Casino-5 Well Intervention and Workover

EP Summary

CONTROLLED DOCUMENT

CHN-EN-EMP-0004

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Document Revision and Amendment

Rev	Date	Details	Author	Reviewer	Approver
0	03/01/2018	For Submission	R Hooke / P Raitt	J Earnshaw	
1	22/01/2018	Updated to address NOPSEMA comments	R Hooke / P Raitt	J Earnshaw	

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1.0 Introduction

Cooper Energy Pty Ltd (Cooper Energy), as the titleholder, proposed to undertake well intervention and workover activities at the Casino-5 well in Production Licence VIC/L24 (Figure 1-1).

This Environment Plan (EP) Summary has been prepared to meet Regulation 11(4) of the *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009* (OPGGSER) and summarises the information provided in the Casino-5 Well Intervention and Workover EP accepted by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA).

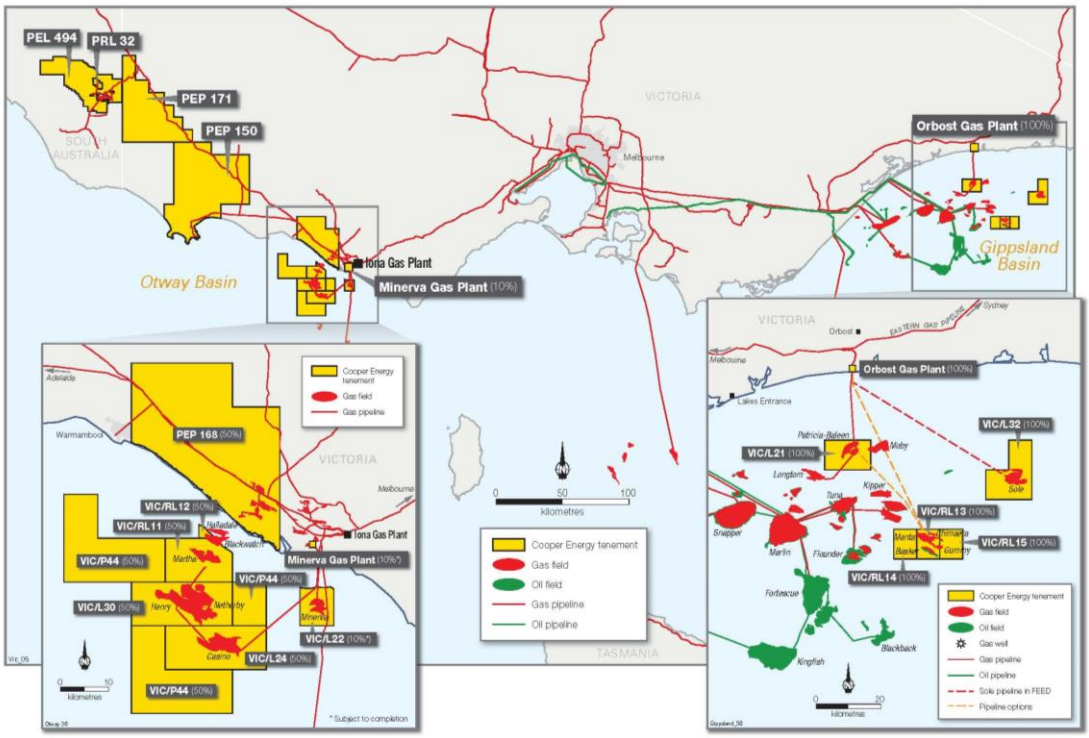


Figure 1-1 Location of Vic/L24 and VIC/L30

1.1 Titleholder Nominated Liaison Person

VIC/L24 titleholder's nominated liaison person is:

Iain MacDougall (General Manager Operations), Cooper Energy Limited

Address: Level 10, 60 Waymouth Street, Adelaide, SA, 5000

Phone: (08) 8100 4900

Email: iainm@cooperenergy.com

2.0 Location of the Activity

2.1 Location

The Casino wells, which includes Casino-5, are located in Production Licence VIC/L24, in water depths ranging from 60-70 m, approximately 30 km southwest of Port Campbell, Victoria (Figure 1-1). The field layout is showing in Figure 2-1 below.

The coordinates for the Casino-5 well is provided in Table 2-1.

Table 2-1 Casino-5 Well Coordinates (Surface Locations) (GDA94)

Locations	Longitude (E)	Latitude (S)	Water Depth (m)
Casino-5	142º 44' 44.599"	38º 47' 43.68"	70

2.2 Operational Area

The "operational area" for the activities is the area where well intervention and workover-related activities will take place and will be managed under the EP. This operational area includes:

- A 500 m designated petroleum safety zone (PSZ) around the MODU to manage vessel movements. Note, the MODU will be located within the existing PSZ for the Casino-2 wellhead.
- An area out to 2 km from the MODU within which anchoring activities will be undertaken.

The transit of the MODU and support vessels is outside the scope of this Plan. These activities are managed under the *Commonwealth Navigation Act 2012*.

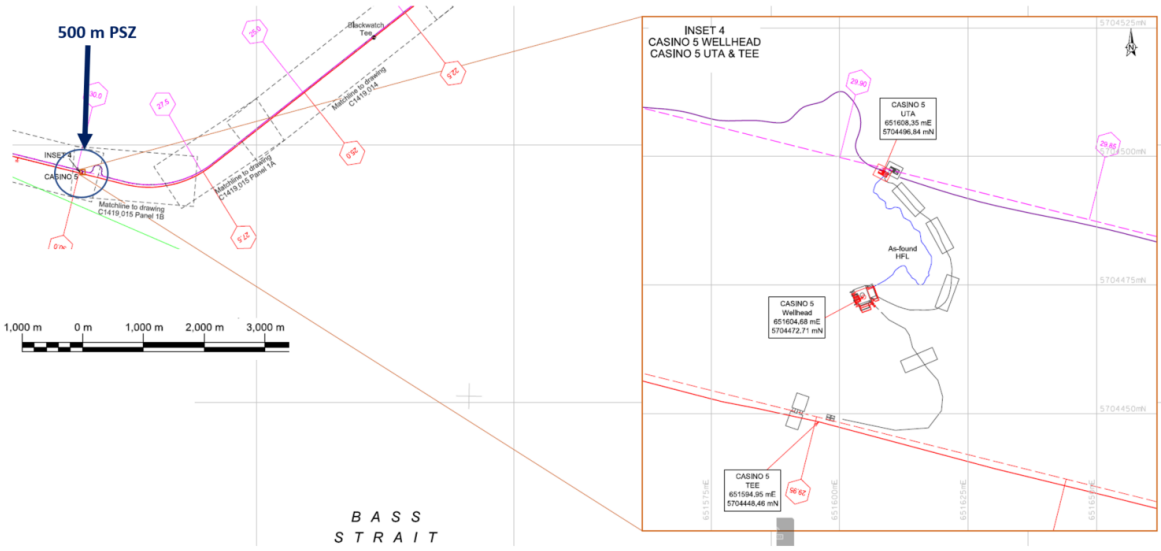


Figure 2-1 Casino-5 Field Layout Drawing

2.3 Casino VIC/L24 Hydrocarbon System Overview

The CHN fields comprise four operating subsea wells, flowlines and umbilicals.

The condensate of the CHN reservoirs is classified as a Group 1 (non-persistent) oil. There is little variation in composition between the three reservoirs. On this basis, Netherby condensate is representative of the three reservoirs. The condensate is highly evaporative when released

into the environment, with a zero percent estimated residual (persistent) component. Physical characteristics of the Netherby condensate is provided in Table 2-2.

Table 2-2 Physical Characteristics of Netherby Condensate

Rm		Netherby Condensate
API Gravity		51.2
Density@25ºC g/ml		0.774
Dynamic Viscosity @ 25ºC (cP)		0.14
Condensate Gas Ratio		0.6
Pour Point (ºC)		-54
Boiling Point Curve (% mass)	Volatiles (<180ºC)	84
	Semi-volatile (180-265ºC)	14
	Low Volatility (265-380ºC)	2
	Residual (>380ºC)	-
Group		I

2.3.1 Flow Rate

As outlined in the Well Operations Management Plan (*CHN-DC-WMP-0001 Casino Henry Netherby WOMP Rev 1*) Cooper Energy has conducted reservoir simulation to identify the maximum credible blow out rates for the field. The range of potential flows from wells ranges considerably between the wells depending on the permeability, completion strategy and/or reservoir pressure.

The maximum blowout rate for Casino-5 using industry recognised modelling software for the existing 7" completion is 68 MMscfd; this drops to 42 MMscfd after the downsize 5-1/2" completion tubing is installed.

3.0 Description of the Activity

3.1 Timing of the Activity

Activities covered under this plan are anticipated to commence in the first half of 2018. Preparations for the MODU arrival including pre-lay of moorings and preparations for BOP tethering system, may potentially occur 1-3 weeks prior, and are also described and assessed within the EP.

The total expected duration for the Casino-5 workover is approximately 25 days, excluding weather and operational delays. During this period any of the activities described in this EP Summary may be undertaken, with normal operations conducted 24-hours a day.

3.2 MODU Positioning and Rig Up

Cooper Energy has engaged the *Ocean Monarch* semi-submersible MODU to undertake the Casino-5 well intervention and workover.

The MODU will be towed to location where it is then moored prior to commencing activities. Anchors may be placed on the seabed and tested by the support vessels prior to the MODU arriving. Eight anchors will be required, with each having a footprint of approximately 30m^2.

Each anchor is connected to large chain (84mm diameter) which runs along the seabed towards the MODU for approximately 1500m; before rising towards the MODU. The final mooring analysis will determine the anchor distance from the MODU and the chain on the seabed.

3.2.1 Clump weight deployment

A BOP tethering system is also likely to be used to reduce wellhead cyclic stresses and manage fatigue by arresting the motion of the BOP stack.

The tethering system comprises of up to 8 clump weights positioned around the BOP, which are either pre-installed or installed on rig arrival, and connected to the outer frame of the BOP once deployed to provide dampening of the BOP motion. Each clump weight has a footprint of approximately 10m^2.

3.3 Well Intervention Activities

Once the MODU has been positioned and secured, Cooper Energy plans to undertake well intervention and workover activities at the Casino-5 well.

Well intervention activities planned for Casino-5 include:

- Isolation of the Casino-5 subsea tree from the subsea flowline. No fluids are discharged to the environment during the process of isolation;
- Removal of marine growth and debris from subsea tree by jetting pressurised seawater from a remotely operated vehicle (ROV), or scrubbing the cap. Small volumes of chemicals and grit may be used to assist removal;
- Running and testing well control equipment (i.e. the blowout preventer (BOP)). Operation of the BOP results in small volumes of control fluid (Transaqua HT) being released to the environment (between 0.5L and 2.98L) when BOP valves are actuated. Approximately 150 valve actuations are expected during the well activity for BOP testing and verification purposes;
- Entry into the well using slickline / wireline to perform intervention activities. Small volumes of gas (approximately 0.1 Mscf (3m^3)) will be vented from pressure control equipment (slickline lubricator) during slickline runs;

- Running and testing of a reservoir plug to isolate the well from the reservoir prior to well workover activities. Once the reservoir plug is set, gas (approximately 48 Mscf (1360m^3)) within well tubing above the plug will be vented to atmosphere. During the gas bleed off process, approximately 30m^3 of brine will be pumped into the production tubing from surface down to the reservoir plug. The brine above the reservoir plug is monitored for well control verification;
- Cut tubing above the production packer and recover the upper completion string to the MODU. This will result in the recovery of fluids, including brine, Mono-ethylene glycol (MEG), corrosion inhibitor and biocide, aquifer fluids and reservoir gas to the MODU via a bleed down package. An oil in water (OIW) separator will be used to reduce oil content of the recovered fluids to <15ppm prior to the discharge. Components recovered with the upper completion string will be returned to shore where they may either be subject to diagnostics, inspection or disposal. There are no naturally occurring radioactive materials (NORMS) expected in the tubing.

3.4 Well Workover Activities

With the reservoir isolated and upper completion string recovered to surface during the well intervention activities described above, well workover activities can commence. Well Workover activities will include:

- Remedial casing repair involving the use of wireline to run diagnostic tools and components into the well. Casing will also be cut, resulting in the generation of metal swarf which will be removed from the well either with magnets or viscous fluid pills that will be discharged once circulated back to surface;
- Installation of new production casing;
- Wellbore clean-up to remove fluids (including brine, biocide, corrosion inhibitor) from inside the production casing prior to running new upper completions. Clean-up fluids used will include seawater, brine, viscous space, acid soaking and a surfactant;
- Installation of upper completion string;
- Circulating the well tubing to nitrogen. Nitrogen will be used to displace brine into the annulus prior to removal of the reservoir plug and resumption of production. Approximately 135bbls (21.5m^3) brine is expected to be displaced out of the annulus and discharged from the MODU;
- Well reinstatement; the reservoir plug will be recovered with slickline and lower crown plug installed in the tubing hanger to suspend the well. Nitrogen will be bled off and vented during slickline runs and testing of the lower crown plug.

Well testing or well flowback activities are not planned for the initial phase of Casino-5 workover as the well will be cleaned up directly into the gathering network. Flowback is achieved by opening the isolation valves to the pipeline with a ROV and then operating the well normally under the control of Iona gas plant operators.

The well intervention and workover activities described above involve a variety of planned emissions and discharges to the marine environment, such as completion fluids, control fluids, brine and vented gas. These will be carefully controlled, and have been assessed in the Risk and Impact Evaluation presented in Section 6.

3.5 Support Operations

The MODU will be supported by two or three anchor handling, tow and support (AHTS) vessels. One vessel will remain on standby and in attendance to the MODU throughout the workover program. Vessels will undertake the following support activities:

- Tow the MODU to/from the Casino-5 well location; and
- Supply provisions (food, fuel, bulk materials) and equipment to the MODU and remove waste from the MODU to shore.
- The support vessels are part of the petroleum activity when:
- Within the MODU PSZ; and
- Whilst undertaking activities such as laying anchors for the MODU, within the 2km Operational Area.

The transit of the MODU and support vessels is outside the scope of the EP. These activities are managed under the *Commonwealth Navigation Act 2012*.

Project vessels (MODU and AHTS vessels) will undertake a variety of planned emissions and discharges to the marine environment, such as cooling water and brine, treated bilge, sewage and food waste, and ballast water. These will be carefully controlled, and have been assessed in the Risk and Impact Evaluation presented in Section 6.

Personnel will access the *Ocean Monarch* by helicopter, which is expected to operate out of Warrnambool airfield. Flights to the MODU are expected 5-7 days each week. Helicopters utilised are expected to be *Agusta Westland AW139* or similar type. Helicopter operations within the operational area are limited to landing and take-off on the helideck of the MODU.

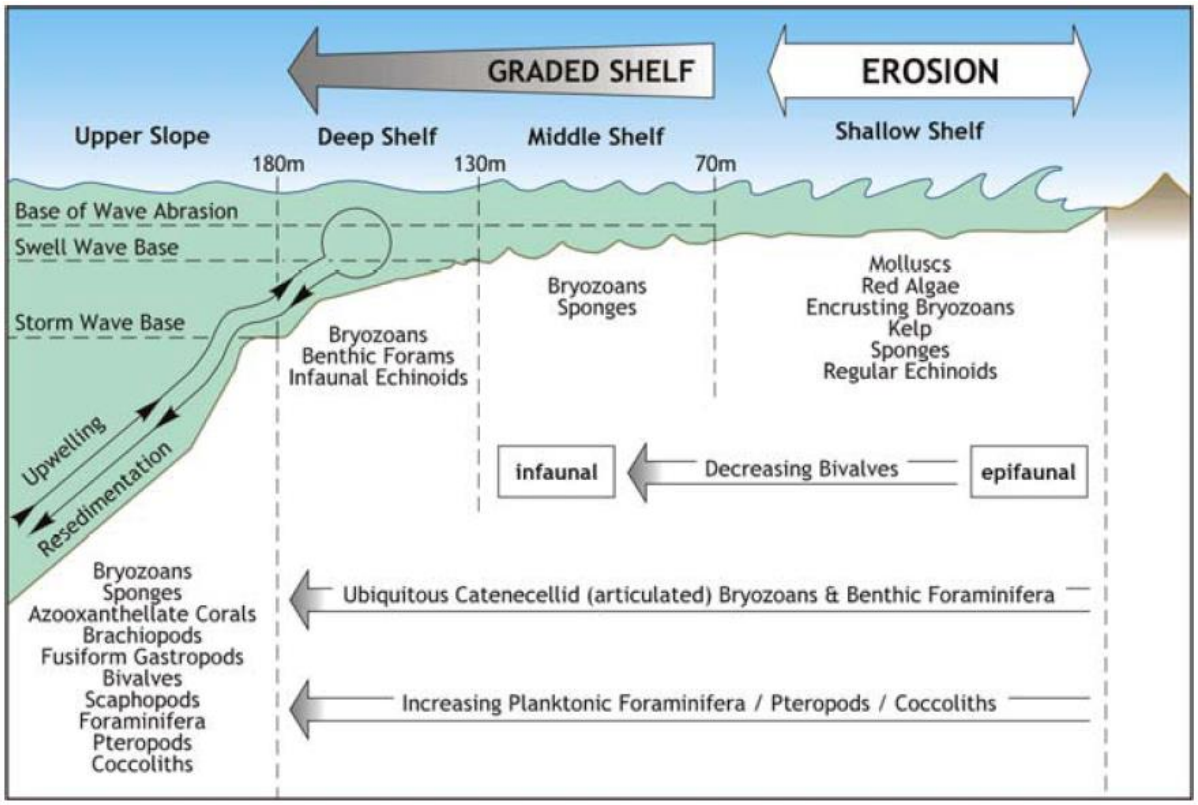
A ROV will be used during the activities. The ROV is deployed from the MODU/support vessel and can be fitted with various tools and camera systems which can be used to capture imagery of the environment and operations. The ROV will be used to assist in the running of the well control equipment, operation of valves on subsea infrastructure, as well as visual and sonar survey.

