stakeholders.</p> <p>Significant damage resulting in:</p> <ul style="list-style-type: none"> • long term/significant modifications to resume the activity • repair cost <\$25,000,000, and/or • loss of production <3 months.
(5) Extensive	<p>Impact on permits/acquisitions (future).</p> <p>An impact on special areas of conservation/reduction of biodiversity.</p> <p>Impacted area >100 square mile (260 km²).</p> <p>Onshore spill >1,000 m³.</p> <p>Potential loss of future business possibilities in the area/region and/or an enduring significant damage to Eni's image in the international field/problems with international stakeholders.</p> <p>Extensive damage resulting in:</p> <ul style="list-style-type: none"> • total loss of operations/business • revamping required to resume the activity • repair cost >\$25,000,000, and/or • loss of production >3 months.

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Consequence					Likelihood or Annual Frequency					
Severity	Company Reputation	People (Health & Safety)	Environment	Assets / Project	0	A	B	C	D	E
					0 - Non credible / Could happen in E&P industry (Freq <10-6 /y)	A - Rare / Reported for E&P industry (Freq 10-6 to 10-4 /y)	B - Unlikely / Has occurred at least once in Company (Freq 10-4 to 10-3 /y)	C - Credible / Has occurred several times in Company (Freq 10-3 to 10-1 /y)	D - Probable / Happens several times per year in Company (Freq 10-1 to 1 /y)	E - Frequent / Several times per year at one location (Freq >1 /y)
1	1-Slight impact	1-Slight health effect / injury	1-Slight effect	1-Slight damage	Low	Low	Low	Low	Low	Low
2	2-Minor impact	2-Minor health effect / injury	2-Minor effect	2-Minor damage	Low	Low	Low	Medium	Medium	Medium
3	3-Local impact	3-Major health effect / injury	3-Local effect	3-Local damage	Low	Low	Medium	Medium - High	High	High
4	4-National impact	4-PTD or single fatality	4-Major effect	4-Major damage	Low	Medium	Medium - High	High	High	High
5	5-International impact	5-Multiple fatalities	5-Extensive effect	5-Extensive damage	Medium	Medium - High	High	High	High	High

Figure 6.1: Eni environmental risk matrix

Table 6.3: Risk management actions

Risk Rating	Management Actions Required
Low (L)	<i>Continuous improvement:</i> The level of risk is broadly acceptable and generic control measures are required, aimed at avoiding deterioration. * Non-credible hazards require no further risk assessment.
Medium (M)	The level of risk can be tolerable only once a structured review of the risk-reduction measures has been carried out (where necessary, the relevant guidance from the local authorities should be adopted for application of ALARP).
Medium - High (orange)	
High (H)	<i>Intolerable risk:</i> The level of risk is not acceptable and risk control measures are required to lower the risk to another level of significance.

The environmental risk assessment process includes an analysis of inherent and residual risk levels. Inherent risk levels assume limited controls are in place. Residual risk levels are based on the application of further recommended risk reduction measures above and beyond those minimum standards, which drive the risk level down to ALARP.

For risks to be considered and reduced to ALARP the following criteria apply:

- there are no reasonable practicable alternatives to the activity, or
- the cost (i.e. sacrifice) for implementing further measure is disproportionate to the reduction in risk.


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Table 6.4: Eni ALARP factors

ALARP Factors	Description
Eliminate	<i>Eliminate the source of the risk.</i>
Substitute	<i>Substitute the source of the risk.</i>
Engineering	<i>Engineer out the risk.</i>
Isolation	<i>Isolate people or the environment from the risk.</i>
Administrative	<i>Provide procedures of training to people to lower the risk.</i>

Eni considers a range of factors when evaluating the acceptability of impacts associated with its activities, summarised in Table 6.5.


Table 6.5: Eni acceptability factors

Demonstration of Acceptability	
Compliance with Legal Requirements/Laws/Standards	Considers the legal aspect, particularly compliance with applicable legislative prescriptions and/or regulations in force which imply specific procedures to be carried out by the Titleholder to control the environmental aspect.
Policy Compliance	The risk or impact must be compliant with the objectives of Eni policies.
Social Acceptability	Considers the 'social' aspects that can alter stakeholder perception on the Titleholder's commitment regarding the safeguard and protection of the environment and that can cause serious harm to the Titleholder's public image.
Area Sensitivity/ Biodiversity	The proposed risk or impact controls, environmental performance outcomes and standards must be consistent with the nature of the receiving environment.
Environmentally Sustainable Development Principles	The overall activity is consistent with the APPEA Principles of Conduct.
ALARP	There is a consensus among the risk assessment team that risks or impacts are at ALARP.

Risk identification and assessment for field management and P&A activities including well intervention was undertaken in September 2016. All the credible risks of the proposed P&A activities were assessed and performance outcomes, standards and measurement criteria to reduce the risks to ALARP and acceptable were developed. A summary of the environmental risks and risk ranking for planned activities is provided in Table 6.11. A summary of the environmental risks and risk ranking for unplanned events is provided in Table 6.12.

6.2 Spill risk assessment methodology

An overview of the spill risk assessment methodology is provided below. The details of the spill scenarios and assessment results are presented in Section 5.4.

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6.2.1 Oil spill modelling

The following credible spill scenarios were identified and modelled during the risk assessment process.

Table 6.6: Spill scenarios and

Spill scenario	Software
Hazard 4: Subsea release of Woollybutt crude due to loss of well control during intervention or P&A activities	OILMAP and SIMAP
Hazard 6: Vessel collision leading to release of marine diesel	
Hazard 5: Subsea release of Woollybutt crude during field management due to corrosion and valve failure	SINTEF OSCAR

Two different the modelling software systems were used, identified above. These are discussed below.


OILMAP and SIMAP

SIMAP and OILMAP modelling was used for the loss of well control and loss of marine diesel scenarios. Surface oil spill modelling was undertaken using a three-dimensional oil spill trajectory and weathering model, SIMAP, which is designed to simulate the transport, spreading and weathering of specific oil types under the influence of changing meteorological and oceanographic forces. Subsurface discharge modelling was undertaken using OILMAP, which predicts the droplet sizes that are generated by the turbulence of the discharge as well as the centreline velocity, buoyancy, width and trapping depth (if any) of the rising gas and oil plumes.

Modelling is applied to repeatedly simulate the defined credible spill scenarios using different samples of current and wind data. These data samples were selected randomly from an historic time-series of wind and current data representative of the study area.

Results of the replicate simulations were then statistically analysed and mapped to define contours of percentage probability of contact at identified thresholds around the hydrocarbon release point. The stochastic approach captures a wide range of potential weathering outcomes under varying environmental conditions, which is reflected in the aggregated spatial outcomes showing the areas that might be affected by sea surface and subsurface oil.

The modelling outcomes provide a conservative understanding of where a large-scale hydrocarbon release could travel in any condition, plotted all in one figure. The modelling does not take into consideration any of the spill prevention, mitigation and response capabilities that would be implemented in response to the spill. Therefore, the modelling results represent the maximum extent that may be influenced by the released hydrocarbons.

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SINTEF OSCAR

Modelling was carried out with SINTEF's Oil Spill Contingency and Response (OSCAR) system for a subsea release of Woollybutt crude during field management due to corrosion and valve failure scenario.

OSCAR provides an integrated transport and weathering model that accounts for hydrocarbon advection, dispersion, surface spreading, entrainment, dissolution, biodegradation, emulsification, volatilisation and shoreline interaction. The weathering model is supported by an extensive hydrocarbon library that contains detailed, laboratory-derived information for a wide range of hydrocarbons subjected to a wide range of environmental conditions.

OSCAR enables simulation of a hydrocarbon release scenario in deterministic mode (i.e. over a fixed period in time with results presented in a deterministic manner) or stochastic mode (i.e. the same scenario is simulated a number of times with varying start dates, and the results are presented in a probabilistic manner).

Twenty-three individual stochastic realisations were simulated, which is considered reasonable given the long release duration (365 days) and the large amount of overlap between consecutive modelling periods (each realisation overlaps with ~9 months of the following realisation). For each realisation, OSCAR separately tracks the components of oil stranded on shorelines, surface oil, and entrained droplets and dissolved oil in the water column, which is summed to provide a total water-accommodated fraction (WAF). Conservative thresholds were applied to each component and statistical spatial output is generated where each threshold was exceeded.

6.2.2 Representative Hydrocarbons

OILMAP and SIMAP

The loss of well containment modelling was undertaken using the parameters from the Woollybutt crude assay report. Characteristics and weathering of Woollybutt crude are presented below.

Table 6.7: Physical properties of Woollybutt crude (Intertek, 2002)

Physical Properties	Woollybutt Crude
Density (kg/m ³)	785.0 (at 15 °C)
API	48.6
Dynamic viscosity (cP)	1.342 (at 25 °C)
Pour point (°C)	-42.0
Hydrocarbon property category	Group I
Hydrocarbon persistence classification	Non-persistent


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Table 6.8: Boiling-point breakdown of Woollybutt crude (Intertek, 2002)

Oil Type	Volatiles (%)	Semi-Volatiles (%)	Low Volatiles (%)	Residual (%)	Aromatics (%)
Boiling point (°C)	<180 C4 to C10	180 - 265 C11 to C15	265 - 380 C16 to C20	>380 >C20	Of whole oil <380 BP
	Non-persistent			Persistent	
Woollybutt crude	43.4	25.4	24.7	6.5	2.9

For the OILMAP/SIMAP modelling, an analogue hydrocarbon was chosen from SINTEF's Hydrocarbon library that provided a reasonable match to the Woollybutt assay, a comparison of properties can be seen in Table 6.9. Kristin was selected as the most appropriate analogue for Woollybutt because:

- It is a low emulsifying crude oil, which is similar to the Woollybutt Crude. Conversely;
- Kristin provides a reasonable match to the boiling point curve at lower temperatures (0 – 200°C) and is more conservative (i.e. more persistent) at higher temperatures.

Given the likenesses in oil properties, it is expected that the Kristin crude would behave similarly to Woollybutt crude in water and is therefore considered an appropriate analogue used for leak scenario modelling.

Table 6.9: Comparison of whole properties for Woollybutt crude and SINTEF's Kristin analogue

Parameter	Woollybutt Crude	Kristin Crude
Oil type	Crude oil	Crude oil (low emulsifying)
API gravity	48.6	46.6
Specific gravity	0.7857	0.794
Viscosity @20C	1.709 cSt	2.0 cP
Pour point	-42C	-30C
Asphaltene content (% by weight)	0.05%	0.04%

6.2.3 ZPI and Hydrocarbon Contact Thresholds

The outputs of the spill modelling are used as a tool to assess the environmental risk. It can provide an insight into the areas of the marine environment that could be exposed to hydrocarbon levels exceeding hydrocarbon threshold concentrations (Table 6.10).

A conservative approach to adopting contact thresholds that are documented to impact the marine environment are used to define the ZPI. These hydrocarbon thresholds are presented in Table 6.10 and described further below.


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Table 6.10: Summary of environmental impact thresholds applied to the quantitative hydrocarbon spill risk modelling results


Spill scenario	Threshold applied to modelling
Hazard 4: Subsea release of Woollybutt crude due to loss of well control during P&A activities (10,589 m ³ over 74 days)	Shoreline Contact Hydrocarbon (10 g/m ²)
	Surface Hydrocarbon (1 g/m ²)
	Entrained hydrocarbon (100 ppb)
	Dissolved aromatic hydrocarbon (6 ppb)
Hazard 5: Subsea release of Woollybutt crude during field management due to corrosion and valve failure (14,490.5 m ³ over 365 days)	Shoreline Contact Hydrocarbon (10 g/m ²)
	Surface Hydrocarbons (1 g/m ²)
	Total WAF (70 ppb)
	Dissolved WAF (6 ppb)
Hazard 6: Vessel collision leading to release of 100m ³ marine diesel	Shoreline Contact Hydrocarbon (10 g/m ²)
	Surface Hydrocarbons (1 g/m ²)
	Dissolved WAF (6 ppb)

Surface Hydrocarbon Threshold

Thresholds for registering biological impacts resulting from contact of surface slicks have been estimated by different researchers at approximately 10–25 g/m² (French *et al.*, 1999; Koops *et al.*, 2004; NOAA, 1996). Potential impacts of surface slick concentrations in this range for surface hydrocarbons may include harm to seabirds through ingestion from preening of contaminated feathers or the loss of the thermal protection of their feathers.