4.0 Description of the Environment

4.1 Regional Setting

The Casino-5 well is located within the South-east Marine Bioregion, on the Otway Shelf, approximately 30 km southwest of Port Campbell, Victoria. The Otway environment includes very steep to moderate offshore gradients, high wave energy and cold temperate waters subject to upwelling events.

The Otway shelf is comprised of Miocene limestone beneath a thin veneer of younger sediments (James *et al.*, 2013). Based on assessment of sampled sediments, it was concluded that the Otway continental margin is a swell-dominated, open, cool-water, carbonate platform. A conceptual model was developed that divided the Otway continental margin into depth-related zones, each with different typical habitat types (Figure 4-1). The Casino-5 well is located in approximately 70 m water depth, at the transition between shallow and middle shelf zones (Figure 4-1).



(Source: James *et al.*, 2013)

Figure 4-1 Conceptual Model of the Geomorphology and Benthic Habitats of the Otway Shelf

Surveys along the Casino pipeline route between the HDD exit point (18 m depth) and approximately 60 m water depth, indicated primarily open sand habitat with infauna communities of bivalves, polychaetes and crustaceans, and with little or no epifauna present (Figure 4-2) (Santos, 2004). A side-scan survey of the Otway gas pipeline (adjacent to the Casino pipeline) undertaken by Woodside (2003) showed similar results with soft seabed characterised by coarse sand and containing mega-ripples. It was reported that given the nature of the highly mobile sand, there is likely to be an inherent temporal and spatial variability of infauna and epibiota.

An area along the pipeline corridor at KP19.5 (i.e. beyond the operational area), was characterised by a localised and isolated sponge reef habitat. The area had a diverse range of epifauna, including sponges, hydrozoans, bryozoans and algae; as well as demersal fish species. This sponge reef habitat also represents the only potential abalone and rock lobster habitat along the pipeline route (Santos, 2004).

Sponges and epifauna may also occur, albeit in reduced density and diversity, intermittently along the pipeline alignment between KP19.5 and the well sites. Kelp-dominated reef (known to occur elsewhere in the region) do not appear to be a feature along the pipeline alignment as covered by the acoustic survey (Santos, 2004).

Beyond 60 m water depth and out to the well sites (i.e. approximately 70 m water depth), the seabed is characterised by outcrops of hard substrate with low relief and structural complexity, separated by gullies of sand or gravel (Santos, 2004). Survey footage in the vicinity of the Casino wells (e.g. locations 1 and 2 from the 2002 survey (see Figure 4-2)) show a sparse cover of epifauna, typically dominated by sponges. The presence of some small fish species were also recorded in the vicinity of the wells (Santos, 2004).

Therefore, based on the above survey information, it is expected that the benthic habitat around the Casion-5 well site, and within the operational area, is typically soft sediment, with some outcropping of hard substrate, and a sparse coverage of epifauna (e.g. sponges or bryozoans).

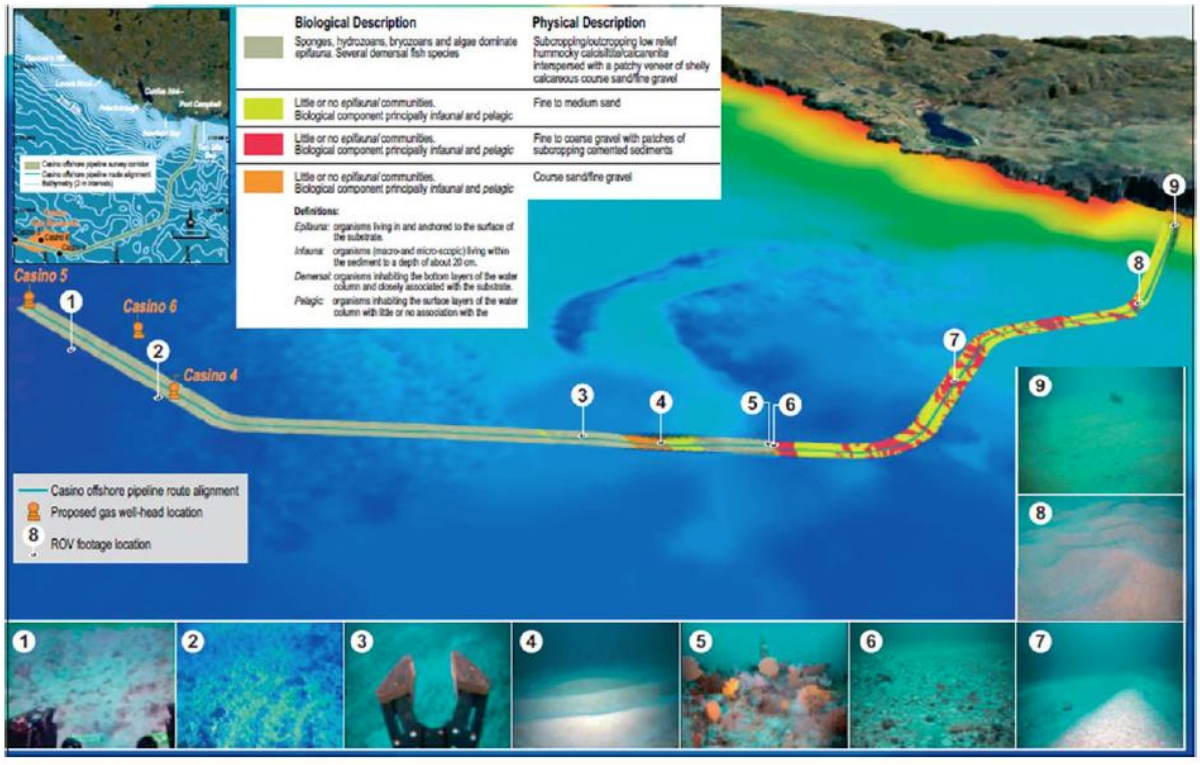


Figure 4-2 Seabed Habitats at Casino wells and along the Casino Pipeline route

4.2 Environment that May be Affected

The Environment that May be Affected (EMBA) is based on the maximum credible hydrocarbon spill event that might occur during petroleum activities. For the activities under this EP, the EMBA is based on hydrocarbon exposures above the impact thresholds for the accidental release of marine diesel oil from a vessel collision and the release of condensate from a loss of well control event. Based on stochastic modelling results (APASA 2013; RPS-APASA 2017a), the EMBA extends into waters off the western Victoria coast (Figure 4-3).

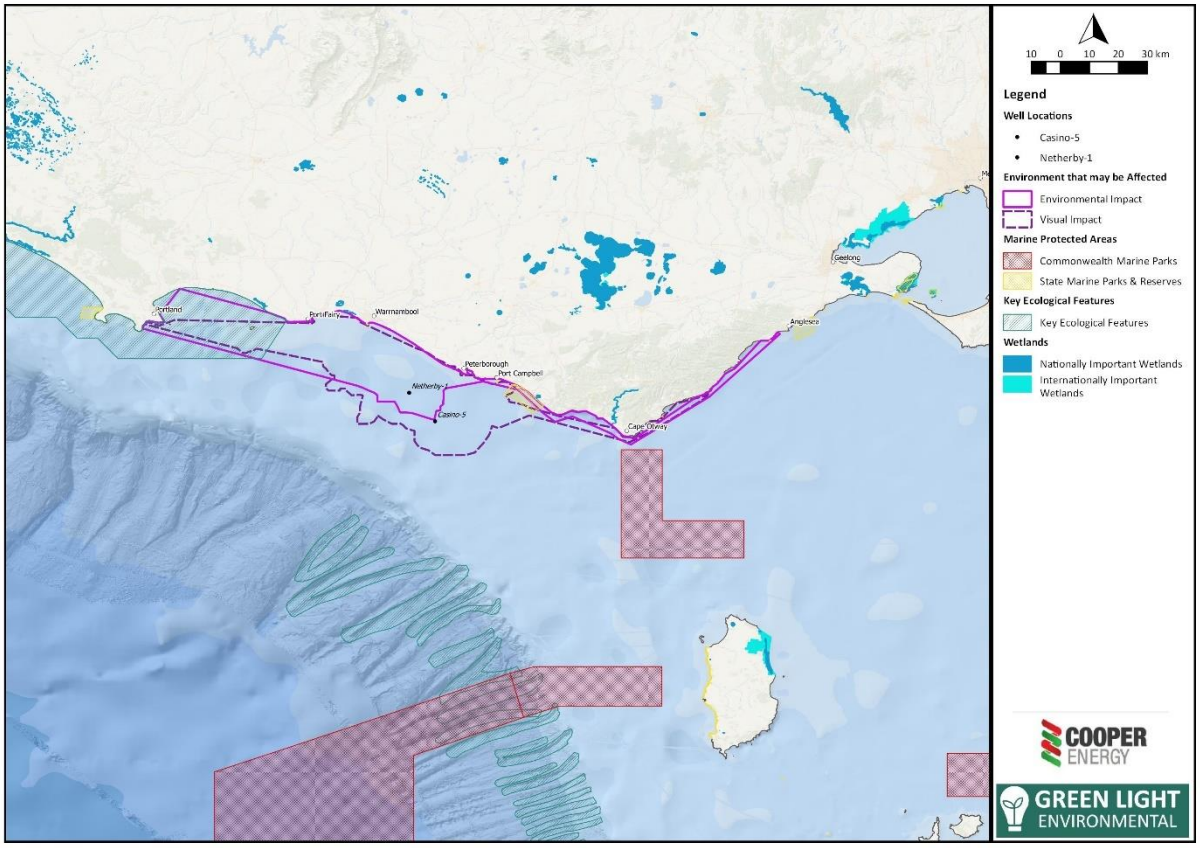


Figure 4-3 Casino-5 Well Intervention and Workover - EMBA

4.3 Ecological and Social Receptors

The following tables show the presence of ecological (Table 4-1) and social (Table 4-2) receptors that may occur within the operational area and EMBA.

The Operational Area is 2km from the well location, as defined in Section 2.2, and the EMBA is defined in Section 4.3 above. The tables below present information from the relevant EPBC Protected Matters Searches, and from other literature and data available for the Otway region.

Examples of values and sensitivities associated with each of the ecological or social receptors have been included in the tables. These values and sensitivities have been identified based on:

- Presence of listed threatened or migratory species, or threatened ecological communities;
- Presence of BIAs;
- Presence of important behaviours (e.g. foraging, roosting or breeding) by fauna, including those identified in the EPBC Protected Matter searches;
- Provides an important link to other receptors (e.g. nursery habitat, food source, commercial species); or
- Provides an important human benefit (e.g. community engagement, economic benefit).

Table 4-1 Presence of Ecological Receptors within the Operational Area and the EMBA

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area		EMBA	
Habitat	Shoreline	Rocky	• Foraging habitat (e.g. birds) • Nesting or Breeding habitat (e.g. birds, pinnipeds, turtles) • Haul-out sites (e.g. pinnipeds)	–	Not present.	✓	The coastal environment in the Otway region is a mixture of sandy beaches and rocky coasts, including the well known limestone and sandstone cliffs and rock formations of the Great Ocean Road.
		Sandy		–		✓	Each of these shoreline types has the potential to support different flora and fauna assemblage due to the different physical factors (e.g. waves, tides, light etc.) influencing the habitat; for example: • Australian Fur-seals are known to use rocky shores for haul-out and/breeding; • Birds species may use sandy, rocky or cliff areas for roosting and breeding sites; and • Cliff and rocky coasts can provide a hard substrate for sessile invertebrate species (e.g. barnacles, sponges etc.) to attach to.
		Gravel/Cobble		–		✓	
	Saltmarsh	Saltmarsh ecosystem	• Nursery habitat (e.g. crustaceans, fish)	–	Not present.	✓	Saltmarshes are widespread along the Victorian coast, typically within estuaries and coastal embayments. The 'Subtropical and Temperate Coastal Saltmarsh' is listed as a vulnerable TEC under the EPBC Act, and it's known distribution includes the southern and eastern coasts of Australia. Known areas of saltmarsh within the EMBA include Merri River (Warrnambool, Port
			• Threatened Ecological Community	–		✓	

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area		EMBA	
							Campbell creek, and Moyne River estuary (Port Fairy).
	Soft Sediment	Unvegetated soft sediment substrates	• Key habitat (e.g. benthic invertebrates)	✓	Sediment is ubiquitous on the open ocean floor. The Otway Shelf is comprised of Miocene limestone beneath a thin veneer of sediments. The seabed within the operational area is expected to be typically soft sediment, with some outcropping of hard substrate, and a sparse coverage of epifauna (e.g. sponges or bryozoans).	✓	Sediment is ubiquitous on the open ocean floor, throughout both intertidal and subtidal areas. The Otway Shelf is comprised of Miocene limestone beneath a thin veneer of sediments. Shallow water (<20 m) water depth is typically open sand with intermittent patch reefs with algae coverage. Deeper water depths (>20 m) is dominated by open sandy habitat with sparse coverage of epifauna (e.g. sponges or byrozoans). Small, isolated patches of sponge reef may also occur.
	Seagrass	Seagrass meadows	• Nursery habitat (e.g. crustaceans, fish) • Food source (e.g. dugong, turtles)	–	Not present.	✓	Seagrass generally grows in soft sediments within intertidal and shallow subtidal waters where there is sufficient light. Known seagrass areas include offshore from Warrnambool, extending east from Port Campbell (including within the Twelve Apostles Marine Park).

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area		EMBA	
	Algae	Benthic microalgae	• Food source (e.g. gastropods)	–	Not present.	✓	Benthic microalgae are ubiquitous in aquatic areas where sunlight reaches the sediment surface. Macroalgae communities are generally found on intertidal and shallow subtidal rocky substrates. Intermittent patch reefs dominated by the brown alga, *Ecklonia* sp., with red algae and coralline algae also present, have been recorded in shallow (<20 m) water depths). The 'Giant Kelp Marine Forests of South East Australia' is listed as an endangered TEC under the EPBC Act. The ecological community is characterised by a closed to semi-closed surface or subsurface canopy of *Macrocystis pyrifera*. This ecological community predominantly occurs in Tasmania; however small areas of Giant Kelp have been identified within the EMBA within the Merri Marine Sanctuary.
		Macroalgae	• Nursery habitat (e.g. crustaceans, fish) • Food source (e.g. birds, fish)	–		✓	
			• Threatened Ecological Community	–		✓	
	Coral	Hard and soft coral communities	• Nursery habitat (e.g. crustaceans, fish) • Breeding habitat (e.g. fish)	–	Not present.	✓	Soft corals can be found at most depths throughout the continental shelf, slope and offslope regions, to well below the limit of light penetration. Soft corals (e.g. sea fans, sea whips) may occur as

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities		Operational Area		EMBA
							part of mixed reef environments in waters along the Otway coast.
Marine Fauna	Plankton	Phytoplankton and zooplankton	• Food Source (e.g. whales, turtles)	✓	Phytoplankton and zooplankton are widespread throughout oceanic environments. No defined area of upwelling occurs within the operational area.	✓	Phytoplankton and zooplankton are widespread throughout oceanic environments; however increased abundance and productivity can occur in areas of upwelling (e.g. Bonney Coast Upwelling).
	Seabirds and Shorebirds		• Listed Marine Species	✓	30 seabird and shorebird species (or species habitat) may occur within the operational area; with foraging behaviours identified for some albatross and tern species. The operational area intersects foraging BIAs for: Antipodean Albatross, Wandering Albatross, Buller's Albatross, Shy Albatross, Campbell Albatross, Black-browed Albatross, and the Common Diving-Petrel.	✓	77 seabird and shorebird species (or species habitat) may occur within the EMBA; with breeding, foraging and roosting behaviours identified for many species. The EMBA intersects foraging BIAs for: Antipodean Albatross, Wandering Albatross, Buller's Albatross, Shy Albatross, Campbell Albatross, Black-browed Albatross, Common Diving-Petrel, Short-tailed Shearwater, and the Australasian Gannet. There is also an aggregation BIA for the Australasian Gannet at the eastern end of the EMBA, at Point Danger and Lawrence Rocks (south of Portland). A breeding BIA for the Common Diving-Petre also exists for Lady Julia Percy Island.
			• Threatened Species	✓		✓	
			• Migratory Species	✓		✓	
			• BIA – Aggregation	–		✓	
			• BIA – Breeding	–		✓	
			• BIA – Foraging	✓		✓	
			• Behaviour – Breeding	–		✓	
			• Behaviour – Foraging	✓		✓	
			• Behaviour – Roosting	–		✓	

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area		EMBA	
	Marine Invertebrates	Benthic and pelagic invertebrates	• Food Source (e.g. whales, turtles)	✓	A variety of invertebrate species may occur within the operational, including sponges and bryozoans. Infauna may also be present within the sediment profile. Given the lack of suitable habitat, commercially important species (e.g. rock lobster, Giant Crab) are unlikely to occur in significant numbers within the operational area.	✓	A variety of invertebrate species may occur within the EMBA, including sponges, bryozoans and arthropods. Infauna studies along the Victorian coast showed high species diversity, that increased with water depth; crustacean were the dominant taxa in each depth class. Commercially important species (e.g. abalone, rock lobster, and Giant Crab) may occur within the EMBA.
			• Commercial Value	✓		✓	
	Fish	Fish	• Threatened Species	✓	One threatened fish species (or species habitat) may occur within the operational area, the Australian Grayling. Note, this species is typically found in freshwater streams; however, may spend part of its lifecycle in coastal waters. Commercial fish species may occur within the operational area, including species of wrasse (e.g. Bluethroat Wrasse).	✓	One threatened fish species (or species habitat) may occur within the operational area, the Australian Grayling. Note, this species is typically found in freshwater streams; however, may spend part of its lifecycle in coastal waters. Commercial fish species may occur within the EMBA, including species of wrasse, flathead, and warehou,
			• Commercial Value	✓		✓	
		Sharks and Rays	• Threatened Species	✓	Three shark species (or species habitat) may occur within the operational area. No important behaviours or BIAs have been identified.	✓	Three shark species (or species habitat) may occur within the EMBA; with foraging behaviours identified for the Great White Shark. There is also a foraging BIA at the eastern end of
			• Migratory Species	✓		✓	
			• BIA – Distribution	✓		✓	

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area		EMBA	
			• BIA – Foraging	–		✓	EMBA (extending approximately between Port Fairy and Portland), and a wider distribution BIA present in the area.
			• Behaviour – Foraging	–		✓	
		Syngnathids	• Listed Marine Species	✓	27 syngnathid species (or species habitat) may occur within the operational area. No important behaviours of BIAs have been identified.	✓	29 syngnathid species (or species habitat) may occur within the EMBA. No important behaviours of BIAs have been identified.
	Marine Reptiles	Turtles	• Listed Marine Species	✓	Three marine turtle species (or species habitat) may occur within the operational area. No important behaviours of BIAs have been identified.	✓	Three marine turtle species (or species habitat) may occur within the EMBA, with breeding behaviours identified for the Leatherback Turtle. No BIAs have been identified within the vicinity.
			• Threatened Species	✓		✓	
			• Migratory Species	✓		✓	
			• Behaviour – Breeding	–		✓	
	Marine Mammals	Pinnipeds	• Listed Marine Species	✓	Two pinniped species (or species habitat) may occur within the operational area. No important behaviours of BIAs have been identified.	✓	Two pinniped species (or species habitat) may occur within the EMBA; with breeding behaviours identified for the Australian Fur-seal. One of the main breeding colonies for the Australian Fur-seal is located on Lady Julia Percy Island. No BIAs have been identified within the vicinity.
			• Behaviour – Breeding	–		✓	
		Whales	• Listed Marine Species	✓		✓	

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area		EMBA	
			• Threatened Species	✓	6 whale species (or species habitat) may occur within the operational area, with foraging behaviours identified for some species. The EMBA intersects a distribution and forging BIA for the Pygmy Blue Whale, and a distribution BIA for the Southern Right Whale.	✓	7 whale species (or species habitat) may occur within the EMBA, with foraging and breeding behaviours identified for some species. The EMBA intersects a distribution and forging BIA for the Pygmy Blue Whale, and an aggregation, distribution and migration BIA for the Southern Right Whale.
			• Migratory Species	✓		✓	
			• BIA – Aggregation	–		✓	
			• BIA – Foraging	✓		✓	
			• BIA – Migration	–		✓	
			• Behaviour – Breeding	–		✓	
			• Behaviour – Foraging	✓		✓	
		Dolphins	• Listed Marine Species	✓	6 dolphin species (or species habitat) may occur within the operational area. No important behaviours of BIAs have been identified.	✓	7 dolphin species (or species habitat) may occur within the EMBA. No important behaviours of BIAs have been identified.
			• Migratory Species	✓		✓	

Table 4-2 Presence of Social Receptors within the Operational Area and the EMBA

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area		EMBA	
Natural System	Commonwealth Areas, Parks and Reserves	Key Ecological Features	• High productivity • Aggregations of marine life	–	Not present.	✓	One KEF, Bonney Coast Upwelling, intersects with the eastern extent of the EMBA. The Bonney Coast Upwelling is a seasonal upwelling feature, that supports regionally high productivity

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area		EMBA	
							and species diversity, and is a known Blue Whale foraging area. The Shelf Rocky Reefs and Hard Substrates KEF is not spatially defined, however the EMBA falls within the water depths (50–220 m) that this feature may be present.
	State Parks and Reserves	Marine Protected Areas	• Various; e.g. foraging or breeding areas	–	Not present.	✓	There are four State marine protected areas intersect with the EMBA: • Merri Marine Sanctuary • The Arches Marine Sanctuary • Twelve Apostles Marine Park • Marengo Reefs Marine Sanctuary • Eagle Rock Marine Sanctuary
		Terrestrial Protected Areas	• Various; e.g. shorelines	–	Not present.	✓	A number of State terrestrial protected areas have a coastal boundary that intersects with the EMBA, including: • Discovery Bay Coastal Park • Lawrence Rocks Wildlife Reserve • Lady Julia Percy Island Wildlife Reserve • Bay of Islands Coastal Park • Port Campbell National Park • Cape Otway National Park
Human System	Commercial Fisheries	Commonwealth-managed	• Economic benefit	✓	While a number of Commonwealth-managed fisheries have management areas that intersect with the operational	✓	A number of Commonwealth-managed fisheries have management areas that intersect with the EMBA. Fishing

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area		EMBA	
					area, active fishing effort within this area is expected to be minimal given the lack of suitable benthic habitat features within the operational area, and pre-existing PSZ's around the Casino wells.		intensity data suggests that the Southern and Eastern Scalefish and Shark Fishery and the Southern Squid Jig Fishery are the two with activity that may occur within the EMBA.
		State-managed	• Economic benefit	✓	While a number of State-managed fisheries have management areas that intersect with the operational area, active fishing effort within this area is expected to be minimal given the lack of suitable benthic habitat features within the operational area, and pre-existing PSZ's around the Casino wells.	✓	A number of State-managed fisheries have management areas that intersect with the EMBA. Fishing intensity data is not available; however, it is possible that the Giant Crab, Rock Lobster and Wrasse fisheries may be active within the EMBA.
	Recreational Fisheries		• Community engagement	✓	Recreational fishing may occur within the operational area, but activity is expected to be minimal given its location >20 km offshore.	✓	Most recreational fishing typically occurs in nearshore coastal waters, and within bays and estuaries; offshore (>5 km) fishing only accounts for approximately 4% of recreational fishing activity in Australia. The Otway coastal waters have a moderate fishing intensity (relative to other areas within the South-East Marine Region).
	Coastal Settlements		• Community engagement • Economic benefit	–	Not present.	✓	The communities of Port Campbell, Peterborough, Warrnambool and Port Fairy are located along the coast of the EMBA. The coastal communities provide services to the recreational and

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area		EMBA	
							commercial fishing industries of south-eastern Victoria.
	Recreation and Tourism		• Community engagement • Economic benefit	✓	Marine-based recreation and tourism may occur within the operational area, but activity is expected to be minimal given its location >20 km offshore.	✓	The Australian coast provides a diverse range of recreation and tourism opportunities, including scuba diving, charter boat cruises, and surfing. The Great Ocean Road is a popular tourism attraction in eastern Victoria.
	Industry	Shipping	• Community engagement • Economic benefit	✓	The south-eastern coast is one of Australia's busiest in terms of shipping activity and volumes. The Casino-5 well does not coincide with major shipping routes.	✓	The south-eastern coast is one of Australia's busiest in terms of shipping activity and volumes. There are no major ports within the EMBA, but minor ports do exist (e.g. Portland) that support commercial and recreational fishing industries.
		Oil and Gas Exploration and/or Operations	• Economic benefit	✓	Petroleum activity within the operational area includes other Cooper operated assets.	✓	Petroleum infrastructure in Otway Basin is well developed, with a network of pipelines transporting hydrocarbons produced offshore to onshore facilities. Current offshore production in the Otway Basin includes the Minerva, Thylacine, Geographe, Casino, Henry (including Netherby) fields, and the Halladale/Speculant gas project.
	Heritage	Maritime	• Shipwrecks	–	Not present.	✓	Numerous shipwrecks have been recorded in nearshore and coastal Australian waters. The one in closest

Receptor Group	Receptor Type	Receptor Description	Values and Sensitivities	Operational Area		EMBA	
							proximity to Casion-5 is *Falls of Halladale*, *Schomberg* and *Newfield* (approximately 16 km to the northeast).
		Cultural	• Commonwealth Heritage Places • World Heritage Properties • National Heritage Places	–	Not present.	✓	There is one National Heritage Place within the EMBA: • Great Ocean Road and Scenic Environs.
		Indigenous	• Indigenous use or connection • Native Title	–	Not present.	✓	The coastal area of south-east Australia was amongst the most densely populated regions of pre-colonial Australia. Through cultural traditions, Aboriginal people maintain their connection to their ancestral lands and waters. The Gadubanud (Ktabanut) people have occupied the Otway region, including the estuaries and coastline for thousands of years.

4.4 Conservation Values within the EMBA

The following table provides details of the features present within the EMBA for those receptors identified within Regulation 13(3) of the OPGGS(E) Regulations (Table 4-3). Note, no AMPs, internationally (Ramsar) or nationally important wetlands, World Heritage Properties or Commonwealth Heritage Places occur within the EMBA.

Table 4-3 Summary of conservation values and sensitivities within the EMBA

Receptor Type	Value and Sensitivities	Features present within the EMBA
Commonwealth Areas, Parks and Reserves	Key Ecological Features	• Bonney Coast Upwelling • Shelf Rocky Reefs and Hard Substrates
State Parks and Reserves	Marine Protected Areas	• Merri Marine Sanctuary • The Arches Marine Sanctuary • Twelve Apostles Marine Park • Marengo Reefs Marine Sanctuary • Eagle Rock Marine Sanctuary
	Terrestrial Protected Areas	• Bay of Islands Coastal Park • Great Otway National Park • Lady Julia Percy Island Wildlife Reserve • Lawrence Rocks Wildlife Reserve • Port Campbell National Park • Discovery Bay Coastal Park
Heritage	National Heritage Places	• Great Ocean Road and Scenic Environs
Seabirds and Shorebirds	Threatened and/or migratory species	• Numerous threatened (35) and migratory (52) species or species habitat present (including various albatross, petrel, plover, sandpiper, shearwater and tern species)
Fish	Threatened and/or migratory species	• One threatened fish species or species habitat present (Australian Grayling) • One threatened (Great White Shark) and three migratory (Great White Shark, Shortfin Mako Shark, Porbeagle Shark) shark species or species habitat present
Marine Reptiles	Threatened and/or migratory species	• Three threatened and migratory marine turtle species or species habitat present (Loggerhead Turtle, Green Turtle, Leatherback Turtle)
Marine Mammals	Threatened and/or migratory species	• Five threatened whale species or species habitat present (Sie Whale, Blue Whale, Fin Whale, Southern Right Whale, Humpback Whale); and ten migratory whale species or species habitat present • One migratory dolphin species or species habitat present (Dusky Dolphin)
Saltmarsh	Threatened Ecological Community	• Subtropical and Temperate Coastal Saltmarsh
Macroalgae	Threatened Ecological Community	• Giant Kelp Marine Forests of South East Australia

5.0 Environmental Impact and Risk Assessment Methodology

This section describes the environmental impact and risk assessment methodology employed for activities to be undertaken as part of the Casino-5 well intervention and workover, adopting Cooper Energy's risk assessment framework and toolkit to evaluate the potential impacts and risks.

For the Cooper Energy offshore activities, environmental aspects, impacts and risks have been identified and assessed through the following steps:

- Establish the context for the assessment by defining the activity and associated environmental aspects;
- Identifying the impact or risk associated with the environmental aspects;
- Identifying the ecological and social receptors with the potential to be exposed to the hazard;
- Evaluate the potential impact or risk (consequence);
- Determine the ALARP decision context and identify control measures;
- Evaluate the likelihood of the impact or risk (consequence) occurring;
- Assigning residual risk rating (after control measures are implemented) utilizing the Cooper Energy qualitative risk matrix. In accordance with the Cooper Energy acceptance criteria, the impacts and risks continue to be reassessed until it is demonstrated the impact or risk is reduced to a level which is as low as reasonably practicable (ALARP) and is acceptable according to the Cooper Energy acceptance criteria; and
- Evaluate the acceptability of the potential impact or risk.

Figure 5-1 provides the process adopted for managing impacts and risks associated with the petroleum activity.

Figure 5-1 AS/NZS ISO 31000 – Risk Management Methodology

5.1 Impact and Risk Evaluation

5.1.1 Establish the context

After describing the petroleum activity, an assessment was carried out to identify potential interactions between the petroleum activity and the receiving environment. The outcomes of stakeholder consultation also contributed to aspect identification.

Based upon an understanding of the environmental interactions, relevant impacts or risks were defined. Ecological and social receptors identified with the potential to be exposed to an aspect and subsequent impacts or risks were then summarised enabling a systematic evaluation to be undertaken.

5.1.2 Evaluate the potential impact (consequence)

After identifying the potential impacts or risks; consequences were determined based on:

- the spatial scale or extent of potential impact or risk of the environmental aspect within the receiving environment;
- the nature of the receiving environment (within the spatial extent), including proximity to sensitive receptors, relative importance, and sensitivity or resilience to change;
- the impact mechanisms (cause and effect) of the environmental aspect within the receiving environment (e.g. persistence, toxicity, mobility, bioaccumulation potential);
- the duration and frequency of potential effects and time for recovery;
- the potential degree of change relative to the existing environment or to criteria of acceptability.

Consequence definitions are provided in Table 5-1.

Table 5-1 Definition of Consequence

Descriptor	Environment	Regulatory, reputation, community and media
5. Critical	Severe long-term impact on highly-valued ecosystems, species populations or habitats. Significant remedial/recovery work to land/water systems over decades (if possible at all).	Critical impact on business reputation &/or international media exposure. High-level regulatory intervention. Potential revocation of License/Permit. Operations ceased.
4. Major	Extensive medium to long-term impact on highly-valued ecosystems, species populations or habitats. Remedial, recovery work to land or water systems over years (~5-10 years).	Significant impact on business reputation and/or national media exposure. Significant regulatory intervention. Operations ceased.
3. Moderate	Localised medium-term impacts to species or habitats of recognized conservation value or to local ecosystem function. Remedial, recovery work to land/water systems over months/year.	Moderate to small impact on business reputation. Potential for state media exposure. Significant breach of regulations, attracting regulatory intervention.

Descriptor	Environment	Regulatory, reputation, community and media
2. Minor	Localised short-term impacts to species/habitats of recognised conservation value but not affecting local ecosystem functioning. Remedial, recovery work to land, or water systems over days/weeks. No significant impacts to third parties.	Some impact on business reputation and/or industry media exposure. Breach of regulations - event reportable to authorities.
1. Negligible	Temporary localised impacts or disturbance to plants/animals. Nil to negligible remedial/recovery works on land/water systems.	Minimal impact on business reputation. Negligible media involvement. No regulatory breaches or reporting.

5.1.3 Determine the ALARP decision context and identify control measures

In alignment with NOPSEMA's ALARP Guidance Note (N-04300-GN0166, Rev 6, June 2015), Cooper Energy have adapted the approach developed by Oil and Gas UK (OGUK) (formerly UKOOA; OGUK, 2014) for use in an environmental context to determine the assessment technique required to demonstrate that potential impacts and risks are ALARP (Figure 5-2). Specifically, the framework considers impact severity and several guiding factors:

- activity type
- risk and uncertainty
- stakeholder influence.

A **Type A** decision is made if the risk is relatively well understood, the potential impacts are low, activities are well practised, and there are no conflicts with company values, no partner interests and no significant media interests. However, if good practice is not sufficiently well-defined, additional assessment may be required.

A **Type B** decision is made if there is greater uncertainty or complexity around the activity and/or risk, the potential impact is moderate, and there are no conflict with company values, although there may be some partner interest, some persons may object, and it may attract local media attention. In this instance, established good practice is not considered sufficient and further assessment is required to support the decision and ensure the risk is ALARP.

A **Type C** decision typically involves sufficient complexity, high potential impact, uncertainty, or stakeholder influence to require a precautionary approach. In this case, relevant good practice still must be met, additional assessment is required, and the precautionary approach applied for those controls that only have a marginal cost benefit.