For surface hydrocarbons, a conservative surface hydrocarbon threshold of 1 g/m² was selected which is an order of magnitude below the minimum concentration that will result in harm to seabirds and other wildlife (French, 2000).

Surface hydrocarbons at a concentration of 1 g/m² have rainbow sheen in appearance, according to the Bonn Agreement Oil Appearance Code (Bonn Agreement, 2009) and are the lowest practical limit of observing oil in the marine environment (AMSA, 2012). This threshold was used to determine the ZPI as it used to indicate where a sheen will be visible in the event of a spill.

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Entrained Hydrocarbon / Total WAF Thresholds

The 100 ppb threshold is considered conservative in terms of potential for toxic effects leading to mortality for sensitive mature individuals and early life stages of species. This threshold has been defined to indicate a potential zone of acute exposure, which is more meaningful over shorter exposure durations. Contact within this exposure zone may result in impacts to the marine environment.

OSPAR has published a predicted no effect concentration (PNEC) for produced formation water (PFW), which accounts for the dispersed oil fractions which is representative of the WAF. The OSPAR PNEC is 70 ppb (median estimate (50% confidence) at 5% of the hazardous concentration and is based on biomarker and whole organism testing to total hydrocarbons by Smit *et al.*, (2009). This PNEC represents an acceptable long term chronic exposure level from continuous point source discharges in the North Sea.

Dissolved Aromatic / Dissolved WAF Thresholds


The 6 ppb threshold value for species toxicity in the water column is based on global data from French *et al.* (1999) and French-McCay (2002, 2003), which showed that species sensitivity (fish and invertebrates) to dissolved aromatics exposure >4 days (96-hour LC50) under different environmental conditions varied from 6 ppb-400 ppb, with an average of 50 ppb. This range covered 95% of aquatic organisms tested, which included species during sensitive life stages (eggs and larvae).

Based on scientific literature, a minimum threshold of 6 ppb is used to define the low exposure zones (Engelhardt, 1983; Clark, 1984; Geraci & St. Aubin, 1988; Jenssen, 1994; Tsvetnenko, 1998).

This exposure zone is not considered to be of significant biological impact, however in the absence of any toxicology results for Woollybutt crude, the 6 ppb threshold has been applied as a conservative measure. This exposure zone represents the area contacted by the spill and conservatively defines the outer boundary of the area of influence from a hydrocarbon spill.

Shoreline Contact Threshold Concentrations

Owens and Sergy (1994) define accumulated hydrocarbon <100 g/m² to have an appearance of a stain on shorelines. French-McCay (2009) defines accumulated hydrocarbons ≥100 g/m² to be the threshold that could impact the survival and reproductive capacity of benthic epifaunal invertebrates living in intertidal habitat. As a conservative measure a threshold of 10 g/m² has been applied to represent shoreline impact.


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6.3 Summary of risks and control measures associated with planned activities


Table 6.11: Summary of environmental risks and control measures associated with planned activities

Hazard title	Description of Hazard	Potential Impact	Summary of Control Measures	F	S	RR ¹
1. Interaction with Other Users	<p>The presence of support vessels, a LWIV and MODU has the potential to interact with other activities in the area such as fishing, shipping, tourism and defence activities.</p> <p>The presence of the shut-in wells and associated 500 m petroleum safety zone (PSZ) currently excludes other marine users from the area. The suspended wells are marked on nautical charts surrounded by a 500 m (PSZ).</p>	<p>Fishing</p> <p>The field coincides with a number of Commonwealth and State managed fisheries. However, low levels of effort at the field location and surrounding area have been recorded for the fisheries that operate in the vicinity of the field, and/or a low number of fishing vessels are known to operate. Trap fisheries generally operate in less than 50 m of water and trawl fisheries generally in less than 100 m of water. Given the depth of waters (>100 m) trawl fishing effort is not expected to occur within the Operational Area or ZPI. In addition, the trawling has not been permitted in either demersal scalefish Area 3 or Area 6 and Pilbara fish trawl Area 1 since 1998 (DoF 2014) which overlaps the Operational Area and ZPI.</p> <p>Consultation has been undertaken with all commercial fishing companies working in the area regarding the status of the field management and upcoming P&A activities and no issues with the proposed activities have been raised. No recreational fishing occurs in the area.</p> <p>Shipping</p> <p>Traffic is relatively light within the Operational Area, with the exception of the southern region. AIS data indicates that a number of tankers transit through this area, most likely on their way into and out of the ports of Ashburton and Onslow.</p> <p>Defence</p> <p>The Operational Area is located within a defence practice area. The Department of Defence has confirmed that operations would not affect the proposed P&A activities or impact on the field management.</p> <p>Tourism</p> <p>No known tourism occurs in the Operational Area. Apart from the possibility of occasional passing private motor vessels or yachts, there are no known tourism interests in the area.</p>	<ul style="list-style-type: none"> Marine Order Part 30 (Prevention of Collisions) 2009 Marine Order Part 21 (Safety of Navigation and Emergency Procedure) 2012 Notify AHS before commencement of intervention and plug and abandonment Notify AMSA Joint Rescue Coordination Centre (JRCC) before commencement of intervention and plug and abandonment Stakeholder consultation with relevant stakeholders (who requested ongoing consultation) prior to intervention and plug and abandonment Maintain 500m petroleum safety zone 	B	1	L
2. Underwater Noise/Vibrations	<p>During field management, well intervention and P&A activities, noise emissions will be generated through vessels, helicopters, LWIV, MODU operations and the use of bow thrusters to maintain position.</p>	<p>Potential environmental impacts from underwater noise include:</p> <ul style="list-style-type: none"> behavioural change in marine fauna (localised avoidance/attraction) hearing impairment and pathological damage to marine fauna increase stress levels in marine fauna disruption to marine fauna underwater acoustic cues, and secondary ecological effects – alteration of predator prey relationship. <p>Underwater noise generated through vessel positioning and movement does not have the intensity and characteristics likely to cause physiological damage in marine fauna (Nedwell & Edwards 2004; Hatch & Southall 2009). The sound energy levels generated from project vessels are considered to be relatively low intensity when compared to natural noise sources.</p> <p>In the Operational Area the marine fauna most at risk from acoustic disturbance are cetaceans, particularly baleen whales, as the auditory bandwidth of these large whales overlap with the low frequency broadband noise produced by thrusters during vessel positioning and movement.</p> <p>Impacts are likely to be limited to behavioural disturbance, as the noise levels likely to be produced by operations are well below proposed injury criteria for low frequency cetaceans (estimated at 230 dB re 1 µPa) (Southall et al. 2007).</p>	<ul style="list-style-type: none"> EPBC Regulations 2000 <ul style="list-style-type: none"> Part 8 Division 8.1 – Interacting with cetaceans Part 8 Division 8.1 – Regulation 8.06 Interacting with calves Part 8 Division 8.1 – Regulation 8.07 Aircraft Marine management procedures for vessels, including inspection, maintenance and repair programs Submit marine fauna sighting records to Department of Environment and Energy 	C	1	L
3. Light Emissions	<p>Lights on vessel(s) and LWIV/MODU will be required on a 24-hour basis for safety and navigational purposes in accordance with requirements of the Navigation Act 2012 (Marine Orders Part 30 [Prevention of Collisions]).</p>	<p>Artificial lighting can cause a change in the behaviour of fauna, particularly nesting turtles and birds. The main implication of artificial lighting from offshore vessels for marine turtles is the disruption of hatchling sea-finding behaviour, as hatchlings can be disoriented if lights or atmospheric glow occur away from the sea. Adult turtles are more inclined to avoid brightly lit facilities (Witherington & Martin 1996). Artificial lighting may also attract seabirds or migratory shorebirds, in the event that the activities coincide with shorebird migrations.</p>	<ul style="list-style-type: none"> Navigation Act 2012 (Marine Orders Part 30 [Prevention of Collisions]) 	C	1	L


¹ RR = Residual Risk

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Hazard title	Description of Hazard	Potential Impact	Summary of Control Measures	F	S	RR ¹
		<p>Adult green turtles nesting on the west coast of Barrow Island also tend to remain close to shore (within 5 km of nesting beaches) during inter-nesting periods (Pendoley 2005). As the field is located approximately 35 km from the nearest turtle nesting beach at Barrow Island, light emissions from project vessel(s)/ LWIV/MODU are not expected to affect the sea finding behaviour of hatchling turtles.</p> <p>Cetacean species are not expected to be affected by light generated by field management, well intervention and P&A activities. Certain pelagic species such as fish and plankton species may be attracted to a localised area around project vessels.</p> <p>Light generated by field management, well intervention and P&A activities is temporary and short term in nature (3-7 days for field management, 7 days for well intervention and 20 days per well for P&A activity), and given the limited area over which light emissions are likely to extend, impacts to marine fauna are highly unlikely.</p>				
4. Atmospheric Emissions	<p>Exhaust gases are produced from running the power plant and machinery on board the vessels and are ultimately released into the atmosphere.</p> <p>Products of hydrocarbon combustion emitted to the atmosphere include emissions of greenhouse gases (GHG), such as carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O), along with non-GHG such as sulphur oxides (SOX) and nitrogen oxides (NOX). There may also be emissions of particulate matter, and hydrocarbons, including BTEX (benzene, ethyl benzene, toluene, and xylene).</p> <p>During P&A activities the gas in the annulus will be circulated or lubricated back to surface and will be vented from a dedicated surface bleed-off package on the MODU or LWIV (if used for WB-4 and WB-1A). It is expected that the total volume of gas brought to surface on each well is ~1,550 ft³ during P&A activities, for the purpose of well integrity. Venting will be limited to the gas in the annulus. Should all seven wells be P&A, a total of 10,850 ft³ will be emitted to the atmosphere.</p>	<p>Hydrocarbon combustion from vessels, LWIV and the MODU and venting of gas during P&A may result in a temporary, localised reduction of air quality in the environment immediately surrounding the discharge point.</p> <p>Non-GHG emissions, such as NOX and SOX, and GHG emissions can lead to a reduction in local air quality which could impact humans and seabirds in the immediate vicinity of the discharge and add to the national GHG loadings.</p> <p>Local impacts typically associated with the emissions are mitigated by the dispersive nature of the offshore environment. Any potential local elevated concentrations of emissions will be short lived and unlikely to be detectable except in the near vicinity of the release. Combustion of fuels within the Operational Area will not impact on air quality at any nearby settlement areas, the nearest being approximately 65 km south of Onslow and 35 km east of Barrow Island.</p> <p>Air emissions will be similar to other vessels operating in the region for both petroleum and non-petroleum activities.</p> <p>Air emissions are not expected to significantly affect air quality or contribute significantly to greenhouse gas contributions to the atmosphere.</p>	<ul style="list-style-type: none"> MARPOL 73/78 Annex VI / Commonwealth Protection of the Sea (Prevention of Pollution from Ships) Act 1983 Marine Order 97 (Marine pollution prevention – Air Pollution) 2007 Use of low sulphur fuel when available, in accordance with MARPOL Annex VI. 	B	2	L
5. Discharge of Oily Water	<p>The vessels, LWIV and the MODU may generate water that has become contaminated by hydrocarbons.</p> <p>Deck drainage consists of rain and wash down water that may contain small amounts of detergents, residual hydrocarbons and chemicals spilt or stored on the deck floor.</p> <p>Bilge water consists of deck drainage and machinery space water that has been directed to a bilge water tank. Bilge water shall be diverted to a holding tank either for onshore disposal at an appropriately licensed facility, or for discharge with an oil content of less than 15 parts per million (ppm) in accordance with MARPOL 73/78 Annex I/ Marine Order 91.</p>	<p>The environmental impacts associated with an oily water discharge are likely to be highly localised and temporary, due to the low volumes and the high dilution rates expected at the open ocean environment of the Operational Area (Black et al. 1994). Hinwood et al. (1994) predicted dilution factors in excess of 10,000 within 100 m of the discharge point.</p>	<ul style="list-style-type: none"> Marine Orders 91 – Marine pollution prevention – Oil Oily water treatment system in place and maintained International Oil Pollution Prevention Certificate 	B	2	L
6. Discharge of Cooling Water and Reject Brine Water	<p>Potable water for drinking and domestic use on board is produced from seawater which is drawn from the ocean and treated by reverse osmosis. A by-product of reverse osmosis is reject brine water and cooling water.</p> <p>Cooling water is used as a heat exchange medium for the cooling of machinery engines on the MODU, LWIV and vessels. Seawater is drawn from the ocean and flows counter-current through closed-circuit heat exchangers, transferring heat engines and machinery to the seawater. The seawater is then discharged to the ocean. Cooling water temperatures vary dependent upon the engine's work load and activity.</p>	<p>The discharge of cooling water and reject brine is not expected to have a negative impact on the surrounding marine environment.</p> <p>Once discharged into the ocean, the reject water will initially be subject to mixing due to open ocean conditions. The plume is expected to disperse and rise to the ocean surface, where further loss of heat, dilution and mixing with oxygen rich waters would occur (Black et al. 1994).</p> <p>Discharged cooling water and reject brine is expected to disperse in the water column and effects limited to the local area of the outlet. It is expected that most pelagic species could tolerate short term exposure to small increases in salinity resulting from discharge of reject water (Walker and McComb 1990).</p>	<ul style="list-style-type: none"> Trained personnel to maintain the reject water systems. Volume of reject water discharged will be maintained below 200 m³/hr. 	A	1	L
7. Sewage, Grey Water and Putrescible	<p>Vessels, LWIV and MODU will produce putrescible wastes such as greywater, sewage and food scraps during field management, well intervention and P&A activities. Approximately 100 L of sewage/greywater and approximately 1 L of food waste will be produced per person per day, per</p>	<p>Sewage discharge may result in an increase in nutrient availability and biological oxygen demand (BOD) in the marine environment. In the open oceanic environment, the effect of the effluent BOD on seawater oxygen concentrations is expected to be insignificant (Black et al. 1994).</p>	<ul style="list-style-type: none"> MARPOL 73/78 Annex V (Prevention of pollution by garbage) MARPOL 73/78 Annex IV / Marine Order 96 	B	1	L