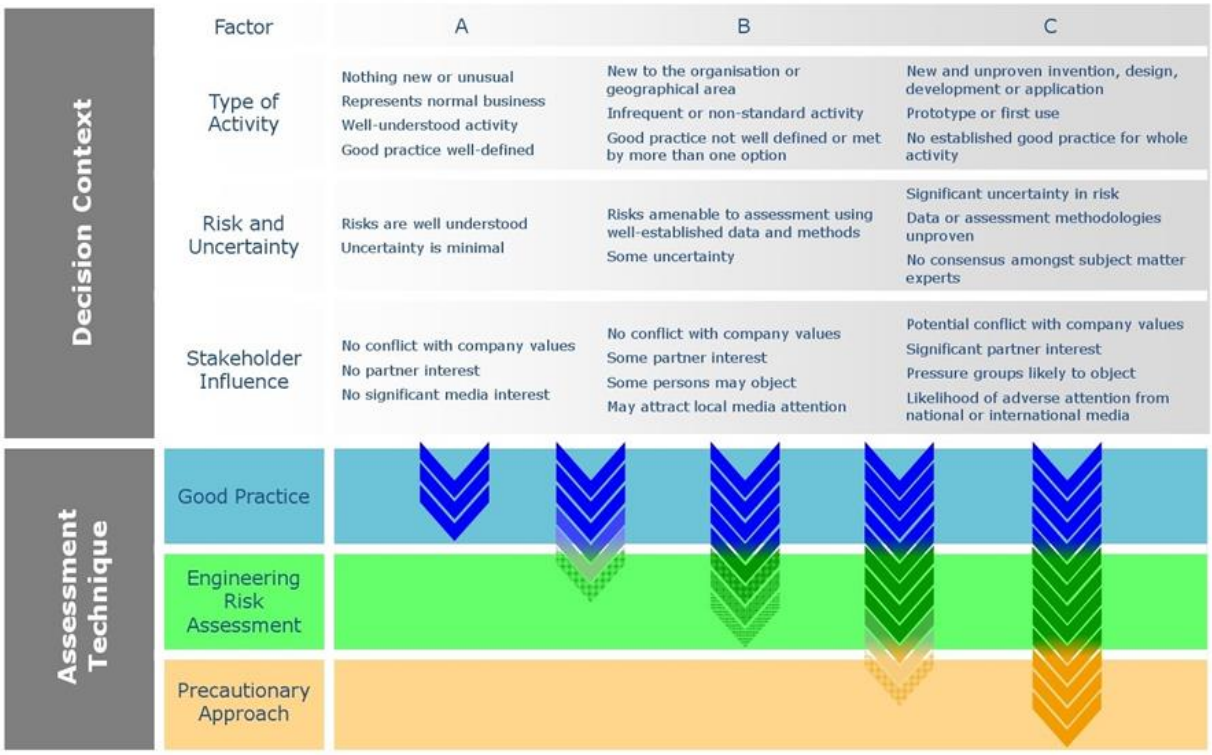


Figure 5-2 ALARP Decision Support Framework

(NOPSEMA Decision-making – Criterion 10A(c) Acceptable level. N-04750-GL1637, Rev 0, Nov 2016)

In accordance with the regulatory requirement to demonstrate that environmental impacts and risks are ALARP, Cooper Energy has considered the above decision context in determining the level of assessment required. This is applied to each aspect described in Section 6.0.

The assessment techniques considered include:

- good practice
- engineering risk assessment
- precautionary approach.

5.1.4 Evaluate the likelihood of the impact (consequence) occurring

The likelihood of a defined consequence occurring was determined, considering the control measures that have been previously identified. Likelihood levels are determined according to the Cooper Energy qualitative risk matrix (Table 5-3). Likelihood definitions are provided in Table 5-2.

Table 5-2 Definition of Likelihood

Descriptor	Description
A. Almost certain	Common event, expected to occur in most circumstances within Cooper Energy operations (i.e., several times a year).
B. Likely	Event likely to occur once or more during a campaign, ongoing operations or equipment design life.
C. Possible	Infrequent event that may occur during a campaign, ongoing operations or equipment design life.

Descriptor	Description
D. Unlikely	Unlikely event, but could occur at sometime within Cooper Energy operations (has occurred previously in similar industry).
E. Remote	Rare event. May occur in exceptional circumstances of Cooper Energy operations (not heard of in recent similar industry history).

5.1.5 Assigning residual risk rating

Based upon the identified consequence and likelihood levels, Cooper Energy use the qualitative risk matrix (Table 5-3) to rate the residual risk level.

Table 5-3 Cooper Energy Qualitative Risk Matrix

		CONSEQUENCE				
		1.Negligible	2.Minor	3.Moderate	4.Major	5.Critical
LIKELIHOOD	Almost Certain	M	M	H	H	H
	Likely	M	M	M	H	H
	Possible	L	M	M	H	H
	Unlikely	L	L	M	M	H
	Remote	L	L	L	M	M

5.1.6 Evaluate the acceptability of the potential impact and risk

Cooper Energy considers a range of factors when evaluating the acceptability of environmental impacts or risks associated with its activities. This evaluation works at several levels, as outlined in Table 5-4 and is based on NOPSEMA's Guidance Notes for EP Content Requirements (N04750-GN1344, Rev 3, April 2016) and guidance issued in Decision-making – Criterion 10A(c) Acceptable Level (N-04750-GL1637, Rev 0, Nov 2016). The acceptability evaluation for each aspect associated with this activity is undertaken in accordance with Table 5-4.

Table 5-4 Cooper Energy Acceptability Evaluation

Factor	Criteria / Test
Cooper Energy Risk Process	• Is the level of risk High? (if so, it is considered unacceptable)

Principles of Ecologically Sustainable Development (ESD) [See below]	• Is there the potential to affect biological diversity and ecological integrity? (Consequence Level Major [4] and Critical [5])
	• Do activities have the potential to result in serious or irreversible environmental damage?
	  ○ If yes: Is there significant scientific uncertainty associated with aspect?
	  ○ If yes: Has the precautionary principle been applied to the aspect?

Legislative and Other Requirements	• Confirm that all good practice control measures have been identified for the aspect including those identified in relevant EPBC listed species recovery plans or approved conservation advices.
Internal Context	• Confirm that all Cooper Energy HSEC MS Standards and Risk Control Processes have been identified for this aspect
External Context	• What objections and claims regarding this aspect have been made, and how have they been considered / addressed?

ESD Principles are:

A. Decision making processes should effectively integrate both long term and short term economic, environmental, social and equitable considerations

This principle is inherently met through the EP assessment process. This principal is not considered separately for each acceptability evaluation

B. If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

An evaluation is completed to determine is the activity will result in serious or irreversible environmental damage. Where the activity has the potential to result in serious or irreversible environmental damage, an assessment is completed to determine if there is significant uncertainty in the evaluation

C. The principle of inter-generational equity—that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.

Where the potential impacts and risk are determined to be serious or irreversible the precautionary principle is implemented to ensure the environment is maintained for the benefit of future generations

D. The conservation of biological diversity and ecological integrity should be a fundamental consideration in decision making

An assessment is completed to determine if there is the potential to impact biological diversity and ecological integrity

E. Improved valuation, pricing and incentive mechanisms should be promoted

Not relevant to this EP

5.2 Monitor and Review

Monitoring and review activities are incorporated into the impact and risk management process to ensure that controls are effective and efficient in both design and operation. This is achieved for the Casino-5 well intervention and workover activities through the environmental performance outcomes, standards and measurement criteria that are described for each environmental hazard. Additional aspects of monitoring and review include:

- Analysing and lessons learnt from events (including near-misses), changes, trends, successes and failures;
- Detecting changes in the external and internal context (e.g. new conservation plans issued); and
- Identifying emerging risks.

6.0 Risk and Impact Evaluation

This Section summarises the impacts and risks associated with the petroleum activity appropriate to the nature and scale of each impact or risk, and provides the control measures that are used to reduce the risks to ALARP and an acceptable level.

6.1 Physical Interaction (Collision with Marine Fauna)

Table 6-1 provides a summary of the environmental impact assessment (EIA) / environmental risk assessment (ERA) for

Physical Interaction (Collision with Marine Fauna).

Table 6-1

Physical Interaction (Collision with Marine Fauna) EIA / ERA

Cause of Aspect	The movement of vessels within the operational area and the physical presence of the vessel has the potential to result in collision with marine fauna.
Summary of impact(s)	Interaction with fauna has the potential to result in: • injury or death of marine fauna
Consequence Evaluation	
Receptor(s)	**Description of Potential Environmental Impact**
Megafauna	Several marine mammals (whale, dolphin) and turtle species, including those listed as either threatened and/or migratory under the EPBC Act have the potential to occur within the operational area. The operational area is located within a foraging BIA for the Pygmy Blue Whale, and a distribution BIA for the Southern Right Whale and Great White Shark. Cetaceans are naturally inquisitive marine mammals that are often attracted to offshore vessels and facilities. The reaction of whales to the approach of a vessel is quite variable. Some species remain motionless when in the vicinity of a vessel, while others are curious and often approach ships that have stopped or are slow moving, although they generally do not approach, and sometimes avoid, faster-moving ships (Richardson et al.1995). Collisions between larger vessels with reduced manoeuvrability and large, slow-moving cetaceans occur more frequently where high vessel traffic and cetacean habitat occurs (Whale and Dolphin Conservation Society, 2006). Laist et al. (2001) identifies that larger vessels with reduced manoeuvrability moving in excess of 10 knots may cause fatal or severe injuries to cetaceans, with the most severe injuries caused by vessels travelling faster than 14 knots. Vessels typically used to support workover activities do not have the same limitations on manoeuvrability and would not be moving at these speeds when conducting activities within the scope of this EP, inside the operational area. The duration of fauna exposure to vessel strike is limited to the duration of this activity which is expected to be approximately 25 days. If a fauna strike occurred and resulted in death, it is not expected that it would have a detrimental effect on the overall population. Consequently, the potential impacts and risks from fauna strike are considered to be **Minor (2)** as this type of event may result in a localised short-term impact to species of recognised conservation value but is not expected to affect the population or local ecosystem function.
ALARP Decision Context	**A**

Summary of Control Measures			
• Adherence to EPBC Regulations 2000 – Part 8 Division 8.1 interacting with cetaceans – The Australian Guidelines for Whale and Dolphin Watching describes strategies to ensure whales and dolphins are not harmed during offshore interactions with people. • Vessel strike reporting			
Likelihood	Unlikely (D)	**Residual Risk**	Low

6.2 Physical Interaction (Other Marine Users)

Table 6-2 provides a summary of the EIA / ERA for Physical Interaction (Other Marine Users).

Table 6-2 Physical Interaction (Other Marine Users) EIA / ERA

Cause of Aspect	The movement of vessels within the operational area, and the physical presence of the MODU and vessels has the potential to result in interactions with other marine users.
Summary of impact(s)	Interaction with other marine users has the potential to result in: • a disruption to commercial activities.
Consequence Evaluation	
Receptor(s)	**Description of Potential Environmental Impact**
Commercial Fisheries Other marine users	Several commercial fisheries have management areas that overlap the operational area associated with the EP; however, fishing activity in the area is low. The MODU will be located within an existing exclusion zone (the PSZ for Casino-2 wellhead). Stakeholder engagement, along with annual fishing records, indicates that that the proposed activities are not expected to result in an impact to commercial operations (via loss of catches or damage to fishing equipment.) The operational area is located to the northern extremity of commercial shipping routes. The well intervention and workover activities for the EP is expected to take approximately 25 days. Consequently, any impacts would be **Negligible (1)**, with little to no potential impacts to, or concerns from, affected external stakeholders.
ALARP Decision Context	**A**
Summary of Control Measures	
• Pre-start notifications • Petroleum Safety Zone	
Likelihood	Remote (E)	**Residual Risk**	Low

6.3 Light Emissions

Table 6-3 provides a summary of the EIA / ERA for Light Emissions.

Table 6-3 Light Emissions EIA / ERA

Cause of Aspect	The MODU and support vessels will generate light while in the operational area. Lighting is used for marine safety to ensure clear identification of vessels to other marine users and to allow activities to be undertaken safely 24 hours a day. Lighting will typically consist of bright white (i.e., metal halide, halogen, fluorescent) lights, and are not dissimilar to other offshore activities in the region, including fishing and shipping.
Summary of impact(s)	A change in ambient light levels may have the potential to result in: • Attraction of light-sensitive species such as seabirds, squid and zooplankton in turn affecting predator-prey dynamics; and • Alteration of behaviour that may affect species during breeding periods (e.g. shearwaters, turtle hatchlings).
Consequence Evaluation	
Receptor(s)	**Description of Potential Environmental Impact**
Seabirds, squid and zooplankton	**Localised light glow that may act as an attractant to light sensitive species** High levels of marine lighting can attract and disorient seabird species resulting in species behavioural changes (e.g. circling light sources leading to exhaustion or disrupted foraging), injury or mortality near the light source (e.g. Marquenie *et al.* 2008; Weise et al. 2001). These studies indicate that migratory birds are attracted to lights on offshore platforms when travelling within a radius of 5 km from the light source, but their migratory paths are unaffected outside this zone (Shell, 2010). Other marine life may also be attracted to the MODU or support vessels (e.g., fish, squid and plankton) that can aggregate directly under downward facing lights. These are prey species to many species of marine fauna and given the nature of the activity, any impacts arising from light emissions will be localised and temporary. Consequently, the potential impacts and risks from light emissions are considered to be **Negligible (1)** as this type of event may result in temporary localised impacts or disturbance to animals but is not expected to affect the population or local ecosystem function.
Turtles, seabirds	**Alteration of behaviour from light-sensitive species during breeding periods** <u>Turtles</u> Light pollution can be an issue along, or adjacent to, turtle nesting beaches where emerging hatchlings orient to, and head towards, the low light of the horizon unless distracted by other lights which disorient and affect their passage from the beach to the sea (EA, 2003). Given the absence of known turtle nesting in Victoria, impacts to turtle hatchlings are not expected. <u>Seabirds</u> Artificial light can cause significant impacts on burrow-nesting petrels and shearwaters. The operational area is approximately 30 km from the closest shoreline. Given the distance offshore, changes to ambient light levels in seabird breeding areas are not expected to occur, thus impacts to breeding periods from light emissions are not expected.
ALARP Decision Context	**A**
Summary of Control Measures	

• Lighting will be limited to that required for safe work and navigation.			
Likelihood	Possible (C)	**Residual Risk**	Low

6.4 Underwater Sound Emissions

Table 6-4 provides a summary of the EIA / ERA for

Underwater Sound Emissions.

Table 6-4

Underwater Sound Emissions EIA / ERA

Cause of Aspect	Underwater sound emissions will be generated from: • Support operations (MODU/vessel operations) • Support operations (helicopter operations) Note, MODU sound will be from thrusters and power generation only. No drilling or seismic activities will be undertaken under the EP.
Summary of impact(s)	The potential impacts of underwater sound emissions in the marine environment are: • Localised and temporary fauna behavioural disturbance that affects migration or social behaviours; and • Auditory impairment, Permanent Threshold Shift (PTS).
Consequence Evaluation	
Receptor(s)	**Description of Potential Environmental Impact**
Marine mammals Fish and sharks Commercial Fisheries	**Localised and Temporary Fauna Behavioural Disturbance** <u>Marine Mammals</u> Using the National Marine Fisheries Service (NMFS) guidance for sounds such as vessel noise, behavioural disturbance may occur within 4km of the MODU / vessel. The operational area is located within a foraging BIA for the Pygmy Blue Whale, and a distribution BIA for the Southern Right Whale; both species typically occur as individuals or in small (2–3 individuals) groups. Therefore, within the open water environment of the operational area, it is anticipated that cetacean numbers would be low, and so it is not expected that exposure to these sound levels would result in a significant change to foraging behaviours or natural movement that would result in further impact at either the individual or local population levels. Consequently, the potential impacts and risks from noise emissions are considered to be **Minor (2).** <u>Fish and sharks</u> Sound levels are expected to be below the Popper et al. (2014) threshold for injury in fish with a high or medium hearing sensitivity. For some fish, a strong 'startle' response has been observed at lower sound levels, with fish shown to move away from the noise source. Using a conservative approach, Cooper Energy has estimated that fish may exhibit a behavioural response to expected sound levels within 3km of the sound source (well location). Any behavioural impacts would be temporary. Consequently, the potential impacts and risks from noise emissions are **Negligible (1)** as this type of event may result in temporary localised impact or disturbance to animals. <u>Commercial fisheries</u> The EMBA is located within an important commercial fishing area. Localised and temporary behaviour changes in fish have the potential to adversely affect commercial fishing operations. During stakeholder consultation, concern was raised by South East Trawl Fishing Industry Associate (SETFIA) regarding the potential impact of seismic survey on marine invertebrates and fish. Cooper Energy provided sufficient information to show that, as seismic survey will not be undertaken, impacts from the activities are unlikely to result in impacts to fish and will not affect commercial fishing.

	As potential impacts and risks from noise emissions to fish and sharks is determined to have a negligible consequence, impacts and risks to commercial fisheries from noise emissions are also considered to be **Negligible (1)**.		
Marine mammals Fish and sharks	**Auditory Impairment, Permanent Threshold Shift (PTS)** As the sound levels generated by MODU/vessel operations associated with the activities will be below the thresholds suggested by Southall et al., (2007) (cetaceans) and Popper et al., (2014) (fish), no further assessment is required.		
ALARP Decision Context	**A**		
Summary of Control Measures			
• Planned Maintenance Schedule • Adherence to EPBC Regulations 2000 – Part 8 Division 8.1 interacting with cetaceans			
Likelihood (species of recognised conservation value)	Unlikely (D)	**Residual Risk**	Low
Likelihood (fish)	Possible (C)		
Likelihood (Commercial Fisheries)	Remote (E).		

6.5 Physical Presence – Seabed Disturbance

Table 6-5 provides a summary of the EIA / ERA for Physical Presence – Seabed Disturbance.

Table 6-5 Physical Presence – Seabed Disturbance EIA / ERA

Cause of Aspect	During the activity, the MODU will be anchored to the seabed to enable well intervention and workover activities to be undertaken.
Summary of impact(s)	Seabed disturbance has the potential to impact on receptors through: • Smothering and alteration of benthic habitats • Localised and temporary increase in turbidity near the seabed
Consequence Evaluation	
Receptor(s)	**Description of Potential Environmental Impact**
Benthic habitats and fauna	**Smothering and Alteration of benthic habitat** The benthic habitat within the operational area is characterised by soft sediment with the occasional hard substrate outcrop, infauna communities, and sparse epibiotic communities (typically sponges). Any impact will be limited to the immediate vicinity of the well location, and thus the extent of potential impact is localised. The type of damage that could be sustained may include destruction of habitat. However, due to the similarity of surrounding habitat, and lack of sensitive benthic habitats, it is expected that recovery is likely. It is expected that any localised impacts from anchoring would rapidly recolonise and recover following any disturbance, therefore the potential impact has been determined as **Negligible (1).** **Localised and temporary increase in turbidity near the seabed** Benthic fauna may be disturbed through the temporary increase in turbidity near the seafloor as a result of seabed disturbance during anchoring. The area of increased

	turbidity is likely to be a very small area localized around the disturbance points where anchors or weights sit on the seabed. The location of the wells within a homogenous seabed area, and lack of sensitive benthic features, means that turbidity resulting from the described activities is not expected to result in any environmental impacts.		
ALARP Decision Context	**A**		
Summary of Control Measures			
• Undertake mooring analysis • Monitor mooring line tensions			
Likelihood	**Unlikely (D).**	**Residual Risk**	Low

6.6 Atmospheric Emissions

Table 6-6 provides a summary of the EIA / ERA for Atmospheric Emissions.