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Hazard title	Description of Hazard	Potential Impact	Summary of Control Measures	F	S	RR ¹
Waste Discharges	vessel.	<p>Discharge of putrescibles wastes may attract pelagic marine fauna, such as fish and sharks, and increased nutrient availability may result in the biostimulation of marine organisms and a slight increase in algal growth in the local environment near the outlet. The mass of nutrients to be discharged in sewage on a daily basis is likely to be small and, given the open ocean environment of the field, rapid dilution of the effluent is expected, resulting in highly localised effects (Black et al. 1994).</p> <p>Monitoring of sewage and grey water discharges from a drill rig operating in the Timor Sea concluded that discharges were rapidly diluted in the surface layer of the water column (within 10 m of the surface), and there were no measurable impacts on water quality parameters 50 m from the release site (Woodside 2011).</p> <p>The discharge of sewage, grey water and putrescible wastes is considered unlikely to have any significant adverse effects on the marine environment.</p>	(Marine pollution prevention – sewage) 2018 <ul style="list-style-type: none"> International Sewage Pollution Prevention (ISPP) Certificate Sewage treatment system 			
8. Routine P&A Discharges	<p>Cementing operations will be undertaken to abandon selected wells. During cement unit testing, commissioning and cleaning operations cement (as a slurry) will be discharged to sea surface from the cement discharge line. Such discharge events would be typically less than 6 m³ and be performed on arrival at the P&A location.</p> <p>Excess cement is pumped to ensure structural integrity is achieved. The majority of cement remains downhole but minor volumes may be discharged to the seafloor at the well location. A discharge of 5 m³ per well is expected.</p> <p>P&A and intervention chemicals will be required to make kill fluid or cement slurry in order to place the permanent barriers. The use of additives for the brine would be minimal, as the fluid requires to provide the hydrostatic column only in order to hold off the reservoir fluid from coming to surface. In addition, low volumes of high viscosity WBM mud (up to 20 m³) will be used per well to clean the hole or spot on bottom to maintain the placement of the cement slurry placement in the hole. Discharge will occur at sea-surface through a riserless mud recovery (RMR) system.</p> <p>A maximum of 10m³ brine, which includes chemicals may be discharged per well. Effort will be made to leave all the brine / cement and high viscosity pills downhole.</p>	<p>Cement discharge impacts to the marine environment are associated with smothering of benthic and/or infauna communities in the vicinity of the well. Cement is the most common material currently used in artificial reefs around the world (OSPAR, 2010) and is not expected to pose any toxicological impacts to benthic and/or infauna from leaching or direct contact.</p> <p>Excess cement discharge occur as dry bulk or as a slurry. Dry bulk cement is a powder form cement and therefore low density compared to the slurry. Dry bulk will disperse across a larger area before settling on the seafloor. Slurry will likely settle on the seafloor closer to the well location. Once settled the cement may smother any surrounding benthic and/or infauna communities local to the well.</p> <p>All chemicals that may be operationally released or discharged to the marine environment are required to be selected and approved as per Chemical Risk Assessment. Chemicals are chosen based on the environmental performance and based on an ALARP assessment and are expected to be of low toxicity and biodegradable.</p> <p>Impacts from discharges of cementing and P&A and intervention chemicals will be localised to the immediate vicinity of the release location, and have no lasting environmental effects, based on:</p> <ul style="list-style-type: none"> the low potential for toxicity and bioaccumulation the relatively small volumes of discharges the low sensitivity of the receiving environment the rapid dilution of the release. <p>Biota of the Operational Area comprises mostly epibenthic invertebrates of which are widely represented across the region. Sessile fauna is found at low density due to the predominantly low sensitivity soft sediment habitat.</p> <p>Given the minor quantities of cementing and P&A and intervention discharges, short and infrequent discharge durations and the low toxicity and high dispersion in the open, offshore environment, any impacts on the marine environment from discharges are expected to minor. Recovery of water quality conditions is expected within hours after the cessation of the activity.</p>	<ul style="list-style-type: none"> Cement and P&A and intervention chemicals will be assessed in accordance with the Chemical Assessment Process and ALARP assessment Excess dry bulk cement which is surplus to requirements of a P&A well will be retained and used on the next P&A well. At the end of the P&A or intervention campaign it will either be provided to the next operator or discharged to the marine environment 	E	1	L
9. Seabed Disturbance	<p>The MODU may anchor during P&A activities, potentially disturbing the seabed and associated benthic habitats. The area of impact is limited to the footprint of the anchor and chain.</p> <p>Seabed disturbance will result from the anchor holding testing and MODU anchor mooring system, including placement of anchors and chain/wire on the seabed, potential dragging during tensioning and recovery of anchors. Overall, the mooring of the MODU and anchor holding testing activities will result in localised, small scale seabed disturbance to the seabed. Mooring may require a 12 point pre-laid mooring system at each well location.</p> <p>The following areas are anticipated to be disturbed at each well during MODU mooring:</p> <ul style="list-style-type: none"> Anchor drag: 10 m x 50 m (allowing for up to 50m drag per anchor, depending on soil, anchor type and 	<p>As the benthic fauna in the Operational Area are expected to be widely represented on the shelf, anchoring is not expected to result in widespread loss or degradation of environmentally significant habitats. Due to the localised area of disturbance, impacted benthic communities are expected to rapidly recolonise any damaged areas upon completion of P&A activities (Currie & Isaacs 2004). Designated areas shall be defined for mooring.</p> <p>The Ancient Coastline at 125 m Depth Contour KEF overlaps the Operational Area in the outmost north west corner. Activities are not planned to occur on the KEF, therefore no impact is anticipated.</p>	<ul style="list-style-type: none"> Mooring Analysis Report be undertaken and implemented Anchors installed as per mooring design analysis 	E	1	L

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Hazard title	Description of Hazard	Potential Impact	Summary of Control Measures	F	S	RR ¹
	deployment method). <ul style="list-style-type: none"> Chain on seabed: 400 – 800m per line depending on line tensions. ROV use during field management or P&A activities is required. The ROV may station on the seabed for short periods if required. The footprint of a typical ROV is approximately 2.5 m x 1.7 m.					

6.4 Summary of risks and control measures associated with unplanned activities


Table 6.12: Summary of environmental risks and control measures associated with unplanned events

Hazard title	Description of Hazard	Potential Impact	Control Measures	F ²	S	RR
1. Introduction of Marine Pest Species	<p>Marine pest species may potentially be transported to the Operational Area as a component of ballast water (and associated sediments) or as marine fouling on vessels/LWIV/MODU. Ballast water may contain organisms such as fish, invertebrate larvae and phytoplankton from foreign source waters. Similarly, despite the use of antifouling systems, there will inevitably be some degree of hull fouling on the support vessel(s).</p> <p>Vessels will be sourced locally, within Australian waters, however the LWIV and MODU may be sourced from international waters.</p> <p>An IMS risk assessment process will be undertaken on all vessels and the LWIV and MODU prior to contracting. All vessels are required to provide Australian biosecurity documentation as part of pre-hire documentation. Pre-hire vessel audits are also undertaken, including checking recent movements, anti-fouling coating, internal cleaning and compliance against the Australian Ballast Water Requirements - Version 7 and the International Maritime Organisation's Guidelines for the Control and Management of Ships' Biofouling to Minimise the Transfer of Invasive Aquatic Species. LWIV and MODU will be assessed to demonstrate low risk. If deemed necessary, LWIV and MODU sourced internationally may be dry docked and cleaned prior to mobilisation Australian waters to reduce the biosecurity risk to low.</p>	<p>Non-endemic marine species transported into areas where they have not previously been found can displace native species, or interfere with ecosystem processes in other ways (e.g. through predation).</p> <p>The successful establishment of an exotic species transported via either ballast or hull-fouling depends primarily on three factors:</p> <ul style="list-style-type: none"> colonisation and establishment of the marine pest on a vector (vessel, equipment or structure) in a donor region (e.g., a home port, harbour or coastal project site where a marine pest is established) survival of the marine pests on the vector during the voyage from the donor to the recipient region colonisation (for example, by reproduction or dislodgement) of the recipient region by the marine pest, followed by successful establishment of a viable new local population. <p>The deep offshore open waters of the Operational Area are not conducive to the settlement and establishment of IMS. The field is in water depths of approximately 100 m, precluding light penetration to the seabed, distant from any coastline (>30 km) and more than 12 nm from shorelines and/or critical habitat. The likelihood that any marine organisms could become established at the field is remote.</p>	<ul style="list-style-type: none"> Vessels and MODU will be risk assessed to ensure vessels and MODU are at 'low risk' of introducing invasive marine species Australian Ballast Water Management Requirements (as defined under the Biosecurity Act 2015) IMS management measures will be applied according to risk to minimise the likelihood of IMS being introduced (e.g. treatment of internal systems, IMS Inspections or cleaning) 	A	4	M
2. Non-Hazardous and Hazardous Waste	<p>Generated solid wastes may be broadly classified into one of two categories: general non-hazardous solid wastes, and hazardous wastes.</p> <p>Non-hazardous solid wastes produced on vessels include cardboard, plastic, aluminium and paper. These waste materials will be stored on board the project vessels in suitable containers (segregated from hazardous waste materials) for transport back to shore for disposal/recycling in accordance with local regulations.</p> <p>Hazardous wastes are defined as being waste materials that are harmful to health or the environment. Chemicals and other hazardous materials that may be stored on the vessels include: lubricating oils, cleaning and cooling agents; oil filters and batteries; oily rags; paint, aerosol cans; and acids/caustics and solvents. All hazardous waste materials will be transported to shore for disposal or recycled at an approved facility in accordance with local requirements.</p>	<p>Potential impacts of solid waste discharge to sea include potential physical harm to marine fauna resulting from ingestion or entanglement with solid waste (garbage).</p> <p>If accidentally lost overboard, hazardous waste would result in a temporary and highly localised hazardous water quality zone. This could have a toxic effect on marine fauna that are present within this zone. The exposure and toxicity would be highly temporary due to rapid dilution and dissipation in the marine environment expected on the NWS. Potential impacts are likely to be limited to one or a few individual marine animals in the immediate vicinity of the accidental release site, with the most likely fauna affected being those within the surface waters.</p>	<ul style="list-style-type: none"> MARPOL 73/78 Annex V (Prevention of pollution by garbage) / Marine Order 95 (Marine pollution prevention – garbage) Maintain garbage record book Waste inspections 	A	2	L


² F = Frequency, S = Severity, RR = Residual Risk

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Hazard title	Description of Hazard	Potential Impact	Control Measures	F ²	S	RR
	No discharge of non-hazardous or hazardous waste to sea is planned during field management, well intervention or P&A activities.					
3. Vessel Collision with Marine Fauna	<p>Project vessels will transit from Dampier to and from the Operational Area no more than once per year to undertake field management activities.</p> <p>Well intervention activities will have one LWIV in the Operational Area for a duration of 7 days.</p> <p>For P&A activities, a maximum of three vessels may be in the Operational Area at any one time supporting the MODU. P&A activities are expected to take approximately 20 days per well (up to 30 days).</p>	<p>Vessel collision with marine fauna may result in injury or death of marine fauna. Marine fauna that are present in surface waters such as marine turtle and cetaceans are most susceptible to vessel strikes due to their proximity to the vessel (hull, propeller or equipment). Marine turtles on the sea surface or in shallow coastal waters have been observed avoiding approaching vessels by typically moving away from the vessels track (Hazel et al. 2007). Cetaceans including humpback whales demonstrate a variety of behaviours in response to approaching vessels (attributed to vessel noise), including longer dive times and moving away from the vessel's path with increased speed (Baker & Herman 1989; Meike et al. 2004). These behaviours may contribute to reducing the likelihood of a vessel strike. Other marine fauna species including seabirds and fish species (including whale sharks) are likely to avoid any moving vessels and are considered at low risk of potential vessel strike.</p> <p>The Operational Area does not support any critical breeding, feeding or calving areas for EPBC listed species. However, the area is within the northern migration route for humpback whales and the migratory route for whale sharks.</p> <p>Given that cetaceans, marine turtles and other marine fauna exhibit avoidance behaviour, the likelihood of vessel collision with marine fauna is low. During movements into or out of the Operational Area, vessels will move slowly (5 knots or less), this also reduces the risk of collision allowing time for any marine fauna to move out of the immediate area. Management controls will also be implemented for further reduced the potential risk of collision.</p>	<ul style="list-style-type: none"> EPBC Regulations 2000 <ul style="list-style-type: none"> Part 8 Division 8.1 – Interacting with cetaceans Part 8 Division 8.1 – Regulation 8.06 Interacting with calves Part 8 Division 8.1 – Regulation 8.07 Aircraft Marine management procedures for vessels, including inspection, maintenance and repair programs Submit marine fauna sighting records to Department of Environment and Energy 	A	1	L
4. Subsea Release of Crude – P&A Activities	<p>All four suspended shut in wells were producing with assistance of gas lift. Of four suspended shut in wells, WB4 is the only well currently capable of flowing naturally. The other three wells can produce limited gas / oil / water (due to the presence of small gas cap in the well) and will be then naturally killed by the hydrostatic of the water produced from the reservoir.</p> <p>During intervention and plugging operations, changes of pressure (kicks) can occur in which reservoir fluids can flow into the well bore. While highly unlikely, kicks may still occur due to human error, such as missing warning signs or using an inappropriate volume of drilling fluid. When uncontrolled, a kick could result in a loss of well control. A loss of well control during WB4 P&A activities would result in a subsea release of Woollybutt crude.</p> <p>The worst-case scenario would result in the crude being released from WB4 at a rate of 900 bbl/day (143.1 m³/day) over 74 days, with a total volume of 66,600 bbl (10,589 m³).</p>	<p>A 10,589 m³ Woollybutt crude release was modelled by RPS APASA (2019) at the WB4 well for summer, winter and transitional seasons and is considered appropriate, although conservative, for informing the approximate spatial extent of potential impacts from a well blowout event during activities.</p> <p>Surface and shoreline hydrocarbons</p> <p>Surface hydrocarbon concentrations at or greater than 1 g/m² could travel up to 54 km from the WB4 well (in the winter season). The maximum extents are at a concentration of 10 g/m² is 2 km (in winter). Concentrations are not set to exceed 25 g/m².</p> <p>A maximum worst case local accumulated concentration and volume of up to 4.7 g/m² and >1 m³, respectively, was forecast for Ningaloo State Marine Park and Ningaloo Coast receptors in summer.</p> <p>Overall, based on the results of repeated individual simulations under a wide range of environment conditions, sensitive receptors are not predicted to be contacted by surface oil or shoreline in any season.</p> <p>Subsurface – Entrained hydrocarbons</p> <p>The seasonal probability contour figures indicate that entrained oil concentrations at or greater than 100 ppb could travel up to 251 km from the WB4 well location in summer.</p> <p>Probability of contact by entrained oil concentrations are predicted to be greatest in summer at Ningaloo AMP (30%) for the 100 ppb threshold.</p> <p>Subsurface - Aromatics</p> <p>The seasonal probability contour figures indicate that dissolved aromatic hydrocarbon concentrations at or greater than 6 ppb) could travel up to 136 km from the WB4 location in summer with concentrations not set to exceed the 50 ppb and high 400 ppb thresholds.</p> <p>The probabilities of contact by dissolved aromatic hydrocarbon concentrations are not predicted to exceed >2% at any receptor in any season. The worst-case instantaneous dissolved aromatic hydrocarbon concentration at any receptor is predicted at Ningaloo State Marine Park in winter at 10 ppb.</p> <p>Summary of potential environmental impact</p> <p>As described above, the predicted impact area from surface hydrocarbons is confined to around the spill site and not the wider region.</p> <p>In addition the weathering results for the variable-wind case indicate that the wind conditions will have a large impact on the proportion of oil that remains afloat, with very little oil mass predicted to persist on the sea surface (<1% after 24 hours). Woollybutt Crude also contains</p>	<ul style="list-style-type: none"> Accepted Well Operations Management Plan (WOMP) in place for intervention and P&A activities and implemented WOMP includes control measures for well integrity to manage the risk of an unplanned release of hydrocarbons and demonstrates that at least two isolation barriers are in place between the reservoir and the environment MODU safety case in place for P&A campaign and includes measures for well control to manage the risk of an unplanned release of hydrocarbons Vessel safety case in place for intervention campaign and includes measures for well control to manage the risk of an unplanned release of hydrocarbons BOP installed during P&A and intervention operations. BOP specification and function testing will be undertaken in accordance with: <ul style="list-style-type: none"> Eni Well Control Manual STAP-P-1-M-25007 Original Equipment Manufacturer (OEM) Standards API Standard 53. 	A	4	M

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Hazard title	Description of Hazard	Potential Impact	Control Measures	F ²	S	RR																							
		<p>a relatively low proportion (6.5% by mass) of hydrocarbon compounds that will not evaporate at atmospheric temperatures.</p> <p>Sensitive receptors</p> <p>The potential impacts of surface, dissolved and stranded hydrocarbons on sensitive receptors occurring in the ZPI, and along the stretch of coastline where shoreline accumulation of hydrocarbons above 0 g/m² could occur, is provided below.</p>																											
		<table border="1"> <thead> <tr> <th>Environmental Sensitivity</th> <th>Potential Impact</th> </tr> </thead> <tbody> <tr> <td colspan="2">Marine fauna</td> </tr> <tr> <td>Plankton</td> <td> <p>Surface hydrocarbons will have no impact on plankton as plankton is present in the water column only.</p> <p>There is potential for localised mortality of plankton due to reduced water quality and toxicity. Effects will be greatest in the upper 10 m of the water column and areas close to the spill source where hydrocarbon concentrations are likely to be highest.</p> </td> </tr> <tr> <td>Marine mammals</td> <td> <p>Marine mammals may be come in contact with hydrocarbons due to surfacing within slick. Effects include irritation of eyes/mouth and potential illness. Surface respiration could lead to accidental ingestion of hydrocarbons or result in the coating of sensitive epidermal surfaces. 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The highest potential risks for dugongs are related to direct ingestion of macro-algae exposed to acute or chronic toxicity and or drastic reduction on macro-algae coverage due to hydrocarbon spills (Heinsohn et al. 1977).</p> <p>Migratory marine mammals may encounter either surface or entrained hydrocarbons, however, due to the localised nature of the spill, significant numbers are unlikely to be impacted.</p> </td> </tr> <tr> <td>Marine reptiles</td> <td> <p>Direct contact with hydrocarbons may result in harmful effects through ingestion of oil, inhalation of toxic vapours (e.g. close to the spill source) or irritation to the head, neck and flippers due to oil contact with the skin.</p> <p>Modelling for Hazard 4 (Subsea Release of Crude during P&A) indicates that the maximum distance to the outer extent of the 1 g/m² surface hydrocarbons is predicted to be 54 km. For the Hazard 5 (Subsea Release of Crude during Field Management) the outer extent at 1 g/m² is predicated to be 110 km. 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Marine mammals	<p>Marine mammals may be come in contact with hydrocarbons due to surfacing within slick. Effects include irritation of eyes/mouth and potential illness. Surface respiration could lead to accidental ingestion of hydrocarbons or result in the coating of sensitive epidermal surfaces. Fresh hydrocarbons may have a higher potential to cause toxic effects when ingested, while weathered hydrocarbons are considered to be less likely to result in toxic effects. Behavioural disturbance (i.e. avoiding spilled hydrocarbons) in some instances has been observed (Geraci, 1988) or several species of cetacean suggesting that cetaceans have the ability to detect and avoid surface slicks. The highest potential risks for dugongs are related to direct ingestion of macro-algae exposed to acute or chronic toxicity and or drastic reduction on macro-algae coverage due to hydrocarbon spills (Heinsohn et al. 1977).</p> <p>Migratory marine mammals may encounter either surface or entrained hydrocarbons, however, due to the localised nature of the spill, significant numbers are unlikely to be impacted.</p>																												
Marine reptiles	<p>Direct contact with hydrocarbons may result in harmful effects through ingestion of oil, inhalation of toxic vapours (e.g. close to the spill source) or irritation to the head, neck and flippers due to oil contact with the skin.</p> <p>Modelling for Hazard 4 (Subsea Release of Crude during P&A) indicates that the maximum distance to the outer extent of the 1 g/m² surface hydrocarbons is predicted to be 54 km. For the Hazard 5 (Subsea Release of Crude during Field Management) the outer extent at 1 g/m² is predicated to be 110 km. Surface hydrocarbons concentrations are not predicted to exceed 25 g/m² concentrations. It is therefore predicted the impact area from surface hydrocarbons is confined to around the spill site and not the wider region.</p> <p>Within the immediate vicinity of the spill event, where hydrocarbons are still fresh, this could lead to fatal impacts on individuals, but is unlikely to have a population effect. Therefore, impacts from surface oil are considered localised and temporary.</p>																												
Seabirds	<p>Seabirds are particularly vulnerable to surface hydrocarbons. As most fish survive beneath floating slicks, they will continue to attract foraging seabirds, which typically do not exhibit avoidance behaviour. Smothering can lead to reduced water proofing of feathers and ingestion while preening. In addition, hydrocarbons can erode feathers causing chemical damage to the feather structure that subsequently affects ability to thermos-regulate and maintain buoyancy on water.</p> <p>Surface hydrocarbons concentrations are not predicted to exceed 25 g/m² concentrations. It is therefore predicted the impact area from surface hydrocarbons is confined to around the spill site and not the wider region.</p> <p>Beached hydrocarbons will evaporate quickly in the temperatures experienced in the JBG. However, reduced prey may be available to foraging shorebirds due to mortality or avoidance, and nesting individuals may be temporarily disrupted.</p>																												
Fish and sharks	<p>While fish and sharks do not generally break the sea surface, individuals may feed at the surface. However, since the Woollybutt crude is expected to weather rapidly and low surface concentrations are predicted from the spill scenarios, significant impacts are not anticipated. The probability of prolonged exposure to a surface slick by fish and shark species is low.</p> <p>There is potential for localised mortality of fish eggs and larva due to reduced water quality and toxicity. Effects will be greatest in the upper 10 m of the water column and areas close to the spill source where hydrocarbon concentrations are likely to be highest and therefore demersal fish communities are not expected to be impacted.</p>																												
Habitats																													
Sandy beaches	<p>Sandy beaches have a relatively low biodiversity although they do provide important habitats for nesting turtles, breeding and foraging seabirds, and shorebirds. They also provide habitat for polychaetes, molluscs, marine crustaceans, semi-terrestrial crustaceans and insects.</p> <p>Sandy beaches do not occur in the Operational Area but are widespread within the ZPI on Barrow/Montebello/Lowendal islands, Murion Islands and the mainland coast. These beaches have potential to be impacted by Hazard 5: Subsea Release of Crude during Field Management. However, given the low volumes of shoreline accumulation the impacts are not considered significant.</p>																												
Intertidal reefs	<p>Intertidal reefs occur within the ZPI. The closest significant coral reefs to the Operational Area are found fringing the Barrow/Montebello Island groups, Muiron Islands and Ningaloo reef, which also occur within the ZPI. Entrained oil has the potential to coat contacted coral reefs. The concentrations predicted to contact the reef locations are low, therefore significant impacts are not anticipated.</p>																												
Mangroves	<p>The shoreline is not considered to be a significant mangrove area. Isolated groups of mangroves are within the ZPI, particularly around Barrow Island and along the Ningaloo coastline. Significant impacts to mangrove habitats are not expected due to the entrained hydrocarbon concentrations reaching the shorelines and relatively low volumes of accumulated hydrocarbon from Hazard 5: Subsea Release of Crude during Field Management.</p>																												
Socio-Economic																													