Table 6-6 Atmospheric Emissions EIA / ERA

Cause of Aspect	The following activities have the potential to result in air emissions: • Use of fuel (support vessels and MODU) • Venting of gas and nitrogen from slickline operations Venting would be undertaken intermittently over several days. Volumes released are controlled such that only small amounts are released at any given time. Given the slow release rates and volumes associated with this activity, it is not expected to generate exposures significant enough to result in impacts to any identified environmental receptors.
Summary of impact(s)	Generation of atmospheric emissions has the potential to result in: • chronic effects to sensitive receptors from localised and temporary decrease in air quality from diesel combustion; • contribution to the global greenhouse gas (GHG) effect.
Consequence Evaluation	
Receptor(s)	**Description of Potential Environmental Impact**
Seabirds Marine megafauna that surface for air (e.g. cetaceans and marine turtles)	**Localised and temporary decrease in air quality from diesel combustion** The use of fuel (specifically marine-grade diesel) to power engines, generators and mobile and fixed plant (e.g., ROV, back-deck crane, generator), will result in gaseous emissions of greenhouse gases (GHG). The quantities of atmospheric emissions and related impacts will be similar to other vessels and helicopters operating in the region. Emissions from engines, generators and deck equipment may be toxic, odoriferous or aesthetically unpleasing, and will result in a localised, temporary reduction in air quality. Modelling of nitrogen dioxide (NO_2) emissions from MODU power generation for an offshore project (BP, 2013) indicates that, although emissions will result in a temporary increase in ambient NO_2 concentration, any exposure from these operations would be expected to be below Australian Ambient Air Quality National Environmental Protection (Air Quality) Measures (NEPM) standards.

	Emissions will be small in quantity and will dissipate quickly into the surrounding atmosphere, therefore any reduction in air quality will be localised and impacts would be limited. No impacts are anticipated on a population scale, and consequence is therefore considered to be **Negligible (1).** **Contribution to the global GHG effect** While these emissions add to the GHG load in the atmosphere, which adds to global warming potential, they are relatively small on a global scale, and temporary, representing an insignificant contribution to overall GHG emissions (DoEE, 2017). Any exposure from these operations would be expected to be insignificant, therefore no further evaluation of this aspect has been undertaken.
ALARP Decision Context	**A**
Summary of Control Measures	
• Use reduced sulphur content fuel • All vessels to comply with Marine Orders – Part 97: Marine Pollution Prevention – Air Pollution (appropriate to vessel class) • Adherence to MARPOL Annex VI (Prevention of Air Pollution from Ships) requirements • Adherence to MARPOL Annex VI (Chapter III Regulation 16 and Appendix IV – Requirements for Control of Emissions from Ships – Shipboard Incineration) requirements • Control cold venting of gas	

Likelihood	**Remote (E).**	**Residual Risk**	Low

6.7 Planned Discharge – Cooling Water and Brine

Table 6-7 provides a summary of the EIA / ERA for Planned Discharge – Cooling Water and Brine.

Table 6-7 Planned Discharge – Cooling Water and Brine EIA / ERA

Cause of Aspect	Seawater is used as a heat exchange medium for cooling machinery engines on vessels. Upon discharge, it will be warmer than the surrounding ambient water and may contain low concentrations of residual biocide if used to control biofouling. Concentrated brine is a waste stream created through the vessels desalination equipment for potable water generation. Brine will also be used, and subsequently discharged, during wellbore clean-up.
Summary of impact(s)	Planned discharge of cooling and brine waters has the potential to result in chronic effects to fauna through: • increased water temperature • increased water salinity • potential chemical toxicity in the water column.
Consequence Evaluation	
Receptor(s)	**Description of Potential Environmental Impact**
Transient marine fauna, including whales, sharks, fish, and reptiles	**Increased Temperature** Modelling of continuous wastewater discharges (including cooling water) found that discharge water temperature decreases quickly as it mixes with the receiving waters (WEL, 2014).

	Marine mammals and fish passing through the area will be able to actively avoid entrainment in any heated plume (Langford, 1990), and reptiles and sharks would be expected to behave similarly. Studies of organisms at 15, 20 and 25°C allowed them to tolerate temperature increments of 8-9°C without damage (UNEP, 1983). Given the open nature of the receiving environment, the short duration of the activity, and the lack of sensitive environmental receptors, the impact of increased temperature is expected to be **Negligible (1)**. **Potential Chemical Toxicity** Scale inhibitors and biocide used in the heat exchange and desalination process to avoid fouling of pipework are inherently safe at the low dosages used; they are usually consumed in the inhibition process, so there is little or no residual chemical concentration remaining upon discharge. Larger pelagic species are mobile; at worst, it is expected that they would be subjected to very low levels of chemicals for a very short time as they swim near the discharge plume. As transient species, they are not expected to experience any chronic or acute effects. Any impacts from chemical discharge will be localised and short-term. Given the open nature of the receiving environment, the intermittent nature of the activity, and the lack of sensitive environmental receptors, the impact of potential chemical toxicity is expected to be **Minor (2).**
Pelagic Fish Plankton	**Increased salinity** Brine water will sink through the water column where it will be rapidly mixed with receiving waters and dispersed by ocean currents. As such, any potential impacts are expected to be limited to the source of the discharge where concentrations are highest. Changes in salinity can affect the ecophysiology of marine organisms. Most marine species are able to tolerate short-term fluctuations in salinity in the order of 20% to 30% (Walker and McComb, 1990). However, larval stages, which are crucial transition periods for marine species, are known to be more susceptible to impacts of increased salinity (Neuparth, Costa & Costa 2002). Pelagic species are mobile; it is expected that at worst, they would be subjected to slightly elevated salinity levels (~10-15% higher than seawater) for a very short period which they are expected to be able to tolerate. As such, transient species are not expected to experience chronic or acute effects. Given the open nature of the receiving environment, the short duration of the activity, and the lack of sensitive environmental receptors, the impact of increased salinity is expected to be **Negligible (1)**.
ALARP Decision Context	**A**
Summary of Control Measures	
• Planned Maintenance Schedule • Development of and adherence to Chemical Assessment Process	

Likelihood	**Remote (E).**	**Residual Risk**	Low

6.8 Planned Discharge - Treated Bilge

Table 6-8 provides a summary of the EIA / ERA for

Planned Discharge - Treated Bilge.

Table 6-8

Planned Discharge - Treated Bilge EIA / ERA

Cause of Aspect	Bilge water consists of water, oily fluids, lubricants, cleaning fluids, and other similar wastes that have accumulated in the lowest part of the vessel / MODU typically from closed deck drainage and machinery spaces. Bilge water is treated onboard the vessel or MODU using the oil water separator (OWS) to reduce any oily residue to below regulated level, before being discharged at surface.		
Summary of impact(s)	A discharge of this material has the potential to result in chronic effects to plankton through potential toxicity in the water column.		
Consequence Evaluation			
Receptor(s)	**Description of Potential Environmental Impact**		
Fish embryo, larvae, and other plankton Species which rely on plankton as a food source	OSPAR (2014) indicates that the predicted no effect concentration (PNEC) for marine organisms exposed to dispersed oil is 70.5 ppb. A discharge of treated bilge is non-continuous and infrequent. Modelling by Shell (2009) indicates that upon discharge, hydrocarbon and other chemical concentrations are rapidly diluted and expected to be below PNEC within a relatively short period of time. Given the nature of this discharge, marine fauna most susceptible to toxic impacts are mainly limited to less mobile fish embryo, larvae, and other plankton. There is potential for short-term impacts to species that rely on plankton as a food source. Any impact to prey species would be temporary as the duration of exposure would be limited, and fish larvae and other plankton are expected to rapidly recover as they are known to have high levels of natural mortality and a rapid replacement rate (UNEP, 1985). Consequently, the potential impacts and risks from planned discharge of treated bilge are considered to be localised and short-term, and have been rated as **Minor (2)**.		
ALARP Decision Context	**A**		
Summary of Control Measures			
• Bilge discharges from vessels comply with MARPOL Annex I bilge discharge requirements • MARPOL-approved oil water separator • Planned Maintenance Schedule			
Likelihood	**Remote (E).**	**Residual Risk**	Low

6.9 Planned Discharge - Sewage and Food Waste

Table 6-9 provides a summary of the EIA / ERA for Planned Discharge – Sewage and Food Waste.

Table 6-9 Planned Discharge – Sewage and Food Waste EIA / ERA

Cause of Aspect	The use of ablution, laundry and galley facilities by personnel will result in the surface discharge of sewage and grey water. The generation of food waste from feeding personnel will result in the discharge of food waste from the galley.
Summary of impact(s)	A discharge of food waste, sewage and greywater has the potential to result in impacts to marine fauna from: • Temporary and localised reduction in water quality (nutrients and biological oxygen demand [BOD]) • Changing predator / prey dynamics from increased scavenging behaviours
Consequence Evaluation	
Receptor(s)	**Description of Potential Environmental Impact**
Transient marine fauna, including whales, sharks, fish and reptiles	**Temporary and localised reduction in water quality (nutrients and biological oxygen demand [BOD])** Monitoring of sewage discharges for another offshore project (WEL, 2014), determined that a 10 m^3 sewage discharge (over the course of an activity) reduced to ~1% of its original concentration within 50 m of the discharge location. Studies into the effects of nutrient enrichment from offshore sewage discharges indicate that the influence of nutrients in open marine areas is much less significant than that experienced in enclosed areas (McIntyre and Johnson, 1975) and suggest that zooplankton composition and distribution in areas associated with sewage dumping grounds are not affected. In addition, regardless of receptor sensitivity to BOD, Black et al. (1994) state that BOD of treated effluent is not expected to lead to oxygen depletion in the receiving waters. Due to the rapid rate of mixing and dispersion identified during modelling of sewage releases (WEL, 2014), no receptors are expected to be impacted by this activity and consequently this hazard has not been evaluated further.
Plankton Large pelagic fauna (e.g. marine mammals, fish and seabirds)	**Changing predator / prey dynamics from increased scavenging behaviours** The overboard discharge of sewage and macerated food waste creates a localised and temporary food source for scavenging marine fauna or seabirds whose numbers may temporarily increase as a result, thus increasing the food source for predatory species. The rapid consumption of this food waste by scavenging fauna, and physical and microbial breakdown, ensures that the impacts of food waste discharges are insignificant and temporary, and receptors that may potentially be in the water column are not impacted. Plankton are not affected by sewage discharges, and thus impacts to food source and any predator-prey dynamics is not expected to occur. Consequently, the potential impacts and risks from the planned discharge of sewage and greywater have been evaluated as **Minor (2)**, given this type of event may result in localised short-term impacts to a species of conservation value (seabirds) through impacting their foraging habitat.
ALARP Decision Context	**A**

Summary of Control Measures			
• MARPOL-approved sewage treatment plant (STP) • Food waste macerated (MARPOL Annex V) • Planned Maintenance Schedule			
Likelihood	**Unlikely (D)**	**Residual Risk**	Low

6.10 Planned Discharge - Ballast Water and Biofouling

Table 6-10 provides a summary of the EIA / ERA for Planned Discharge - Ballast Water.

Table 6-10 Planned Discharge - Ballast Water EIA / ERA

Cause of Aspect	The operation of the MODU and vessels may result in the discharge of ballast water within the operational area. The operation of the MODU and vessels also have the potential to result in biofouling, resulting in the same hazard. Consequently, both biofouling and ballast water discharge are evaluated below.
Summary of impact(s)	Planned discharge of ballast water, or biofouling, has the potential to introduce a marine pest (IMP).
Consequence Evaluation	
Receptor(s)	**Description of Potential Environmental Impact**
Benthic Habitat	IMP are likely to have little or no natural competition or predators, thus potentially outcompeting native species for food or space, preying on native species, or changing the nature of the environment. Marine pest species can also deplete fishing grounds and aquaculture stock, with between 10% and 40% of Australia's fishing industry being potentially vulnerable to marine pest incursion. Marine pests can damage marine and industrial infrastructure, such as encrusting jetties and marinas or blocking industrial water intake pipes. By building up on vessel hulls, they can slow the vessels down and increase fuel consumption. The benthic habitat within the operational area is expected to comprise soft sediment with the occasional hard substrate outcrop, infauna communities, and sparse epibiotic communities (typically sponges). Areas of higher value or sensitivity are located further afield (e.g. it is approximately 75 km to the closest AMP (Apollo)). Once established, some pests can be difficult to eradicate (Hewitt *et al.*, 2002) and therefore there is the potential for a long-term or persistent change in habitat structure. Successful colonisation in the recipient region would be difficult given the nature of the benthic habitats near the operational area, and lack of light due to deep waters. If an IMP was introduced, and if it did colonise an area, it is expected that any colony would remain fragmented and isolated, and only within the vicinity of the wells. Therefore, there is the potential for a localised, but irreversible, impact to habitat resulting in a **Moderate (4)** consequence.

ALARP Decision Context	**B** Additional control measures considered but not adopted: • Only use vessels / MODUs that are currently operating in Commonwealth Waters to reduce the potential for introducing IMPs. This control measure is considered to have costs (limited vessel availability leading to delays in schedule and incurring additional expenses) which outweigh the benefits.
Summary of Control Measures	

• Maritime Arrivals Reporting System (MARS)
• Adherence to Australian Ballast Water Management Requirements (version 7; DAWR, 2017), including:
  ○ Ballast Water Management Plan
  ○ Report ballast water discharges
  ○ Maintain a ballast water record system
• Anti-fouling certificate
• Biofouling management plan
• Biofouling record book	

Likelihood	**Possible (C)**	**Residual Risk**	Medium

6.11 Operational Discharges – Subsea

Table 6-11 provides a summary of the EIA / ERA for Operational Discharges – Subsea.

Table 6-11 Operational Discharges – Subsea EIA / ERA

Cause of Aspect	Fluids planned to be discharged subsea include: • Sulfamic Acid • Gas • Debris from tree cap removal • Control Fluid • Seawater-brine interface • Brine The release of brine and seawater-brine interface is assessed in Section 6.7.
Summary of impact(s)	A planned discharge of various fluids during well activities has the potential result in chronic and acute impacts to marine fauna via localised and temporary decrease in water quality.
Consequence Evaluation	
Receptor(s)	**Description of Potential Environmental Impact**
Soft sediment, infauna communities, and sparse epibiotic communities Transient marine fauna, including whales, sharks, fish, and reptiles	**Chemical Discharge** All chemicals used and discharged will be assessed using the Cooper Energy Offshore Environmental Chemical Assessment Process which uses the CHARM OCNS ranking in conjunction with toxicity, biodegradation and bioaccumulation data to determine potential impacts to the environment and acceptability of planned discharges. Little to no impact is expected on benthic fauna at the release location given the low toxicity, low bioaccumulation and biodegradability characteristics of the proposed chemical discharges, and the dispersion characteristics of the release. For seabed invertebrates present near the wellhead, it is possible that low-level concentrations of chemical may be present on a short-term and episodic basis, however given the low

	toxicity of the chemicals, the low frequency and short-term nature of the exposure, **Negligible (1)** impacts are expected. For mobile demersal and pelagic species which may be present at the wellheads during the activity, given the localised and short-term nature of the discharge, the low toxicity and low-frequency nature of the discharge and the species mobility which limits exposure, the environmental impact is expected to have a **Negligible (1)** impact to these species. **Gas** The main concern regarding a gas (methane) release is the possibility that the action of methane-consuming microbes (methanotrophic bacteria) could exhaust oxygen in the water column. As gas is positively buoyant, upon release it will rise through the water column causing the small volume to rapidly disperse and dilute. Consequently, receptors exposed would be limited to transient marine fauna. Based upon the expected volumes (in the order of 0.0001 m^3), exposure to transient marine fauna is not expected to occur at concentrations that could feasibly result in an impact. Thus, this release has not been discussed further.
ALARP Decision Context	**A**
Summary of Control Measures	
• Development of and adherence to Chemical Assessment Process	

Likelihood	**Unlikely (D)**	**Residual Risk**	Low

6.12 Operational Discharges – Surface

Table 6-12 provides a summary of the EIA / ERA for Operational Discharges – Surface.