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	<p>Fisheries</p> <p>Tourism</p> <p>Shipping</p> <p>Defence</p> <p>Shipwrecks</p> <p>Indigenous</p> <p>Existing oil and gas activity</p> <p>Protected areas</p>	<p>In addition to the effects of entrained oil, exclusion zones surrounding a spill can directly impact fisheries by restricting access for fishermen. Entrained hydrocarbon can have toxic effects on fish (as outlined above) reducing catch rates and rendering fish unsafe for consumption. Both entrained and surface hydrocarbons have the potential to lead to temporary interference to fishing operations.</p> <p>In the waters immediately surrounding the Operational Area, tourism activities are expected to be low. Exclusion zones surrounding a spill will reduce access for vessels for the duration of the response undertaken for spill clean-up. Stranding of hydrocarbons on sandy beaches is anticipated to be very low. Tourism activity on the Ningaloo beaches is high, particularly around Cape Range National Park, however given the low volumes of accumulated hydrocarbons impact is not anticipated to be significant.</p> <p>Exclusion zones surrounding a spill will reduce access for shipping vessels for the duration of the response undertaken for spill clean-up (if applicable); vessel may have to take large detours leading to potential delays and increased costs.</p> <p>The level of defence activities carried out is in the airspace only, therefore interference of defence activities due to a hydrocarbon spill are likely to be minimal.</p> <p>Surface oil will have no impact on shipwrecks. Entrained oil from a vessel collision will remain in the surface waters and is therefore unlikely to have an impact on shipwrecks.</p> <p>The level of activities undertaken by indigenous users is expected to be low. Along the north-western coastline of Australia, traditional and subsistence fishing is generally limited to shorelines, creeks and nearshore reefs (Leprovost et al, 1997). Interference due to a hydrocarbon spill are likely to be minimal, however in event there is a requirement for land-based response activities/ disturbance relevant representatives will be contacted.</p> <p>Exclusion zones surrounding spills will reduce access potentially leading to delays to work schedules with subsequent financial implications.</p> <p>Protected areas within the ZPI include:</p> <ul style="list-style-type: none"> • Gascoyne AMP • Ningaloo AMP • Montebello AMP • Ningaloo Marine Park and Murion Island Management Area • Montebello Islands Marine Park, Barrow Island Marine Park and Barrow Island Marine Management Area <p>The Montebello, Ningaloo and Gascoyne AMP's have the potential to receive concentrations of entrained hydrocarbons at low concentrations (at 100 ppb). Potential impacts may include: the contamination of sediments, impacts to benthic fauna/habitats and associated impacts to demersal fish populations and reduced biodiversity.</p> <p>Given the low concentrations the AMPs are anticipated to receive and the low persistent fraction (6.5%) of the crude it is not anticipated the AMP will be significantly impacted. The susceptibility of marine fauna to hydrocarbons is dependent exposure duration, however given that exposures would be limited in extent (maximum extent of surface hydrocarbons at the 1 g/m² threshold concentration is 110 km and no surface hydrocarbons exceed 10 g/m²) and duration (crude is expected to weather rapidly in a variable wind scenario exposure to marine fauna from this hazard is not expected to result in a fatality. Therefore, the natural, cultural and socio-economic values of the AMPs are expected to experience only temporary impacts while the crude disperses and weathers; lasting impact is not anticipated.</p> <p>As discussed above, marine mammals, seabirds, sharks and reptiles within protected areas are at risk of direct contact with hydrocarbons due to chance of surfacing within slick. Effects include irritation of eyes/mouth and potential illness. Surface respiration could lead to accidental ingestion of hydrocarbons or result in the coating of sensitive epidermal surfaces.</p>				
5. Subsea Release of Crude – Field Management	<p>A subsea release of crude could occur during field management in the unlikely event that corrosion of subsea valves leads to simulations failure of multiple barriers.)</p> <p>Corrosion of the valves would happen gradually over time. Initial leaks would be small with gradual rise in flow rate as corrosion increases.</p> <p>Two worst-case scenarios have been identified</p> <ul style="list-style-type: none"> • <250 pbd at WBT for 365 days • 900 bpd at WBT for up to 88 days (detected by fortnightly satellite monitoring). <p>The worse-case scenario is therefore estimated to result in the release of 14,490.5 m³ over a period of up to 365 days.</p>	<p>In the event of a 250 bpd leak scenario for 365 days, the volume of crude released would be a maximum of 14,490.5 m³.</p> <p>Surface hydrocarbons</p> <p>Surface hydrocarbon concentrations at or greater than 1 g/m² could travel up to 110 km from the WB4 well (in the winter season). No sensitive features or Australian Marine Parks were predicted to be contacted by surface oil above this threshold.</p> <p>Shoreline hydrocarbons</p> <p>Hydrocarbons above the >10 g/m² threshold concentrations may accumulate on the shorelines of islands and the mainland, with a maximum accumulation of 14.9 tonnes on the Ningaloo coast and 5.5 tonnes at Barrow Island. Thevenard Island, the Onslow Region, the Lowendal Islands and the Carnarvon Region were also predicted to receive hydrocarbons exceeding 10 g/m², however contact probabilities at these receptors were low (13 – 35%) and total shoreline loadings were below 0.5 tonnes.</p> <p>Subsurface – Entrained</p> <p>The majority of the total WAF exceeding 70 ppb was within 70 km of the release location, with only two other model cells contacted above this threshold near the Ningaloo shoreline, approximately 150 km from the release location. However, the maximum predicted concentration predicted in the Ningaloo Region and Ningaloo Marine Park was 74.1 ppb, with a maximum exposure time of 0.2 days.</p> <p>The KEFs of the Ancient Coastline and the Continental Slope Demersal Fish Communities were predicted to be contacted by total WAF exceeding 70 ppb in 100% of realisations. The maximum time-averaged concentrations in these regions were predicted to be 154.8 ppb and 111.6 ppb at the Ancient Coastline and the CSDFC respectively. However, exposure times</p>	<ul style="list-style-type: none"> • Accepted Well Operations Management Plan (WOMP) in place for intervention and P&A activities and implemented • ROV surveys will be conducted annually prior to P&A of WB-4 to assess the integrity of the valves (and other subsea infrastructure) • ROV surveys every 2 years after P&A of WB-4, until decommissioning • Satellite imagery will be processed every 14 days to detect surface slicks greater • The WB-4 well will be intervened in 2020 and subsequently classed as suspended. 	A	4	M

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		<p>were predicted to be a maximum of 1.1 cumulative days across the entire year of simulation.</p> <p>Subsurface – Dissolved</p> <p>Dissolved hydrocarbons exceeding 6 ppb were predicted to travel up to 130 km from the release location. No geographic features or Australian Marine Parks were predicted to be contacted by dissolved hydrocarbons exceeding the 6 ppb thresholds.</p> <p>The KEFs of the Canyons, the Ancient Coastline and the CSDFC were predicted to have a high probability (82 – 100%) of contact by dissolved hydrocarbons above 6 ppb. The maximum time-averaged concentrations when above 6 ppb for the Canyons and the CSDFC were predicted to be 19.7 ppb and 16.8 ppb, respectively, however the maximum exposure time in these receptors was 0.2 and 0.7 days, respectively. The Ancient Coastline was predicted to have a higher maximum time-averaged concentration of 34.4 ppb and a longer exposure duration of 25.1 days for dissolved hydrocarbons exceeding 6 ppb.</p> <p>Summary of potential environmental impact</p> <p>The potential impacts of a subsea release of Woollybutt crude to environmental sensitivities are the same as those described in Hazard 4 above. The description of impacts covers all sensitivities occurring within the ZPI that encompasses the outer limits of the 900 bpd and 250 bpd scenarios. This includes additional shoreline receptors resulting from shoreline accumulation of hydrocarbons >10 g/m².</p> <p>The susceptibility of marine fauna to the crude is dependent on exposure duration however given that exposures would be limited in extent and duration, exposure to marine fauna from this hazard is not expected to result in a fatality.</p>				
6. Diesel Spill to Sea	<p>The main cause of loss of diesel from the vessels during field management, well intervention and P&A activities is collision with another vessel. The maximum credible spill volume as a result of a vessel collision is the volume of the largest fuel tank (AMSA 2015). The largest tank of the support vessel likely to be used for P&A activities has a capacity of 30.4 m³. The largest tank for the proposed LWIV will be 186.3 m³.</p> <p>For the purpose of a hydrocarbon spill risk assessment from vessel collision, Eni determined that 100 m³ would cover all credible vessel spill scenarios. This is on the basis that the optimal fuel operating capacity is generally at 80% of tank capacity to prevent loss of fuel from vents in rough seas and vessels will not always carry maximum fuel during activities.</p> <p>Marine diesel is a light, refined petroleum product with a relatively narrow boiling range. When spilled on water, most of the oil will evaporate or naturally disperse within a few days or less.</p>	<p>The spill modelling results (APASA 2012) show that diesel at the lowest exposure threshold (1 g/m²) will not contact coral reef communities, seagrass, macroalgae, mangroves or sandy beaches during any season. Modelling results for values and sensitivities predict no contact during any season. As marine diesel is much lighter than water (specific gravity is between 0.83 and 0.88 compared to 1.03 for seawater) it is not possible for this oil to sink and accumulate on the seafloor (NOAA 2016), therefore exposure to the Ancient coastline at 125 m depth contour and Canyons linking the Cuvier Abyssal Plain and the Cape Range Peninsula are highly unlikely.</p> <p>As fish mainly dwell in the water column they are unlikely to be impacted by zone of sea surface contact. Fish are most likely to be impacted by ingesting oil droplets in the water column. However, as the probability of aromatic oil concentrations exceeding the lowest threshold (6 ppb) is predicted to be less than 1% within ~30 km of the spill location for all seasons, impacts to continental slope demersal fish communities are highly unlikely.</p> <p>Impacts to Threatened and Migratory Fauna are described in Hazard 4 above, except: Modelling results predict that no nesting beaches will be exposed to hydrocarbons in the event of a marine diesel spill. Refer to Hazard 4 above for descriptions of the Impacts to Threatened and Migratory Fauna and Socio-Economic Receptors.</p>	<ul style="list-style-type: none"> Bunkering procedure implemented for all hydrocarbon vessel bunkering and helicopter refuelling activities, and will include the following requirements: <ul style="list-style-type: none"> A completed PTW and/or JSA shall be implemented for the hydrocarbon bunkering/refuelling operation Visual monitoring of gauges, hoses, fittings and the sea surface during the operation Hose checks prior to commencement. Bunkering not undertaken in adverse weather conditions and addressed within JSA SOPEP kept on board MODU and vessels and contains plans in case of an oil spill to prevent spills reaching the marine environment, as appropriate to vessel class Spill response kits located in proximity to hydrocarbon storage/bunkering areas and appropriately stocked/replenished as required to prevent spills reaching the marine environment Marine Order Part 30 (Prevention of Collisions) 2009 Marine Order Part 21 (Safety of Navigation and Emergency Procedure) 2012 Stakeholder consultation with relevant stakeholders (who requested ongoing consultation) prior to intervention and plug and abandonment Maintain 500m petroleum safety zone 	A	3	L
7. Leaks from Fittings and Connections (Outboard and BOP Control)	<p>BOP control fittings and outboard fittings and connections on vessels include equipment control lines and ROV control hoses. In the event of a rupture, hydraulic fluid would be released. The maximum release volume is 20 litres; this is based on the hydraulic cylinder capacity of a heavy duty working class ROV.</p> <p>Outside vessels, the largest credible spill would be a release of</p>	<p>The release of hydraulic fluid from control lines or the ROV control hose during P&A activities has the potential to result in a localised temporary reduction in water quality. Given the low predicted release volume, the low toxicity and rapid dilution of hydraulic oil in the marine environment, toxicity impacts to marine fauna are highly unlikely. Marine fauna in the open water environment are also highly mobile transient species, therefore it is highly unlikely they will be exposed to the spill for periods long enough to cause toxicity impacts. Give the low volumes that may be released no impacts to commercial fisheries are predicted.</p>	<ul style="list-style-type: none"> Spill response kits located in proximity to hydrocarbon storage/bunkering areas and appropriately stocked/replenished as required to prevent spills reaching the marine environment Oily water treatment system in place and maintained 	B	2	L

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	<p><1 m³ of stern tube oil (non-hydrocarbon-based lube oil) from a vessel thruster/propeller stern tube.</p> <p>The hydraulic fluid used during vessel operations is a water-based hydraulic fluid, Oceanic HW443. Oceanic HW443 has been classified under the Offshore Chemical Notification Scheme (OCNS) as Class D, which represents a low toxicity (CEFAS 2016).</p>	<p>There are no significant marine habitats, or matters of NES in the predicted localised spill area.</p>	<ul style="list-style-type: none"> International Oil Pollution Prevention Certificate ROV equipment maintained in accordance with manufacturer recommendations A ROV check will be conducted prior to dive which includes check of line / connection integrity 																																													
8. Unplanned seabed disturbance from loss of MODU mooring	<p>The MODU will be secured on station by a number of morning lines. High energy weather events such as cyclones, can lead to excessive loads on the mooring lines resulting in the failure of the lines and the MODU losing station being trailed across the seabed.</p> <p>A loss of station may result in damage to a wellhead (e.g. tree knocked) should the anchors be dragged along the seabed in the Woollybutt field. This could result in a loss of well integrity from a suspended well. In this event, any gas or oil that has accumulated under the cap would be released and be replaced with water. After which point, the well would self-kill.</p>	<p>The benthic fauna in region are expected to be widely represented on the shelf, loss of station is not expected to result in widespread loss or degradation of environmentally significant habitats. Due to the localised area of disturbance, impacted benthic communities are expected to rapidly recolonise any damaged area.</p> <p>In the event of a loss of well integrity from a suspended well and a release of 30 bbl gas/oil, any impacts on the marine environment are expected to be minor. The environmental impacts associated with the discharge are likely to be highly localised and temporary, due to the low volume.</p>	<ul style="list-style-type: none"> Mooring Analysis Report be undertaken and implemented MODU to be tracked when unmanned 	A	2	L																																										
9. Oil Spill Response	<p>While spill response activities are intended to reduce the potential environmental consequences of a hydrocarbon spill, response activities could potentially exacerbate or cause further environmental harm. Decisions regarding spill response activities need to consider both the potential environmental impacts associated with taking no action and the potential environmental impacts associated with a response activity or combination of spill response activities.</p> <p>The response strategies and supporting activities deemed appropriate for the oil spill scenarios for the activities are detailed in the OPEP, and identified as:</p> <ul style="list-style-type: none"> Operational monitoring; Source control; Shoreline clean-up; Oiled wildlife response; and Scientific monitoring; 	<p>Potential risks that may arise through implementation of response strategies are summarised below</p> <table border="1"> <thead> <tr> <th></th> <th>Operational monitoring</th> <th>Source control</th> <th>Shoreline Clean-up</th> <th>Oiled Wildlife</th> <th>Scientific monitoring</th> </tr> </thead> <tbody> <tr> <td>Vessel movements</td> <td>X</td> <td>X</td> <td>X</td> <td>-</td> <td>X</td> </tr> <tr> <td>Light emissions</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>Noise</td> <td>X</td> <td>X</td> <td>-</td> <td>X</td> <td>X</td> </tr> <tr> <td>Atmospheric emissions</td> <td>X</td> <td>X</td> <td>X</td> <td>-</td> <td>X</td> </tr> <tr> <td>Disturbance to natural habitat</td> <td>-</td> <td>-</td> <td>X</td> <td>X</td> <td></td> </tr> <tr> <td>Operational discharge of waste</td> <td>-</td> <td>X</td> <td>X</td> <td>-</td> <td>-</td> </tr> </tbody> </table> <p>Offshore risks are consistent with vessel operations described within this EP for the planned operations. The greatest potential for impacts additional to those described for planned operations are from oiled wildlife response, nearshore protection and deflection and shoreline clean-up operations where disturbance to the environment may occur through implementation efforts.</p>		Operational monitoring	Source control	Shoreline Clean-up	Oiled Wildlife	Scientific monitoring	Vessel movements	X	X	X	-	X	Light emissions	X	X	X	X	X	Noise	X	X	-	X	X	Atmospheric emissions	X	X	X	-	X	Disturbance to natural habitat	-	-	X	X		Operational discharge of waste	-	X	X	-	-	<p>For source control response strategies:</p> <ul style="list-style-type: none"> Subsea First Response Toolkit Capping Stack contract Relief well drilling Prioritize MODU or vessel(s) for intervention work(s) that have an existing safety case MODU and vessel contracts to include clause outlining requirement for support in the event of an emergency <p>For monitor and evaluate oil spill response strategies:</p> <ul style="list-style-type: none"> Satellite imagery Oil spill trajectory modelling Aerial surveillance Vessel surveillance <p>For shoreline clean-up oil spill response strategies:</p> <ul style="list-style-type: none"> Shoreline responders available and onsite within 5 days Shoreline clean-up equipment available and deployed within 5 days <p>For oiled wildlife oil spill response strategies:</p> <ul style="list-style-type: none"> Wildlife response equipment Wildlife responders <p>For operational and scientific monitoring:</p> <ul style="list-style-type: none"> OSMP outlines equipment, personnel and implementation procedures. Contract with a panel of environmental consultants to provide specialist personnel to conduct operational and scientific monitoring when triggered. <p>For waste management for oil spill response strategies:</p> <ul style="list-style-type: none"> Recovered hydrocarbons and wastes will be transferred to licensed treatment facility. Contract with waste management services for transport, removal, treatment and disposal of waste Waste management provider support staff available year-round to assist in the event of an incident with waste management as detailed in contract. 	A	1	L
	Operational monitoring	Source control	Shoreline Clean-up	Oiled Wildlife	Scientific monitoring																																											
Vessel movements	X	X	X	-	X																																											
Light emissions	X	X	X	X	X																																											
Noise	X	X	-	X	X																																											
Atmospheric emissions	X	X	X	-	X																																											
Disturbance to natural habitat	-	-	X	X																																												
Operational discharge of waste	-	X	X	-	-																																											

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7. ONGOING MONITORING OF ENVIRONMENTAL PERFORMANCE

Regulation 14(1) of the OPGGS (E) Regulations requires that the EP contain an implementation strategy for the activities. The purpose of the strategy is to direct, review and manage the activities and their associated environmental risks to ALARP. The following systems, practices and procedures are in place which comprise the implementation strategy for the Activity:

Environmental Performance Outcomes, Standards and Measurement Criteria

Environmental performance outcomes have been defined for each environmental aspect; these are monitored and reviewed against key control measures detailed in Table 6.11 and Table 6.12 to ensure environmental outcomes are achieved.

Eni Management System

Eni operates under an HSE Integrated Management System (IMS). This system provides a structured framework for applying corporate principles into a regional workable management system. The HSE IMS structure, based on five key elements: policy, planning, implementation and operation, monitoring and review.

Eni's HSE IMS has achieved certification with ISO14001:2015 Environmental Management Systems. This certification provides audited assurance of a best practice environmental management system based on continual improvement.


Contractor Management System

The vessel for the activities will be chosen in accordance with the Eni tendering process, which includes HSE qualification of the contractor and compliance with their HSE Plan which has been reviewed and considered acceptable by Eni. All vessels will comply with relevant Australian Maritime laws and regulations, including MARPOL 73/78.

Roles, Responsibilities and Training

Specific responsibilities identified with respect to environmental management arrangements (i.e. control implementation) are assigned in the accepted EP's implementation strategy. This will help ensure that environmental risks associated with the Activity are maintained at a level which is ALARP.

All personnel will be required to undertake an environmental induction upon boarding the vessel undertaking field management and P&A activities. The environmental induction will instruct personnel on the issues and management actions identified in this EP as well as their roles and responsibilities with regards to environmental performance.

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Monitoring

Data on routine emissions and discharges will be collected by the Eni Offshore Representative to ensure that the performance standards in place for the activity are met. Records will be stored by Eni for at least five years, in accordance with the OPGGS (E) Regulations.

Reporting

An environmental report shall be submitted to NOPSEMA annually. This will include all the information necessary to enable NOPSEMA to determine whether environmental performance outcomes and standards have been met.

All environmental incidents, deviations from this EP, or events that do not meet the environmental performance outcomes of the EP will be recorded and reported, using the Hazard and Incident Reporting Procedure in Incident Report Form.


Under the OPGGS Act, a "reportable incident" has the potential to cause moderate to significant environmental damage. This class of incident must be reported to the Regulatory Authority, in accordance with Section 26 of the OPGGS (E) Regulations. In the event of a reportable incident, notification will be provided as soon as possible, but within two hours, and a written report will be provided within three days. In addition, any injury or death of whales, dolphins or turtles related to the Activity (e.g. vessel strike) will be reported immediately to DoEE.

Under the OPGGS Act, a "recordable incident" is an incident arising from the activity that breaches a performance outcome or standard in the EP that applies to the activity (this document), and is not a reportable incident. Recordable incidents will be reported to the Regulatory Authority as per the OPGGS (E) Regulations (i.e. monthly report of recordable incidents sent by the 15th of the following month), including the submission of 'nil' reports if no environmental incidents have occurred.

For vessels travelling through offshore Commonwealth waters, all spills will be reported by the Vessel Master to AMSA. In the event of an oil spill, modelling indicates that it is highly unlikely that WA coastal waters (within 3 nm) will be impacted. However, in the event that coastal waters are impacted, all spills from vessels will be reported to the Department of Transport (DoT) for WA.

Inspection and Review

Eni will undertake a vessel (including MODU) inspection prior to commencement of field management or P&A activities. The primary objective of the inspection is to ensure the requirements of this EP are being met. Eni will also complete an annual compliance audit against this EP. The findings will be included in the Annual Report.

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Non-Conformance

Non-conformance will be logged into the Eni incident database in accordance with the Hazard and Incident Reporting Procedure. Non-conformance management is undertaken in accordance with the Corrective Action Tracking and Non-conformance Reporting Procedure. HSE hazards and incidents are investigated in accordance with the Incident Investigation Procedure.

Resolving breaches of this EP by Eni's contractors can be approached through issuing a formal Non-Conformance report, which links with legal management of the contract and would be initiated by the Eni contract holder. This would apply to any serious or repeated breaches of Eni procedures that could cause environmental harm.


Revisions to the EP

This EP will be revised if any significant new environmental risk or effect, or significant increase in an existing environmental risk or effect occurs that is not provided for in the existing EP.

Management of Change

Eni's change control process ensures changes to critical process or systems are properly and fully evaluated, planned, approved and documented, prior to implementation. This ensures changes have no detrimental effect on Eni Australia's risks, including Health, Safety and Environment (HSE) and business risks.

The Eni Risk Management process will be applied to all MoC. Any new risk exposures identified will be added to the risk register and will go through the risk management process to put in place sufficient controls are in place to ensure risks are ALARP.

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8. OIL POLLUTION EMERGENCY PLAN

An Oil Pollution Emergency Plan (OPEP) has been developed to prevent long term significant environmental impacts by safely limiting the adverse environmental effects from an unplanned release of hydrocarbons to the marine environment to a level that is as low as reasonably practicable (ALARP).

Key components of the OPEP are:

- First strike plan, including initial activation of OPEP or Shipboard Oil Pollution Emergency Plan (SOPEPs) and first response actions.
- Response arrangements;
- Response strategies;
- Testing and auditing;
- Operational and scientific monitoring.

8.1 Response arrangements


In addition to state and territory pollution response arrangements, Eni has the following arrangements in place:

- Services agreements with Australian Marine Oil Spill Centre (AMOSC) and Oil Spill Response Limited (OSRL) for supply of spill response personnel and equipment;
- Memorandum of Understanding (MoU) with AMSA for vessel-based spills;
- MoU with other industry participants for access to a MODU for relief well drilling;
- Access to support services including oil spill trajectory modelling, satellite monitoring, environmental services, logistics, and waste management services.

8.2 Response strategies

A summary of response strategies is provided below:

- Source control
 - Relief well drilling;
- Monitor and evaluate
 - Aerial surveillance;
 - Vessel surveillance;
 - Satellite monitoring;
 - Oil spill trajectory modelling (OTSM);
- Shoreline assessment and clean-up;

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- Waste management;
- Oiled wildlife response.