Table 6-12 Operational Discharges – Surface EIA / ERA

Cause of Aspect	Fluids planned to be discharged at the surface include: • Completion packer brine ($CaCO_3$), Ethylene glycol (MEG), aquifer fluids and/or reservoir gas. The release of brine is assessed in Section 6.7.
Summary of impact(s)	A planned discharge of fluid during well intervention and workover activities has the potential result in chronic and acute impacts to marine fauna via: potential toxicity.
Consequence Evaluation	
Receptor(s)	**Description of Potential Environmental Impact**
Whales, sharks, fish and plankton	All chemicals used and discharged will be assessed using Cooper Energy's Offshore Environmental Chemical Assessment Process which uses the CHARM OCNS ranking in conjunction with toxicity, biodegradation and bioaccumulation data to determine potential impacts to the environment and acceptability of planned discharges. Based upon the offshore location of the activity with no identified obstructions and open ocean currents, potential exposures are expected to be limited to the operational area. Given the infrequent nature of the discharge, it is expected that any exposure will be limited in duration with rapid dilution and dispersion experienced. Impacts from toxicity are most likely to be limited to those organisms that would get entrained in the plume (such as plankton and fish larvae). Consequently, the potential

	impacts and risks from the operational discharges at the surface are considered to be **Negligible (1)**.		
ALARP Decision Context	**A**		
Summary of Control Measures			
• Development of and adherence to Chemical Assessment Process			
Likelihood	**Unlikely (D)**	**Residual Risk**	Low

6.13 Accidental Release – Waste

Table 6-13 provides a summary of the EIA / ERA for Accidental Release – Waste.

Table 6-13 Accidental Release – Waste EIA / ERA

Cause of Aspect	The handling and storage of materials and waste on board MODUs and vessels has the potential for accidental over-boarding of hazardous/non-hazardous materials and waste.
Summary of impact(s)	The potential environmental impacts associated with the accidental release of waste are: • Marine pollution (litter and a temporary and localised reduction in water quality); • Injury and entanglement of marine fauna and seabirds; and • Smothering or pollution of benthic habitats.
Consequence Evaluation	
Receptor(s)	**Description of Potential Environmental Impact**
Plankton and pelagic fish Benthic Habitats	**Hazardous Materials and Waste** Hazardous materials and wastes released to the sea cause pollution and contamination, with either direct or indirect effects on marine organisms. For example, chemical spills can impact on marine life from plankton to pelagic fish communities, causing physiological damage through ingestion or absorption through the skin. Impacts from an accidental release would be limited to the immediate area surrounding the release, prior to the dilution of the chemical with the surrounding seawater. In an open ocean environment such as the operational area, it is expected that any minor release would be rapidly diluted and dispersed, and thus temporary and localised. Solid hazardous materials, such as paint cans containing paint residue, batteries and so forth, would settle on the seabed if dropped overboard. Over time, this may result in the leaching of hazardous materials to the seabed, which is likely to result in a small area of substrate becoming toxic and unsuitable for colonisation by benthic fauna. Given the size of materials release it is expected that only very localised impacts to benthic habitats within the operational area would be affected and unlikely to contribute to a significant loss of benthic habitat or species diversity.
Marine Fauna Seabirds Benthic Habitats	**Non-hazardous Materials and Waste** Discharged overboard, non-hazardous wastes can cause smothering of benthic habitats as well as injury or death to marine fauna or seabirds through ingestion or entanglement (e.g., plastics caught around the necks of seals or ingested by seabirds and fish). If dropped objects such as bins are not retrievable by ROV, these items may permanently smother very small areas of seabed, resulting in the loss of benthic habitat. However, as with most subsea infrastructure, the items themselves are likely to become colonised by

	benthic fauna over time (e.g., sponges) and become a focal area for sea life, so the net environmental impact is likely to be neutral. This would affect extremely localised areas of seabed and would be unlikely to contribute to the loss of benthic habitat or species diversity. Given the restricted exposures and limited quantity of marine pollution expected from this program, it is expected that any impacts from marine pollution may have a **Minor (2)** impact resulting from a localised short-term impact to species/habitats of recognised conservation value but not affecting local ecosystem functioning.
ALARP Decision Context	**A**
Summary of Control Measures	
• Adherence to MARPOL Annex V, including: o Garbage / waste management plan o Garbage record book • Waste management training / induction	

Likelihood	**Unlikely (D)**	**Residual Risk**	Low

6.14 Accidental Release – Loss of Containment (Minor)

Table 6-14 provides a summary of the EIA / ERA for Accidental Release – Loss of Containment (Minor).

Table 6-14 Accidental Release – Loss of Containment (Minor) EIA / ERA

Cause of Aspect	The operation of the MODU and support vessels includes handling, use and transfer of hazardous materials, and consequently the following pathways were identified as potentially leading to a loss of containment event: • Use, handling and transfer of hazardous materials and chemicals on board • Hydraulic line failure from equipment • Transfer of hazardous materials and chemicals between the MODU and Vessel (refuelling)
Summary of impact(s)	A minor loss of containment (LOC) has the potential result in chronic and acute impacts to marine fauna via: potential toxicity
Consequence Evaluation	
Receptor(s)	**Description of Potential Environmental Impact**
Marine Fauna Pelagic species	A loss of 50 m^3 of diesel or chemicals upon release would be expected to result in changes to water quality in both surface waters and the pelagic environment. As evaluated in Section 6.15, the potential impacts associated with a larger loss of diesel fuel were determined to be **Minor (2)**, thus impacts from these types of events are not expected to be any larger (and thus have not been considered further).
ALARP Decision Context	**A**
Summary of Control Measures	

• Bulk transfer process • Hoses and connections • Planned Maintenance Schedule • Development and adherence to vessel SMPEP (or equivalent) • Accidental release / waste management training / induction			
Likelihood	**Unlikely (D)**	**Residual Risk**	Low

6.15 Accidental Release - LOC (Vessel Collision)

Table 6-15 provides a summary of the EIA / ERA for Accidental Release - LOC (Vessel Collision).

Table 6-15 Accidental Release - LOC (Vessel Collision) EIA/ERA

Cause of Aspect	A loss of control event resulting in the release of marine diesel oil (MDO) has the potential to be caused by a collision between a support vessel and third-party vessel, rupturing the diesel storage tank.
Summary of impact(s)	The LOC (vessel collision) event has the potential to expose the environment to surface, in-water and shoreline hydrocarbon, with the potential to directly or indirectly result in: • Toxicity or physical oiling to marine habitats or fauna; • Reduction in intrinsic value / visual aesthetics; • Damage to commercial businesses. Results of stochastic oil spill modelling for the subsea release of gas condensate have predicted: • Surface exposure above environmental impact thresholds were predicted within 18 km of the release location, and be present for 1-2 days after release; • Surface exposure above the visible impact thresholds were predicted within 36 km of the release location; • In-water (entrained) exposure above environmental impact thresholds were scarce and isolated, with a low probability of occurrence; • No in-water (dissolved) exposure above environmental impact thresholds; • Shoreline exposure above environmental impact thresholds were predicted with a low (<10%) probability of occurrence.
Consequence Evaluation	
Receptor(s)	**Description of Potential Environmental Impact**
Shoreline	Shoreline hydrocarbon exposure has the potential to concentrate as it strands ashore, resulting in follow-on impacts to marine fauna that may use the habitat. Habitat types within the area of exposure include rocky, sandy and gravel shores. As MDO rapidly weathers, is highly evaporative, and any oil that does percolate into penetrable substrate will get reworked via tidal and wave action, accumulation on the shoreline surfaces is not expected. As such, it is unlikely that toxicity, smothering or directed oiling to exposed marine fauna will occur. Consequently, the potential impacts and risks to coastal habitats from shoreline exposure are considered to be **Minor (2)** as they could be expected to result in localised short-term impacts to species/habitats of recognised conservation value but not affecting local ecosystem functioning.

Soft Sediment	Shoreline hydrocarbon exposure has the potential to expose intertidal areas of soft sediment to concentrations above the impact threshold. Given the characteristics of MDO and is residues, which due to their viscosity are likely to evaporate or percolate into the sand, it is not considered likely to accumulate on the surface. The constant wave action and tidal movements will naturally wash and further degrade MDO residues which remain in the inter-tidal area. Consequently, the potential impacts and risks to soft sediments in the intertidal zone from shoreline hydrocarbon exposure are considered to be **Minor (2)** as they could be expected to result in localised short-term impacts to species/habitats of recognised conservation value but not affecting local ecosystem functioning
Coral	In-water (entrained) hydrocarbon exposure has the potential to cause lethal or sublethal (e.g. reduced growth rates, tissue decomposition etc) impacts to corals. However, the area predicted to be exposed to in-water concentrations above the impact threshold is patchy and has a low probability of occurrence. Given the lack of hard coral reef formations, and the sporadic cover of soft corals in mixed reef communities, any potential impacts will likely be limited to isolated corals. Consequently, the potential impacts to corals from in-water hydrocarbon exposure are considered to be **Minor (2)**, as they could be expected to result in localised short-term impacts to species/habitats of recognised conservation value, but not affecting local ecosystem functioning.
Macroalgae	In-water (entrained) hydrocarbon exposure has the potential to cause physiological changes (e.g. changes to enzyme systems, rates of photosynthesis etc) to macroalgae, but are typically able to recover rapidly, even from heavy oiling. Macroalgae, including the Giant Kelp TEC, may be present within reef and hard substrate areas within the area predicted to be exposed; noting however, that the area predicted to be exposed to in-water concentrations above the impact threshold is patchy and has a low probability of occurrence. Consequently, the potential impacts to macroalgae from in-water hydrocarbon exposure are considered to be **Minor (2)**, as they could be expected to result in localised short-term impacts to species/habitats of recognised conservation value, but not affecting local ecosystem functioning
Seagrass	In-water (entrained) hydrocarbon exposure has the potential to cause sub-lethal impacts to seagrass. Seagrass may be present within the area predicted to be exposed; noting however, that the area predicted to be exposed to in-water concentrations above the impact threshold is patchy and has a low probability of occurrence. Consequently, the potential impacts to seagrass from in-water hydrocarbon exposure are considered to be **Minor (2)**, as they could be expected to result in localised short-term impacts to species/habitats of recognised conservation value, but not affecting local ecosystem functioning
Plankton	In-water (entrained) hydrocarbon exposure has the potential to result in toxic effects to plankton; plankton risk exposure via ingestion, inhalation and dermal contact. The area predicted to be exposed to in-water concentrations above the impact threshold is patchy and has a low probability of occurrence; but does occur within the 0-10 m surface layer where plankton are generally more abundant. Higher abundance of plankton may also occur within the Bonney Coast Upwelling KEF. However, MDO weathers rapidly with the entrained component naturally biodegrading. Once background water quality conditions have re-established, the plankton community is expected to recover. Consequently, the potential impacts to plankton from in-water hydrocarbon exposure are considered to be **Minor (2)**, as they could be expected to cause short-term and localised impacts, but not affecting local ecosystem functioning.

Marine Invertebrates	In-water (entrained) hydrocarbon exposure has the potential to result in acute and chronic effects to marine invertebrates. No exposure to benthic invertebrates was predicted from oil spill modelling; however pelagic species may be exposed as temporary patches of entrained MDO may be present within 0-10m depth layers. Consequently, the potential impacts and risks to marine invertebrates from in-water hydrocarbon exposure are considered to be **Minor (2)**, as they could be expected to result in localised short-term impacts to species/habitats of recognised conservation value but not affecting local ecosystem functioning. Shoreline hydrocarbon exposure has the potential to expose intertidal areas to concentrations above the impact threshold. Given the characteristics of MDO and is residues, which due to their viscosity are likely to evaporate or percolate into the sand, it is not considered likely to accumulate on the surface. Where oil does penetrate into the sediment profile, smothering of exposed infauna may occur, reducing reproductive capacity or causing death. However, tidal washing rapidly degrades MDO residues, and reworks the upper sediment profile. Consequently, the potential impacts and risks to marine invertebrates in the intertidal zone from shoreline hydrocarbon exposure are considered to be **Minor (2)** as they could be expected to result in localised short-term impacts to species/habitats of recognised conservation value but not affecting local ecosystem functioning.
Seabirds and Shorebirds	Surface hydrocarbon exposure has the potential to expose birds that come into contact with the water surface, causing acute or chronic toxicity. There are foraging BIAs for some species of petrel, shearwater and albatross that occur within the area predicted to exposed. However, the extent of area predicted to be exposed to surface concentrations >10 mg/m^2 is localised (<18 km) and temporary (1-2 days); therefore, contact with considered unlikely. Consequently, the potential impacts and risks to seabirds and shorebirds from surface exposure are considered to be **Minor (2)**, as they could be expected to result in localised short-term impacts to species/habitats of recognised conservation value but not affecting local ecosystem functioning. Shoreline hydrocarbon exposure has the potential to expose birds that come into contact with the shoreline via direct impacts (i.e. contamination, or direct oiling) and indirectly via reduction in available prey items. There are foraging BIAs for a number of species that overlap the shoreline area potentially exposed; and a breeding BIA around Lady Julia Percy Island. However, the probability of shoreline exposure above the impact threshold (>100 g/m^2) is low, typically <10%. Consequently, the potential impacts and risks to seabirds and shorebirds from shoreline exposure are considered to be **Minor (2)** as they could be expected to result in localised short-term impacts to species/habitats of recognised conservation value but not affecting local ecosystem functioning.
Fish and Sharks	In-water (entrained) hydrocarbon exposure has the potential to physically affect fish exposed for an extended duration. No exposure to demersal species is likely, however those pelagic species using the surface waters may be exposed as temporary patches of entrained MDO were predicted within the 0-10m depth layers. Impacts on eggs and larvae in the upper water column are not expected to be significant given the temporary period of water quality impairment, and the limited areal extent of the spill. Consequently, the potential impacts and risks to fish and sharks from in-water hydrocarbon exposure are considered to be **Minor (2)**, as they could be expected to result in localised short-term impacts to species/habitats of recognised conservation value but not affecting local ecosystem functioning.

Marine Turtles	Surface hydrocarbon exposure has the potential to expose marine turtles that come into contact with the water surface; ingested oil can harm internal organs and digestive function, and oil on their bodies can cause skin irritation and affect breathing. No areas identified as critical habitat or BIAs are present within the area predicted to be exposed; therefore, presence in the area is expected to be minimal. Consequently, the potential impacts and risks to marine turtles from surface exposure are considered to be **Negligible (1)**, as they could be expected to result in localised short-term impacts to species/habitats of recognised conservation value but not affecting local ecosystem functioning. Shoreline hydrocarbon exposure has the potential to expose marine turtles nesting on shorelines via direct contact with skin/body. There are no areas identified as critical habitat, and no BIAs or known nesting locations within the area that may be exposed. Vicinity. Consequently, the potential impacts and risks to marine turtles from shoreline exposure are considered to be **Negligible (1)**, as they could be expected to result in localised short-term impacts to species/habitats of recognised conservation value but not affecting local ecosystem functioning.
Pinnipeds	Surface hydrocarbon exposure has the potential to expose pinnipeds that come into contact with the water surface; oils can result in skin and eye irritations and disruption thermal regulation for pinnipeds. No areas identified as critical habitat or BIAs are present within the area predicted to be exposed; therefore, presence in the area is expected to be minimal. Consequently, the potential impacts and risks to pinnipeds from surface exposure are considered to be **Negligible (1)**, as they could be expected to result in localised short-term impacts to species/habitats of recognised conservation value but not affecting local ecosystem functioning. In-water (entrained) hydrocarbon exposure has the potential to result in sub-lethal impacts to pinnipeds via ingestion of the oil or oil-affected prey. However, given the patchy and temporary exposure to in-water hydrocarbons above the impact level, this is considered unlikely to occur. Shoreline hydrocarbon exposure has the potential to expose pinnipeds using the shoreline as haul-out or breeding sites, via direct contact with skin/body; oils can result in skin and eye irritations and disruptions to thermal regulation. Given the rocky nature of haul-out and breeding sites, any MDO is expected to rapidly weather through repeated wave action against the rocks; therefore, exposure is expected to be of short duration. Consequently, the potential impacts and risks to pinnipeds from exposure from an MDO spill event are considered to be **Minor (2)** as they could be expected to result in localised short-term impacts to species/habitats of recognised conservation value but not affecting local ecosystem functioning.