The nature of the hydrocarbon released in a crude scenario predicts the spatial extent of floating oil concentrations are not predicted to exceed the moderate (10 g/m²) greater than 2km from the spill location. Therefore, widespread physical oiling to wildlife is unlikely offshore. OWR may be undertaken onshore in the event of a shoreline contact.

8.3 Testing arrangements

Testing provides an opportunity for crew to gain confidence in using onboard spill equipment and implementing incident response procedures, increase efficiency in the event of an emergency, review the efficiency of procedures and detect any failures in equipment.

Emergency response drills may be either desktop exercises or field-based response exercises. Testing of OPEP response arrangements is conducted annually in accordance with the Eni 4Y Emergency Exercise Plan.


Eni maintains a high standard of oil spill response preparedness through:

- training Eni personnel, particularly those nominated to IMT or CMT;
- implementation and maintenance of an Eni Incident Management Plan;
- ensuring Contractors can respond as required;
- outlining ongoing capability through exercises and drills in accordance with the Eni 4Y Emergency Exercise Plan;
- annual oil spill response drills and assessment of the performance of the IMT;
- ongoing audits to review that the above remain effective;
- regular review of the OPEP;
- consultation to support spill response strategies and ensure roles and responsibilities are understood and accepted.

8.4 Operational and Scientific Monitoring

Eni has prepared an Operational and Scientific Monitoring Plan (OSMP) for use in the event of a large spill. The OSMP provides guidance on how and when monitoring data will be collected in the event of a level 2 or 3 hydrocarbon spill. The data generated will be used to:

- determine the magnitude of short and long term environmental impacts associated with the spill (and its response), including the extent, severity and persistence of the impacts;
- support the planning and execution of the hydrocarbon spill response activities set out in the OPEP;
- inform remediation efforts, if required; and


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- determine whether environmental performance outcomes have been achieved.

The following operational monitoring programs (OMPs) and scientific monitoring programs (SMPs) have been identified for use in the event of a large spill:

- OMP1 – Monitoring of Surface Hydrocarbon Distribution at Sea and on Shorelines;
- OMP2 – Monitoring of Hydrocarbon Character and Fate;
- OMP3 – Shoreline Assessment Surveys;
- OMP4 – Marine Megafauna Assessment Surveys;
- OMP5 – Monitoring of Response Activities;
- SMP1 – Wildlife Impact Monitoring and Sampling;
- SMP2 – Shoreline Ecological Assessment Aerial Surveys;
- SMP3 – Assessment of Fish for the Presence of Hydrocarbons;
- SMP4 – Fish and Fisheries Assessment;
- SMP5 – Shoreline Ecological Surveys;
- SMP6 – Hydrocarbon Fate and Effects Assessment.

The programs may involve desktop studies and in-field studies, including ground surveys, collection of field samples and collection of fauna specimens.

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9. CONSULTATION

Eni has undertaken petroleum activities in the Woollybutt field since 2002, therefore Eni considers stakeholders, including marine users, well informed regarding the location of the field and associated infrastructure. On assessment of activities covered by this EP, Eni believes there will be no increased risk or impact to stakeholders as a result of P&A activities.

Eni has consulted with relevant stakeholders regarding planned P&A activities as part of larger scale consultation regarding the Woollybutt Field Plug and Abandonment and decommissioning activities. This is to assist in combating stakeholder fatigue and ensure stakeholders are well informed of the wider scope of activities at the location.


Eni has allowed each relevant person a reasonable period for assessing consultation material provided. No concerns or objections were received from stakeholders in relation to the proposed P&A activities.

Eni concludes all relevant stakeholders have been well informed of upcoming activities in the Woollybutt field through ongoing discussions regarding field management, intervention and P&A activities.

Eni undertook stakeholder consultation with regard to proposed field management and P&A activities in June 2015 and updated relevant stakeholders in August and September 2016. This consultation noted the "field will be monitored on an ongoing basis using satellite monitoring and periodic in-field visual surveys until plug and abandonment activities are complete". Further consultation was undertaken with some stakeholders in May 2018 and again in March 2019.

The following stakeholders were consulted, and no concerns were received from in relation to the proposed Activities:

- Australian Fisheries Management Authority
- Australian Hydrographic Service
- Australian Maritime Safety Authority
- Department of Biodiversity, Conservation and Attractions (WA)
- Department of Defense (Cth)
- Department of Transport (WA)
- Department of Environment and Energy (Cth)
- Department of Minerals, Industry, Resources and Safety (WA)
- Department of Primary Industries and Regional Development - Fisheries Division
- Austral Fisheries
- Commonwealth Fisheries Association

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- Kailis Brothers
- A Raptis and Sons
- Recfishwest
- Western Australian Fishing Industry Council
- Westmore Seafoods
- Pearl Producers Association
- Mackerel Managed Fishery
- Onslow Prawn Fishery
- Pilbara Trawl Fishery
- Pilbara Line Fishery
- Pilbara Trap Fishery
- Southern Blue Fin Tuna Industry Association (SBFTIA)
- Commonwealth Western Tuna and Billfish Fishery.

Stakeholder consultation for the activities will be ongoing and Eni will work with stakeholders to address any future concerns if they arise throughout the duration of this EP. Should any new stakeholders be identified, they will be added to the stakeholder database and included in all future correspondence as required, including specific activity notifications.

Feedback gathered during the pre-activity consultation will inform stakeholder engagement requirements for ongoing consultation during the activity. Stakeholder Notification Letters will be distributed to stakeholders (who requested ongoing consultation) approximately four weeks prior to the intervention and P&A activities, and will include specific timing, location and vessel details. If additional comments do arise, four weeks allows Eni an appropriate amount of time to respond and address these comments.

Eni will continue to accept feedback from all stakeholders during the assessment of this EP and throughout the duration of the accepted EP.

Additional consultation with relevant stakeholders will occur in the event there is a significant change to the proposed activities.




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Table 9.1: Consultation summary and assessment


Stakeholder	Relevance / reasoning for engagement	Consultation Summary	Consultation Assessment
AFMA	AFMA is the Australian Government agency responsible for the efficient management and sustainable use of Commonwealth fish resources.	<p>AFMA were consulted with regard to proposed field management and P&A activities in 2015, and responded that their preference is for all subsea equipment be removed to minimise the prospect of interference with fishing gear especially trawl gear, and requested that industry operators in the area are consulted as part of the decommissioning process.</p> <p>Further consultation information was provided in 2018 and 2019. No feedback was received in relation to P&A activities.</p>	<p>Decommissioning of subsea infrastructure does not form part of the scope of works in this EP.</p> <p>Eni will continue conversations with AFMA regarding decommissioning options including removal of subsea equipment when developing future approvals.</p> <p>Eni considers the level of consultation to be adequate.</p>
AHO (previously AHS)	The AHO is the Commonwealth Government agency responsible for the publication and distribution of nautical charts and other information required for the safety of ships navigating in Australian waters.	<p>AHO were consulted with regard to proposed field management and P&A activities in 2015.</p> <p>Further consultation information was provided in 2018 and 2019.</p> <p>AHO acknowledged receipt of information but did not provide any feedback.</p>	<p>Eni considers the level of consultation to be adequate.</p>

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Stakeholder	Relevance / reasoning for engagement	Consultation Summary	Consultation Assessment
AMSA	AMSA is the national maritime agency whose responsibilities include protecting the marine environment from the impacts of shipping.	<p>AMSA were consulted with regard to proposed field management and P&A activities in 2015, 2016 and 2018, and responded with the following advice:</p> <ul style="list-style-type: none"> The AHO should be contacted no less than four working weeks before operations commence for the promulgation of notices to mariners. MODU to notify AMSA's Joint Rescue Coordination Centre (JRCC) for promulgation of radio-navigation warnings at each of the plug and abandonment sites, 24-48 hours before operations commence. <p>AMSA provided further feedback in March 2019 following provision of an updated activity description:</p> <ul style="list-style-type: none"> AMSA provided vessel traffic plots providing up to date information on vehicle traffic in the area. AMSA reiterated their notification requirements previously provided in May 2018. 	<p>Eni will ensure AHO and AMSA are notified in accordance with relevant communication procedures.</p> <p>Eni considers the level of consultation to be adequate.</p>
DBCA (previously DPAW)	Conserve Western Australia's biodiversity, cultural and natural values and providing world-recognised nature-based tourism and recreation experiences for the community. Includes the Parks and Wildlife Service.	<p>DBCA were consulted with regard to proposed field management and P&A activities in 2016.</p> <p>Further consultation information was provided in 2018 and 2019. DBCA did not provide any feedback in relation to the proposed activities.</p>	<p>Eni considers the level of consultation to be adequate.</p>

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Stakeholder	Relevance / reasoning for engagement	Consultation Summary	Consultation Assessment
DOD	The Australian Defence Force (ADF) is constituted under the Defence Act 1903, its mission is to defend Australia and its national interests. In fulfilling this mission, Defence serves the Government of the day and is accountable to the Commonwealth Parliament which represents the Australian people to efficiently and effectively carry out the Government's defence policy.	<p>DOD were consulted with regard to proposed field management and P&A activities in 2015 and 2016.</p> <p>Further consultation information was provided in 2018 and 2019. Department has responded to consultation noting no objection in relation to P&A activities DOD requested that the AHO be notified three weeks prior to the actual commencement of activities.</p>	<p>Eni will ensure AHO is notified in accordance with relevant communication procedures.</p> <p>Eni considers the level of consultation to be adequate.</p>

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Stakeholder	Relevance / reasoning for engagement	Consultation Summary	Consultation Assessment
DoT	Provides support in the event of a marine oil spill reaching state waters.	<p>DoT were consulted with regard to proposed field management and P&A activities in 2015 and 2016.</p> <p>Further consultation information was provided in 2018 and 2019.</p> <p>DoT advice dated 14.5.2018 requested that DoT be consulted in the event there is any risk of a spill impacting State waters from the proposed activities. ENI provided spill risk information (OPEP) on 24.5.2018. DoT advice dated 7.08.2018 outlined a comprehensive review of the OPEP and spill risk information has not been undertaken by DoT. This is partially due to the relatively lower risk of plugging and abandonment activities and the offshore location of the activity. DoT requested the revised version of the OPEP be aligned with the current and any future revisions of the IGN and submitted once finalised.</p> <p>DoT provided further advice on 30.4.2019 regarding shoreline response – DoT advised that DoT has shoreline response equipment in Dampier but is unable to provide equipment lists as these are subject to change without notice. As a L2/3 Controlling Agency, DoT will execute the response as per preplanning and resources conducted by the Titleholder and accepted by NOPSEMA.</p>	<p>Eni will submit a final OPEP to DoT.</p> <p>Eni considers the level of consultation to be adequate.</p>

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Stakeholder	Relevance / reasoning for engagement	Consultation Summary	Consultation Assessment
DoEE (formerly DotE)	<p>Implements the Australian Government's policies and programmes to protect and conserve the environment, water and heritage and promote climate action.</p> <p>In February 2015 environmental approvals were streamlined with NOPSEMA becoming the sole assessor for offshore petroleum activities.</p> <p>8.03.2019 – Consultation letter (HSE.LT.5415.STKH.TC) sent</p> <p>18.12.14 Consultation meeting</p> <p>06.09.2016 – Letter (OPS.LT.4596.DOTE.TC) emailed and sent by post</p>	<p>Meeting held in December 2014 discussed the transition of responsibilities from DotE to NOPSEMA for offshore petroleum activities.</p> <p>DoEE were consulted with regard to proposed field management and P&A activities in 2016.</p> <p>Further consultation information was provided in 2019.</p>	<p>No response required. Given the nature of activities proposed under this EP, Eni expects no impact to this stakeholder.</p> <p>Eni considers the level of consultation to be adequate.</p>
DNP	<p>The Director of National Parks is a corporation established under the <i>Environment Protection and Biodiversity Conservation Act 1999</i>. Parks Australia supports the Director of National Parks, the federal park agency, in managing six Commonwealth national parks, the Australian National Botanic Gardens, and Australia's network of Commonwealth marine reserves.</p>	<p>DNP were consulted with regard to proposed field management and P&A activities in 2019.</p> <p>DNP did not provide any feedback in relation to the proposed activities.</p>	<p>No response required. Given the nature of activities proposed under this EP, Eni expects no impact to this stakeholder.</p> <p>Eni considers the level of consultation to be adequate.</p>

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Stakeholder	Relevance / reasoning for engagement	Consultation Summary	Consultation Assessment
DMIRS (formerly DMP)	Responsible for ensuring the State's resources sector is developed and managed responsibly and sustainably for the benefit of all Western Australians. Prior to NOPSEMA it was the Designated Authority for adjacent Commonwealth Waters.	<p>DMIRS were consulted with regard to proposed field management and P&A activities in 2016.</p> <p>Further consultation information was provided in 2018 and 2019.</p> <ul style="list-style-type: none"> During the 2018 consultation DMIRS requested additional information on the receiving environment and potential impacts to State Waters and lands. Information on existing environment and spill modelling was provided on 7.6.2018. Considering spill modelling determined no contact to State Marine Protected Areas, DMIRS did not have any comments. DMIRS requested that the EP contain a requirement for incident notification to DMIRS In March 2019 consultation DMIRS requested Eni provide the updated spill modelling referred to in the correspondence, or a summary that is relevant to State waters/lands In May 2019, DMIRS provided further advice regarding incident notification: to follow up verbal notification with written notification by email, and to use (08) 9222 3727 for notifying the Department of petroleum environment incidents. 	<p>Eni commits to ongoing consultation and notification with DMIRS, including in the event of any incidents, for the Woollybutt Field in line with their Consultation Guidance.</p> <p>A summary of oil spill modelling that is relevant to State waters/lands has been sent to DMIRS.</p> <p>Notification requirements have been incorporated in the OPEP.</p> <p>Eni considers the level of consultation to be adequate.</p>

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Stakeholder	Relevance / reasoning for engagement	Consultation Summary	Consultation Assessment
Austral Fisheries	Commercial fishing company.	<p>Austral were consulted with regard to proposed field management and P&A activities in 2015.</p> <p>Further consultation information was provided in 2019.</p> <p>Austral Fisheries confirmed they had no concern with the proposed activity in consultation dated 21.7.15 and in February 2019.</p>	<p>No response required. Given the nature of activities proposed under this EP, Eni expects no impact to this stakeholder.</p> <p>Eni considers the level of consultation to be adequate.</p>
DPIRD (formerly DOF)	Conserve, develop & manage WA aquatic resources; commercial & recreational. fishing licencing; protecting aquatic environment & fish ecosystems.	<p>DPIRD were consulted with regard to proposed field management and P&A activities in 2015 and 2016.</p> <p>Further consultation information was provided in 2018 and 2019.</p> <p>DPIRD advice dated 29.05.2018 stated that they rely on the Regulator to ensure that risks of impact on aquatic resources due to reduced water quality associated with the various cessation activities (P&A activities) are appropriately mitigated and managed.</p> <p>DPIRD also requested to progress decommissioning as soon as practicable and communicate its preferred decommissioning option. DPIRD also provided advice on their preferences in terms of decommissioning.</p> <p>DPIRD also provided feedback in 2015 in response to the proposed decommissioning activities proposed at the time. Key issues raised by DPIRD include fish spawning and aggregation times in the area, pollution emergency plans, biosecurity.</p>	<p>Potential for reduced water quality impacts and mitigation measures are discussed in the EP.</p> <p>Eni will continue conversations with DPIRD regarding the decommissioning options of subsea equipment as part of future approvals.</p> <p>DoF's advice on decommissioning activities dated 27.07.15 has been used in the development of this EP. Eni has responded to consultation addressing each of these key issues, and updated relevant sections in the EP as follows:</p> <ul style="list-style-type: none"> • fish spawning and aggregation • OPEP • biosecurity <p>Eni considers the level of consultation to be adequate.</p>

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Stakeholder	Relevance / reasoning for engagement	Consultation Summary	Consultation Assessment
Commonwealth Fisheries Association (CFA)	Industry NGO – Peak body representing the collective rights, responsibilities and interests of commercial fishing industry in Commonwealth regulated fisheries.	<p>CFA were consulted with regard to proposed field management and P&A activities in 2015 and 2016.</p> <p>Further consultation information was provided in 2018 and 2019.</p> <p>CFA did not provide any feedback in relation to the proposed activities.</p>	<p>No response required. Impacts to Commonwealth Fisheries have been assessed in the EP and are considered minor. Appropriate management measures will be in place to manage potential impacts.</p> <p>Eni considers the level of consultation to be adequate.</p>
Commonwealth Fisheries (Ocean Wild Tuna)	WAFIC advised there is one active licence holder in the Western Tuna and Billfish Fishery and recommended they be consulted.	<p>Ocean Wild Tuna were consulted with regard to proposed field management and P&A activities in 2019.</p> <p>No response at time of EP acceptance.</p>	<p>No response required. Given the nature of activities proposed under this EP, Eni expects no impact to this stakeholder.</p>
Kailis Bros.	Fishing operator in the area holding 8 out of the 11 licences in the Pilbara Trawl Fishery; 1 out of 6 licences in the Pilbara Trap Fishery and 11 out of 30 licences in the Onslow Prawn Fishery.	<p>Kailis were consulted with regard to proposed field management and P&A activities in 2015 and 2016.</p> <p>Kailis confirmed it had no concern with the proposed activity in consultation dated 21.7.15.</p> <p>Further consultation information was provided in 2018 and 2019.</p>	<p>No response required. Given the nature of activities proposed under this EP, Eni expects no impact to this stakeholder.</p> <p>Eni considers the level of consultation to be adequate.</p>
A Raptis and Sons	Owns and operates 15 commercial fishing vessels that work out of the Northern Prawn Fishery, the Gulf of Carpentaria Developmental Finfish Trawl Fishery, the Gulf of Saint Vincent and the Great Australian Bight Trawl Fishery as well as participating in many international fishing operations.	<p>A Raptis and Sons were consulted with regard to proposed field management and P&A activities in 2015.</p> <p>Further consultation information was provided in 2018 and 2019.</p> <p>A Raptis and Sons did not provide any feedback in relation to the proposed activities.</p>	<p>No response required. Given the nature of activities proposed under this EP, Eni expects no impact to this stakeholder.</p> <p>Eni considers the level of consultation to be adequate.</p>

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Stakeholder	Relevance / reasoning for engagement	Consultation Summary	Consultation Assessment
Recfishwest	Industry NGO- Peak recreational fishing body and advocate for fisheries.	<p>Recfishwest were consulted with regard to proposed field management and P&A activities in 2015.</p> <p>Further consultation information was provided in 2018 and 2019.</p> <p>Recfishwest did not provide any feedback in relation to the proposed activities.</p>	<p>No response required. Given the nature of activities proposed under this EP, Eni expects no impact to this stakeholder.</p> <p>Eni considers the level of consultation to be adequate.</p>
Western Australian Fishing Industry Council (WAFIC)	Represent fishing industry views in Western Australia.	<p>WAFIC were consulted with regard to proposed field management and P&A activities in 2015 and 2016.</p> <p>Further consultation information was provided in 2018 and 2019.</p> <p>WAFIC provided feedback on the following in March 2019:</p> <ul style="list-style-type: none"> • Advice on improving material provided as part of the stakeholder consultation process • Fisheries with a potential to be impacted and those unlikely to be impacted • Licence holders and other relevant stakeholders to be consulted • Potential concerns and opportunities that may arise from future decommissioning activities including the removal and/or leaving in place infrastructure. 	<p>Licence holders and other relevant stakeholders as provided by WAFIC were consulted in regards to the proposed activities.</p> <p>The current EP is for the proposed P&A activities. Future decommissioning options and activities will be assessed as part of a new EP and all relevant stakeholders will be re-consulted.</p> <p>Eni considers the level of consultation to be adequate.</p>

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Stakeholder	Relevance / reasoning for engagement	Consultation Summary	Consultation Assessment
Westmore Seafoods (Seafresh Holdings)	Fishing operator in the area holding 3 out of the 12 licences in the Pilbara Trawl Fishery; 0 out of 6 licences in the Pilbara Trap Fishery and 1 out of 30 licences in the Onslow Prawn Fishery.	Westmore were consulted with regard to proposed field management and P&A activities in 2015 and 2016. Further consultation information was provided in 2018 and 2019. Westmore did not provide any feedback in relation to the proposed activities.	No response required. Given the nature of activities proposed under this EP, Eni expects no impact to this stakeholder. Eni considers the level of consultation to be adequate.
Pearl Producers Association (PPA)	The PPA promotes the economic, social and environmental importance of the Australian pearling industry to key decision makers and the wider community; formulating responses to issues that affect its members, and assisting with the provision of strategic direction in support of Australian South Sea Pearl Producers.	PPA were consulted with regard to proposed field management and P&A activities in 2018 and 2019. PPA did not provide any feedback in relation to the proposed activities.	No response required. Given the nature of activities proposed under this EP, Eni expects no impact to this stakeholder. Eni considers the level of consultation to be adequate.
Southern Blue Fin Tuna Industry Association (SBFTIA)	WAFIC recommended consultation with Southern Blue Fin Tuna Industry Association as WA is an important migratory route for Southern Blue Fin Tuna.	SBFTIA were consulted with regard to proposed field management and P&A activities in 2019. SBFTIA did not provide any feedback in relation to the proposed activities.	No response required. Eni considers the level of consultation to be adequate.

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Stakeholder	Relevance / reasoning for engagement	Consultation Summary	Consultation Assessment
Mackerel Managed Fishery (49 Licences)	Hold fishing licences in the Operational Area.	<p>Licence holders were consulted with regard to proposed field management and P&A activities in 2015 and 2016.</p> <p>Further consultation information was provided in 2018 and 2019.</p> <p>No objection or concern has been raised by license holders in relation to P&A of field management activities.</p> <p>No response at time of EP acceptance to 2019 consultation.</p>	<p>License holders have been kept well informed regarding activities in the Woollybutt Field in permit WA-25-L.</p> <p>Eni considers the level of consultation to be adequate.</p>
Onslow Prawn Fishery (30 Licenses)	Hold fishing licences in the Operational Area.	<p>Licence holders were consulted with regard to proposed field management and P&A activities in 2015 and 2016.</p> <p>Further consultation information was provided in 2018 and 2019.</p> <p>No objection or concern has been raised by license holders in relation to P&A activities such as ROV surveys.</p> <p>No response at time of EP submission to 2019 consultation.</p>	<p>License holders have been kept well informed regarding activities in the Woollybutt Field in permit WA-25-L.</p> <p>Eni considers the level of consultation to be adequate.</p>

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Stakeholder	Relevance / reasoning for engagement	Consultation Summary	Consultation Assessment
Pilbara Trawl Fishery (11 Licenses)	Hold fishing licences in the Operational Area.	<p>Licence holders were consulted with regard to proposed field management and P&A activities in 2015 and 2016.</p> <p>Further consultation information was provided in 2018 and 2019.</p> <p>No objection or concern has been raised by license holders in relation to P&A activities such as ROV surveys.</p> <p>No response at time of EP submission to 2019 consultation.</p>	<p>License holders have been kept well informed regarding activities in the Woollybutt Field in permit WA-25-L.</p> <p>Eni considers the level of consultation to be adequate.</p>
Pilbara Line Fishery (7 Licenses)	Hold fishing licences in the Operational Area.	<p>Licence holders were consulted with regard to proposed field management and P&A activities in 2015 and 2016.</p> <p>Further consultation information was provided in 2018 and 2019.</p> <p>No objection or concern has been raised by license holders in relation to P&A activities such as ROV surveys.</p> <p>No response at time of EP submission to 2019 consultation.</p>	<p>License holders have been kept well informed regarding activities in the Woollybutt Field in permit WA-25-L.</p> <p>Eni considers the level of consultation to be adequate.</p>

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Stakeholder	Relevance / reasoning for engagement	Consultation Summary	Consultation Assessment
Pilbara Trap Fishery (6 Licenses)	Hold fishing licences in the Operational Area.	<p>Licence holders were consulted with regard to proposed field management and P&A activities in 2015 and 2016.</p> <p>Further consultation information was provided in 2018 and 2019.</p> <p>No objection or concern has been raised by license holders in relation to P&A activities such as ROV surveys.</p> <p>No response at time of EP submission to 2019 consultation.</p>	<p>License holders have been kept well informed regarding activities in the Woollybutt Field in permit WA-25-L.</p> <p>Eni considers the level of consultation to be adequate.</p>

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10. CONTACT DETAILS

The nominated contact person for this proposal is:

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