Cetaceans	Surface hydrocarbon exposure has the potential to expose cetaceans that come into contact with the water surface; however, physical contact with MDO is unlikely to lead to any long-term impacts. A foraging BIA for the Pygmy Blue Whale and aggregation and migration BIA for the Southern Right Whale occurs within the area predicted to be exposed. However, the extent of area predicted to be exposed to surface concentrations >10 mg/m^2 is localised (<18 km) and temporary (1-2 days); therefore, contact with considered unlikely. Consequently, the potential impacts and risks to pinnipeds from surface exposure are considered to be **Negligible (1)**, as they could be expected to result in localised short-term impacts to species/habitats of recognised conservation value but not affecting local ecosystem functioning. In-water (entrained) hydrocarbon exposure has the potential to result in toxicity effects (e.g. via ingestion of the oil or oil-affected prey); however, this is typically associated with 'fresh' hydrocarbon and the risk of impact declines with the MDO weathering. Given the patchy and temporary exposure to in-water hydrocarbons above the impact level, these toxicity effects are considered unlikely to occur. Consequently, the potential impacts and risks to cetaceans from in-water exposure are considered to be **Negligible (1)**, as they could be expected to result in localised short-term impacts to species/habitats of recognised conservation value but not affecting local ecosystem functioning.
Commonwealth Areas, Parks and Reserves	In-water (entrained) hydrocarbon exposure may occur within the vicinity of the Bonney Coast Upwelling KEF. While the oil will not affect the upwelling process itself, if the spill occurs at the time of an upwelling event, it may result in krill being exposed to entrained phase MDO. This may have subsequent effects further up the food chain (i.e. from reduced prey); however, these impacts are expected to the localised and temporary. No Australian Marine Parks are predicted to be exposed. Consequently, the potential impacts and risks to Commonwealth Areas, Parks and Reserves from in-water hydrocarbon exposure are considered to be **Minor (2)**, as they could be expected to cause short-term and localised impacts, but not affecting local ecosystem functioning.
State Parks and Reserves	In-water (entrained) hydrocarbon exposure may occur within the vicinity of the Twelve Apostles Marine Park and the Merrie Marine Sanctuary. Major conservation values for these marine protected areas include breeding areas for seabirds and migration route for whales. Any impact is expected to the localised and temporary, given the patchy exposure of in-water hydrocarbons predicted. Consequently, the potential impacts and risks to State Parks and Reserves from in-water hydrocarbon exposure are considered to be **Minor (2)**, as they could be expected to cause short-term and localised impacts, but not affecting local ecosystem functioning. Shoreline hydrocarbon exposure has the potential to expose a number of terrestrial protected areas; noting that the probability of exposure is <10%. Oil ashore would typically concentrate at or below high tide mark; the seaward boundary of most terrestrial parks does not extend past this. Visible surface hydrocarbons have the potential to reduce the visual amenity of the area for tourism, and discourage recreational activities. Given the characteristics of MDO and is residues, which due to their viscosity are likely to evaporate or percolate into the sand, it is not considered likely to accumulate on the surface. Consequently, the potential impacts and risks to terrestrial protected areas from shoreline exposure are considered to be **Minor (2)** as they could be expected to result in localised short-term impacts to species/habitats of recognised conservation value but not affecting local ecosystem functioning

Commercial and Recreational Fishing	In-water (entrained) hydrocarbon exposure may potentially result in the contamination or acute impacts to fish species; nothing acute impacts are expected to eb limited to small numbers of juvenile fish, larvae, and planktonic organisms, which are not expected to affect population viability or recruitment. Actual or potential contamination of seafood can impact seafood markets long after any actual risk to seafood from a spill has subsided which can have economic impacts to the industry. However exposure is expected to minimal given the predicted patchy in-water hydrocarbons above an impact threshold. Consequently, the potential impacts and risks are considered to be **Minor (2)** as this type of event may result in a localised short-term impact, with no significant impact to third-parties.
Coastal Settlements	Visible surface hydrocarbon exposure (e.g. a rainbow sheen) and shoreline hydrocarbon exposure has the potential to reduce the visual amenity of nearshore areas around coastal settlements. However, due to rapid weathering of the MDO, visible sheens on the water surface are only predicted to occur for 1-2 days after release; and accumulate on the surface at the shoreline is also considered unlikely due to the behaviour of the MDO. Consequently, the potential impacts and risks to coastal settlements from surface and shoreline hydrocarbon exposure are considered to be **Minor (2)** as this type of event may result in a localised short-term impact, with no significant impact to third-parties.
Recreation and Tourism	Visible surface hydrocarbon exposure (e.g. a rainbow sheen) and shoreline hydrocarbon exposure has the potential to reduce the visual amenity of an area, and therefore impact marine-based recreation and tourism activities. However, due to rapid weathering of the MDO, visible sheens on the water surface are only predicted to occur for 1-2 days after release; and accumulate on the surface at the shoreline is also considered unlikely due to the behaviour of the MDO. Consequently, the potential impacts and risks to recreation and tourism from surface and shoreline hydrocarbon exposure are considered to be **Minor (2)** as this type of event may result in a localised short-term impact, with no significant impact to third-parties. In-water (entrained) hydrocarbon exposure may potentially impact recreation and tourism industry indirectly via any related impacts to presence of marine fauna (e.g. whales), particular habitats, and recreational fishing. Given the assessment for other receptors, the potential impacts and risks to recreation and tourism from in-water hydrocarbon exposure is considered to be **Negligible (1)**.
Heritage	Visible surface hydrocarbon exposure (e.g. a rainbow sheen) and shoreline hydrocarbon exposure has the potential to reduce the visual amenity of an area, and therefore impact areas of cultural heritage along the coast. However, due to rapid weathering of the MDO, visible sheens on the water surface are only predicted to occur for 1-2 days after release; and accumulate on the surface at the shoreline is also considered unlikely due to the behaviour of the MDO. Consequently, the potential impacts and risks to heritage values from surface and shoreline hydrocarbon exposure are considered to be **Minor (2)** as this type of event may result in a localised short-term impact, with no significant impact to third-parties.
ALARP Decision Context	**A**

Summary of Control Measures			
• Adherence to AMSA Marine Order Part 3 (Seagoing Qualifications) • Adherence to AMSA Marine Order Part 30 (Prevention of Collisions) • Development and adherence to vessel SMPEP (or equivalent) • Development and adherence to Cooper Energy's OPEP and FSP • Development and adherence to Cooper Energy's OSMP • Use of pre-start notifications including Notice to Mariners, as required under the *Navigation Act 2014*			
Likelihood	**Unlikely (D)**	**Residual Risk**	Low

6.16 Accidental Release - LOC (Loss of Well Control Event)

Table 6-16 provides a summary of the EIA / ERA for Accidental Release - LOC (Loss of Well Control Event).

Table 6-16 Accidental Release - LOC (Loss of Well Control Event) EIA / ERA

Cause of Aspect	A loss of well control (LOWC) event has the potential to be caused by the temporary abandonment of the well during the removal of the subsea tree.
Summary of impact(s)	The LOWC event has the potential to expose the environment to surface and in-water hydrocarbon, with the potential to directly or indirectly result in: • Toxicity or physical oiling to marine habitats or fauna; • Reduction in intrinsic value / visual aesthetics; • Damage to commercial businesses. Results of stochastic oil spill modelling for the subsea release of gas condensate have predicted: • No surface exposure above environmental impact thresholds; • Visible surface exposures predominantly in the vicinity of the well, with scattered and isolated exposures potentially occurring up to 120 km away; • No in-water (entrained or dissolved) exposure above environmental impact thresholds; • No shoreline exposure.
Consequence Evaluation	
Receptor(s)	**Description of Potential Environmental Impact**
Recreation and Tourism	Visible surface hydrocarbon exposure (e.g. a rainbow sheen) has the potential to reduce the visual amenity of an area, and therefore impact marine-based recreation and tourism activities. The extent of visible surface sheens was predicted to occur predominantly within the vicinity of the well, but may extend (<5% probability) up to 120 km east-southeast; however, due to the rapid weathering of the condensate, visible surface exposures were only predicted for 1-2 days after the release. Marine-based recreation and tourism in the vicinity of the well is expected to be minimal given its location >20 km offshore. Consequently, the potential impacts and risks are considered to be **Minor (2)** as this type of event may result in a localised short-term impact, with no significant impact to third-parties.

Heritage	Visible surface hydrocarbon exposure (e.g. a rainbow sheen) has the potential to reduce the visual amenity of an area, and therefore impact areas of cultural heritage along the coast. Visible surface sheens within nearshore coastal waters were predicted to the patchy and isolated. Therefore, any impact to coastal cultural heritage areas is expected to be for a short-period and of small spatial extent. Consequently, the potential impacts and risks are considered to be **Minor (2)** as this type of event may result in a localised short-term impact, with no significant impact to third-parties.		
ALARP Decision Context	**B**		
Summary of Control Measures			
• Adherence to the Cooper Energy Well Engineering Standards and Well Management System • Adherence to the Cooper Energy WOMP • Development and adherence to the Cooper Energy well program • Planned Maintenance Schedule • Development and adherence to the Cooper Energy OPEP and FSP • Development and adherence to the Cooper Energy OSMP			
Likelihood	**Unlikely (D)**	**Residual Risk**	Medium

7.0 Ongoing Monitoring of Environmental Performance

Cooper Energy retains responsibility as the Titleholder ensuring that the Casino-5 well intervention and workover activities are implemented in accordance with the performance outcomes outlined in the EP.

The systems in place to ensure that environmental performance and the standards in the EP are met are summarised in this section.

7.1 Cooper Energy's Health Safety Environment and Community Management System (HSEC MS)

Cooper Energy's Health Safety Environment and Community Management System (HSEC MS) is the corporate system which provides the framework for the delivery of Cooper Energy's values, policies, standards and practices related to health, safety, environment and community. The HSEC MS applies to all:

- Workplaces, sites and activities operated by Cooper Energy and under Cooper Energy's management or control;
- Exploration, construction and development activities under Cooper Energy management or control; and
- Cooper Energy employees, contractors and visitors on Cooper Energy sites, in offices and on activities such as offshore inspections, construction and development projects.

All personnel are expected to be familiar with, trained in, and comply with, the requirements of the HSEC MS.

7.2 Environmental Performance Monitoring & Reporting

7.2.1 Emissions and Discharges

For MODU / vessel-based activities Cooper Energy will collect and retain records of emissions and discharges. These emissions and discharges include treated bilge, sewage, food scraps, incinerator (waste), ballast water discharge, fuel use, chemical discharges, spills and accidental waste discharges.

A summary of these results will be reported in the EP performance report submitted to NOPSEMA.

7.2.2 Audit and Inspection

Environmental performance of the activities will be audited and reviewed in accordance with Cooper Energy's HSEC MS. These reviews are undertaken to ensure that:

- Environmental performance standards to achieve the environmental performance outcomes are being implemented, reviewed and where necessary amended;
- Potential non-compliances and opportunities for continuous improvement are identified; and
- All environmental monitoring requirements are being met.

The following arrangements review the environmental performance of the activity:

- Due-diligence pre-activity inspection/audit of the MODU / vessel will be carried out prior to the work commencing (and after contract award) to verify that procedures and equipment for managing routine discharges and emissions are in place to enable compliance with the EP; and
- Campaign inspections of the MODU / vessel by the Cooper Energy Site Representative to continually verify vessel activities are in compliance with the EP.

- Independent of vessel-based inspection/audit activities, Cooper Energy shall undertake a compliance audit of the commitments contained in the EP and assess the effectiveness of the implementation strategy.

Results from the environmental inspections and audits will be summarised in the annual EP performance report submitted to NOPSEMA.

7.2.3 Management of Non-conformance

In response to any EP non-compliances, corrective actions will be issued in accordance with the Cooper Energy Incident Management, Non-Conformity and Corrective Action Standard Instruction.

Corrective actions will specify the remedial action required to fix the breach and prevent its reoccurrence and is delegated to the person deemed most appropriate to fulfil the action. The action is closed out only when verified by the appropriate Manager and signed off. This process is maintained through the Cooper Energy corrective action tracking system.

Cooper Energy will carry forward any non-compliance items for consideration in future operations and drilling and completion activities to assist with continuous improvement in environmental management controls and performance outcomes.

7.3 Management of Change (MoC)

The *Cooper Energy MoC Standard Instruction* describes the requirements for dealing with managing change.

Environmentally relevant changes include:

- New activities, assets, equipment, processes or procedures proposed to be undertaken or implemented that have the potential to impact on the environment and have not been:
    - Assessed for environmental impact previously, in accordance with the relevant standard; and
    - Authorised in the existing management plans, procedures, work instructions or maintenance plans.
- Proposed changes to activities, assets, equipment, processes or procedures that have the potential to impact on the environment or interface with the environmental receptor;
- Changes to the existing environment including (but not limited to) fisheries, tourism and other commercial and recreational uses, and any changes to protective matter requirements; and
- Changes to the requirements of an existing external approval (e.g. changes to conditions of environmental licences).

For any MoC with identified environmental impacts or risks, an impact/risk assessment will be undertaken to consider implications of the proposed change on the environmental impacts/risks and the adopted control measures.

Additional controls identified as part of the MoC will be effective in reducing the environmental impact and risk to a level which is ALARP and acceptable; and will meet the nominated EPOs and EPSs set out in the accepted EP for the activity.

7.3.1 Revisions to the EP

If the proposed change introduces a significant new environmental impact or risk, results in a significant increase to an existing risk, or through a cumulative effect of a series of changes there is a significant increase in environmental impact or risk, this EP will be revised for re-submission to NOPSEMA.

In addition, the titleholder is obligated to ensure that all specific activities, tasks or actions required to complete the activity are provided for in the EP. Section 17(5) of the regulations

require that where there is a significant modification or new stage of the activity (that is, change to the spatial or temporal extent of the activity) a proposed revision of the EP will be submitted to NOPSEMA.

8.0 Emergency Response Arrangements

Cooper Energy manages emergencies from offshore Victoria activities in accordance with the Cooper Emergency Management Plan (CEMP). Within that document the following environmental incidents are recognised as emergencies together with the appropriate notification requirements. Relevant environmental emergencies, as they apply to the impacts and risks identified in this EP include the following:

- IMS introduction (notifiable to DELWP);
- Wildlife affected by an oil spill (notifiable to DELWP); and
- Marine pollution incidents (notifiable to Port of Portland, DEDJTR [Level 2] and AMSA).

Further emergency response arrangements as it relates to oil spill emergencies is detailed below.

8.1 Oil Spill Response Strategies

There are 2 credible spill scenarios for this activity that have been assessed in the EP:

1. LOC - Vessel collision resulting in a ruptured tank and spill of MDO (MDO spill)
2. LOC - Loss of well control (LOWC)

By conducting an Operational and Net Benefit Assessment, Cooper Energy has identified the following response strategies as being appropriate for a response to these events (Table 8-1). These are discussed in the Sections 8.1.1 to 8.1.5, and their impacts evaluated in Section 8.2.

Table 8-1 Suitability of Response Options for MDO and CHN Condensates Spills

Response Option	Adopted (✓ / X)	
	LOC – Vessel Collision (MDO)	LOC – LOWC (Casion-5 Condensate spill)
Source Control	✓	✓
Monitor & Evaluate	✓	✓
Dispersant Application	X	X
Contain & Recover	X	X
Protect & Deflect	✓	X
Shoreline Clean-up	Possible (certain areas where access is possible)	Possible (certain areas where access is possible)
Oiled wildlife Response (OWR)	✓	✓

8.1.1 Spill Response: Source control

Source control arrangements for significant vessel spills resulting from fuel tank perforation includes:

- closing water tight doors
- checking bulkheads;
- determining whether vessel separation will increase spillage;
- isolating penetrated tanks;
- tank lightering, etc.

Source control relies heavily upon the activation of the vessels SOPEP / SMPEP (or equivalent).

Well-related source control activities may range from:

- ROV intervention utilising specialist ROV tooling; and/or
- Well capping and/or
- Relief well installation.

8.1.2 Spill Response: Monitor and Evaluate

Ongoing monitoring and evaluation of the oil spill is a key strategy and critical for maintaining situational awareness and to complement and support the success of other response activities. In some situations, monitoring and evaluation may be the primary response strategy. Monitor and evaluate will apply to all marine spills.

It is the responsibility of the Control Agency to undertake operational monitoring during the spill event to inform the operational response. Operational monitoring includes the following:

- Aerial observation;
- Vessel-based observation;
- Computer-based tools:
  - Oil spill trajectory modelling;
  - Vector analysis (manual calculation); and
  - Automated Data Inquiry for Oil Spills (ADIOS) (a spill weathering model).
- Utilisation of satellite tracking drifter buoys.

8.1.3 Spill Response: Protect and Deflect

Shoreline protection includes use of a boom or sand berm to create a physical barrier to separate hydrocarbons from sensitive resources, to deflect hydrocarbons to other areas for recovery or towards an area where there will be reduced impact (compared to more sensitive sites).

8.1.4 Spill Response: Shoreline Assessment and Clean-up

Shoreline clean-up consists of different manual and mechanical recovery techniques to remove oil and contaminated debris from the shoreline to reduce ongoing environmental contamination and impact. It may include the following techniques:

- Natural recovery – allowing the shoreline to self-clean (no intervention undertaken);
- Manual collection of oil and debris – the use of people power to collect oil from the shoreline;
- Mechanical collection – use of machinery to collect and remove stranded oil and contaminated material;
- Sorbents – use of sorbent padding to absorb oil;
- Vacuum recovery, flushing, washing – the use of high volumes of low-pressure water, pumping and/or vacuuming to remove floating oil accumulated at the shoreline;
- Sediment reworking – move sediment to the surf to allow oil to be removed from the sediment and move sand by heavy machinery;
- Vegetation cutting – removing oiled vegetation; and
- Cleaning agents – application of chemicals such as dispersants to remove oil.

Any shoreline operations will be undertaken in consultation with, and under the control of DEDJTR EMD, the Control Agency for Victoria, and the appropriate land managers of the shoreline affected.

8.1.5 Spill Response: Oiled Wildlife Response

Oiled wildlife response consists of a three-tiered approach involving:

- Primary: Situational understanding of the species/populations potentially affected (ground-truth species presence and distribution by foot, boat or aerial observations);
- Secondary: Deterrence or displacement strategies (e.g., hazing by auditory bird scarers, visual flags or balloons, barricade fences; or pre-emptive capture); and
- Tertiary: Recovery, field stabilisation, transport, veterinary examination, triage, stabilisation, cleaning, rehabilitation, release.

In the event of a Level 2 or 3 hydrocarbon spill, the impacts on wildlife are determined by the types of fauna present, the type of oil spilled and the extent of exposure.

8.2 Risk Assessment of Oil Spill Response Strategies

This section provides a risk assessment of the oil spill response options, based on two credible spill scenarios:

3. LOC - Vessel collision resulting in a ruptured tank and spill of MDO (MDO spill)
4. LOC - Loss of well control (LOWC)

The information presented in this section has been used to inform the First Strike Plan (FSP) and the Oil Pollution Emergency Plan (OPEP).

Further information regarding emergency response arrangements can be found in Section 8.3.

8.2.1 Source Control

A NEBA of source control activities against the potential for, in the instance of a LOWC event, the increased impact/risk associated with vessel-based activities and relief well installation has not been undertaken as it is recognised that source control is the most effective means of mitigating oil spill impacts to the environment for large hydrocarbon releases.

The following source control options will be implemented in the event of a hydrocarbon release to the environment.

Table 8-2 provides a summary of the EIA / ERA for Source Control.

Table 8-2 Source Control EIA / ERA

Description of Response Strategy	Limit flow of hydrocarbons to environment
Net Environmental Benefit Analysis (NEBA)	
Suitability of response for • **LOC – Vessel Collision (MDO)**	Achieved by vessel SMPEP. Considered to be a viable option, with a net benefit
Suitability of response for • **LOC – LOWC (Casino-5 condensate spill)**	For wellhead issues: In accordance with the Offshore Victoria Source Control Plan (VIC-DC-ERP-0001). This plan provides a response to release incidents from wellheads. Considered to be a viable option, with a net benefit

Cause of Aspect	Vessel-based source control options (ROV Intervention and capping deployment) are vessel-based and the impacts and risks associated with those activities relate to: • Vessel discharges and emissions (sound, air emissions, bilge, etc.); • Vessel risks (discharges of deck drainage, IMS introduction, megafauna strikes, equipment loss to the environment, etc.); and • Seabed disturbance. MODU-based source control activities have common impacts and risks from MODU based workover activities described in Section 6.0, however also include the following: • Drill muds and cuttings discharge impacts; and • Cementing operations and cement residue discharges; • Loss of well control risk (dry gas impact).
Summary of impact(s)	All known and potential impacts from vessel-based activities have been identified within Section 6. Based upon the nature and scale of those described in Section 6, the risk evaluation is considered appropriate and thus has not been duplicated here. The control measures in Section 6 considered appropriate for vessel based source control activities will apply to this activity. Thus, vessel based risks have not been discussed further. A planned discharge of drill fluid, cuttings and cementing fluids and residue has the potential result in chronic and acute impacts to marine fauna via: • Potential toxicity. A planned discharge of drill fluid, cuttings and cementing fluids and residue has the potential to impact on receptors through: • Smothering and alteration of benthic habitats
Consequence Evaluation	
Receptor(s)	**Description of Potential Environmental Impact**
Benthic habitat	**Smothering and alteration of benthic habitats** Previous experience at the Minerva well site, which is in similar water depths to the CHN wells, showed that the physical influence of drilling was initially restricted to approximately 100m from the wellhead. Drill cuttings remained present 4 months after drilling completion, but were absent after 11 months, most probably because of sediment reworking due to natural hydrodynamic processes (Currie & Isaacs, 2005). Currie and Isaacs (2005) also identified that changes in abundance of benthic communities reduced within 100m of the wellhead, however in most cases these changes became undetectable four months after drilling. In high-energy environments such as Bass Strait little drilling mud and cuttings accumulate on the sea floor and solids are redistributed by bottom currents soon after deposition (Neff, 2010). Consequently, any impacts would be **Negligible (1)**.
Plankton Pelagic fish	**Potential Toxicity** Water-based muds (WBM) are proposed for any relief well activities on CHN assets. Minor quantities of WBM adhere to cuttings discharged overboard and may form a visible plume which extends from the rig dependent on current direction and speed and background turbidity of the water. Residual mud on cuttings is reduced prior to discharge in a cuttings treatment system. Visible plumes may also be evident when muds are discharged at the end of a well section, however this discharge rapidly disperses and dilutes in the Bass Strait marine environment. In Australia, the plume is typically visible not more than 1 km from the discharge point (Hinwood et al, 1994). As

	any relief wells will be located at least 30 km from shore, visual amenity impacts at adjacent shorelines are not expected. Plume discharges will be temporary and localised (negligible consequence). WBM chemicals discharged to the sea have the potential to impact to marine life. Cooper Energy utilises the UK Offshore Chemical Notification System (OCNS) standard to assess the environmental performance of chemicals during the well planning phase to ensure high environmental performance chemicals are selected which meet the technical requirements for drilling. Additives assessed as low toxicity, biodegradable and having no bioaccumulation potential are utilised. Accordingly, WBM discharges have a low toxicity footprint in the environment. Given the localised nature of the discharge, impacts to water quality and secondary impacts to marine fauna are assessed as having a negligible consequence. Cement used in the drilling program guarantees well integrity. Cement additives used in the program are selected in accordance with the Cooper Energy chemical management standards and have a CHARM rating of Gold or Silver, non-CHARM rating of "D" or "E" or are classified as posing little to no risk to the environment (PLONOR). During drilling operations, small volumes of excess cement per well section are disposed to the marine environment. Given the low environmental hazard presented by this discharge and the small volume, any impacts would be **Negligible (1)**.
ALARP Decision Context	**A**
Summary of Control Measures	
• Development of and adherence to Chemical Assessment Process • Maintain source control response capability as described in the Source Control Plan • Solids control equipment	

Likelihood	**Remote (E)**	**Residual Risk**	Low

8.2.2 Monitor and Evaluate

Ongoing monitoring and evaluation of the oil spill is a key strategy and critical for maintaining situational awareness and to complement and support the success of other response activities.

Table 8-3 provides a summary of the EIA / ERA for monitoring and evaluation activities.

Table 8-3 Monitor and Evaluate EIA / ERA

Description of Response Strategy	Direct observation – Aerial or marine; Vector Calculations; Oil Spill Trajectory Modelling; Satellite Tracking Buoys To maintain situational awareness, all monitor and evaluate options suitable.
Net Environmental Benefit Analysis (NEBA)	

Suitability of response for • **LOC – Vessel Collision (MDO)**	MDO spreads rapidly to thin layers. Aerial surveillance is considered more effective than vessel to inform spill response and identify if oil has contacted shoreline or wildlife. Vessel surveillance limited in effectiveness in determining spread of oil. Manual calculation based upon weather conditions will be used at the time to provide guidance to aerial observations. Oil Spill trajectory modelling utilised to forecast impact areas. Deployment of oil spill monitoring buoys at the time of vessel incident will assist in understanding the local current regime during the spill event. Considered to be a viable option, with a net benefit
Suitability of response for • **LOC – LOWC (Casino-5 condensate spill)**	Modelling identifies that for condensate spills over 84% of the liquid residue will evaporate over the first few hours of release, with a further 14% over the first day, leaving approximately 2% of the spill volume potentially observable at the sea surface (in calm weather conditions). For a continuous significant spill event (well blowout) hydrocarbons will be present at the surface for the duration of the release. To maintain situational awareness, all monitor and evaluate techniques will be considered during condensate spill incidents to understand the possible impacts. Considered to be a viable option, with a net benefit
Cause of Aspect	The following hazards associated with operational monitoring have the potential to interfere with marine fauna: • Additional vessel activity (over a greater area); and • Aircraft use for aerial surveillance (fixed wing or helicopter).
Summary of impact(s)	The potential impacts of underwater sound emissions in the marine environment are: • Localised and temporary fauna behavioural disturbance that significantly affects migration or social behaviours; and • Auditory impairment, Permanent Threshold Shift (PTS).

Consequence Evaluation	
Receptor(s)	**Description of Potential Environmental Impact**
Marine mammals Marine reptiles Fish Commercial fisheries	The potential impacts associated with aircraft and vessel activities have been evaluated in Section 6.4 of this EP Summary. Based upon the nature and scale of the activities, the evaluation is considered appropriate for any aerial or marine surveillance undertaken and thus has not been considered further.
ALARP Decision Context	**A**

Summary of Control Measures

- See Section 6.4 of this EP Summary
- Cooper Energy maintains capability to implement operational monitoring in a Level 2 or 3 spill event.
- As requested by the relevant CA Cooper Energy implements operational monitoring to inform spill response (Level 2 or 3 spill only).

Likelihood	**Remote (E)**	**Residual Risk**	Low

8.2.3 Protect and Deflect

Shoreline protection includes use of a boom or sand berm to create a physical barrier to separate hydrocarbons from sensitive resources, to deflect hydrocarbons to other areas for recovery or towards an area where there will be reduced impact (compared to more sensitive sites).

Table 8-4 presents the EIA / ERA for protect and deflect activities.

Table 8-4 Protect and Deflect EIA / ERA

Description of Response Strategy	Booms and skimmers deployed to protect environmental sensitivities. Environmental conditions (e.g., current, waves) limit application
Net Environmental Benefit Analysis (NEBA)	
Suitability of response for • **LOC – Vessel Collision (MDO)**	MDO has persistent components and has the potential to reach shorelines. Protection and deflection may be effective in protecting open estuaries that have environmental sensitivities (aquatic vegetation, recreational users). Shoreline booming (i.e. sea booming) is not considered viable due to the high energy environment of the Otway coast and the hazards of deploying and maintaining in such an environment. Considered to be a viable option, with a net benefit
Suitability of response for • **LOC – LOWC (Casino-5 condensate spill)**	Casino-5 condensates have no persistent hydrocarbon fractions and will weather rapidly within a few hours and spread into thin layers rapidly due to its viscosity. Predictive modelling identifies that no sensitive estuary systems are threatened by surface oiling. Accordingly, the application of shoreline protect and deflect is not considered a viable response option.
Cause of Aspect	The following hazards are associated with protection and deflection activities: • Boom deployment and management (especially anchored boom); and • Waste collection.
Summary of impact(s)	The known and potential impacts of booming activities are: • Loss of seabed vegetation and impacts to associated fauna habitats while deploying boom; • Disturbance to estuarine habitats from boom anchors; • Restricting access to the area for recreational activities.
Consequence Evaluation	
Receptor(s)	**Description of Potential Environmental Impact**
Nearshore habitats (such as seagrass) Shoreline habitats (sandy beach habitats).	Potential impacts of protect and deflect vary, depending on the method used and the nearshore / shoreline habitat. The consequence of these shoreline activities may potentially result in short-term and localised incidental damage to or alteration of habitats and ecological communities, and are ranked as **Minor (2)**.
ALARP Decision Context	**A**
Summary of Control Measures	

• Maintain protect and deflect capability as described in the Source Control Plan • As requested by relevant CA, Cooper Energy implements or supplies resources for protect and deflect operations (Level 2 or 3 spill), appropriate to the nature and scale of predicted shoreline impacts. • Consultation In the event of a spill will ensure that relevant government agencies support the protect and deflect strategy • Utilising existing tracks and paths where possible • Waste facilities are appropriately facilitated and managed • Collected waste is disposed of in accordance with waste disposal requirements.			
Likelihood	**Remote (E)**	**Residual Risk**	Low

8.2.4 Shoreline Assessment and Clean-up

Shoreline clean-up consists of different manual and mechanical recovery techniques to remove oil and contaminated debris from the shoreline to reduce ongoing environmental contamination and impact.

Table 8-5 provides the EIA / ERA for shoreline assessment and clean-up.

Table 8-5 Shoreline assessment and clean-up EIA / ERA

Description of Response Strategy	Where shoreline impact is predicted, shoreline clean-up assessment technique (SCAT) assessment is initiated. If SCAT and NEBA assess clean-up is of net benefit, initiate clean-up. Shoreline clean-up is a last response strategy due to the potential environmental impact; heavy resource requirements; health and safety concerns to responders; logistical complexities and waste management considerations
Net Environmental Benefit Analysis (NEBA)	
Suitability of response for • **LOC – Vessel Collision (MDO)**	Shoreline contact by MDO may occur at low levels from an MDO spill. Stochastic modelling indicates a there is only 13% probability of shoreline concentrations occurring greater than 25 g/m^2, with loading above 100 g/m^2 not expected to occur. Much of the shoreline affected by MDO residues is rock platform and backing cliffs where shoreline clean-up is hazardous and due to the nature of the shoreline habitat remediates rapidly. Access to these areas is limited along the Otway coastline. MDO residue reaching accessible sand shorelines is likely to infiltrate sand where it will be susceptible to remobilisation by wave action (reworking) until naturally degraded. Due to the light nature of the product and its dispersion in the environment prior to reaching shorelines it is possible that there would be insufficient quantities for manual clean-up. MDO does not discolour shoreline as much as other hydrocarbon types. Manual collection techniques likely to have limited effectiveness. Use of sediment reworking is possible. However, the potential for shoreline assessment and clean-up will be considered as part of the NEBA in the event of a spill incident. Response strategy offers net benefit to shoreline species which are sensitive to oil spill residues (e.g. birds).
Suitability of response for • **LOC – LOWC (Casino-5 condensate spill)**	Although no shoreline residues are predicted from a LOWC event, this response technique has been selected as being possibly viable as it would be considered as part of any NEBA in the event of a spill incident.

Cause of Aspect	The following hazards are associated with shoreline clean-up activities and may interfere with environmental sensitivities: • Personnel and equipment access to beaches; • Shoreline clean-up; and • Waste collection and disposal.
Summary of impact(s)	The known and potential impacts of these activities are: • Damage to or loss of vegetation; • Disturbance to fauna habitat and fauna from noise, air and light emissions from response activities; • Disturbance to Aboriginal cultural heritage (e.g., shell middens); • Temporary exclusion of the public from amenity beaches.
Consequence Evaluation	
Receptor(s)	**Description of Potential Environmental Impact**
Shoreline fauna and habitats Cultural heritage Recreation	The noise and general disturbance created by shoreline clean-up activities could potentially disturb the feeding, breeding, nesting or resting activities of resident and migratory fauna species that may be present (such as hooded plovers). Any erosion caused by responder access to sandy beaches, or the removal of sand, may also bury nests. In isolated instances, this is unlikely to have impacts at the population level. The movement of people, vehicles and equipment through backshore and dune areas may disturb cultural heritage artefacts that occur at the surface or are buried. Disturbance or damage to such sites will be minimised by fencing off such areas and reporting its presence to the relevant state regulatory agency. The vertical infiltration of oil into shoreline sediments caused by heavy machinery and equipment can expose fauna to oil that would not otherwise have been exposed. This exposes the base of the food-web to contamination that may bioaccumulate up through the food chain. It also results in the need for the increased removal of contaminated substrate, exacerbating risks such as beach erosion. The very presence of stranded oil and clean-up operations will necessitate temporary beach closures (likely to be weeks but depends on the degree of oiling and nature of the shoreline). This means recreational activities (such as swimming, walking, fishing, boating) in affected areas will be excluded until access is again granted by local authorities. Given the prevalence of rocky shorelines in the region, this is unlikely to represent a significant social or tourism drawback. Consequently, the potential impacts and risks from these activities are considered to be **Minor (2)**.
ALARP Decision Context	**A**
Summary of Control Measures	
• Maintain shoreline assessment and clean-up capability as described in the Source Control Plan • Consultation In the event of a spill will ensure that relevant government agencies support the shoreline assessment and clean-up strategy • Utilising existing tracks and paths where possible	

Likelihood	**Remote (E)**	**Residual Risk**	Low

8.2.5 Oiled Wildlife Response

In the event of a Level 2 or 3 hydrocarbon spill, the impacts on wildlife are determined by the types of fauna present, the type of oil spilled and the extent of exposure.

Oiled wildlife response (OWR) consists of a three-tiered approach involving:

- Primary: Situational understanding of the species/populations potentially affected (ground-truth species presence and distribution by foot, boat or aerial observations);
- Secondary: Deterrence or displacement strategies (e.g., hazing by auditory bird scarers, visual flags or balloons, barricade fences; or pre-emptive capture); and
- Tertiary: Recovery, field stabilisation, transport, veterinary examination, triage, stabilisation, cleaning, rehabilitation, release.

Table 8-6 provides the EIA / ERA for OWR activities.

Table 8-6 Oiled Wildlife Response EIA / ERA

Description of Response Strategy	Consists of capture, cleaning and rehabilitation of oiled wildlife. May include hazing or pre-spill captive management. In Victoria, this is managed by DELWP.
Net Environmental Benefit Analysis (NEBA)	
Suitability of response for • **LOC – Vessel Collision (MDO)**	Given limited size and rapid spreading of the MDO spill, large scale wildlife response is not expected. However, there is the potential that individual birds could become oiled near the spill. OWR is both a viable and prudent response option for this spill type.
Suitability of response for • **LOC – LOWC (Casino-5 condensate spill)**	OWR may offer net benefits to both seabirds which come into contact and area affected by minor residues. OWR is both a viable and prudent response option for this spill type.
Cause of Aspect	The hazards associated with OWR are: • Hazing of target fauna may deter non-target species from their normal activities (resting, feeding, breeding, etc.); • Distress, injury or death of target fauna from inappropriate handling and treatment; • Euthanasia of target individual animals that cannot be treated or have no chance of rehabilitation.
Summary of impact(s)	The potential impacts of this activity are disturbance, injury or death of fauna.
Consequence Evaluation	
Receptor(s)	**Description of Potential Environmental Impact**
Marine fauna	Untrained resources capturing and handling native fauna may cause distress, injury and death of the fauna. To prevent these impacts, only DELWP-trained oiled wildlife responders will approach and handle fauna. It is preferable to have oil-affected animals that have no prospect of surviving or being successfully rehabilitated and released to the environment humanely euthanized than to allow prolonged suffering. The removal of these individuals from the environment has

	additional benefits in so far as they are not consumed by predators/scavengers, avoiding secondary contamination of the food-web. Hazing and exclusion of wildlife from known congregation, resting, feeding, breeding or nesting areas may have a short- or long-term impact on the survival of that group if cannot access preferred resources. These effects may be experienced by target and non-target species. For example, shoreline booming or ditches dug to contain oil may prevent penguins from reaching their burrows after they've excited the water and low helicopter passes flown regularly over a beach to deter coastal birds from feeding in an oil-affected area may also deter penguins from leaving their burrows to feed at sea, which may impact on their health. Due to the potential for localised short-term impacts to species/habitats of recognised conservation value but not affecting local ecosystem functioning, the potential impacts form this activity have been identified as **Minor (2).**		
ALARP Decision Context	**A**		
Summary of Control Measures			
• Maintain OWR capability as described in the Source Control Plan • Consultation In the event of a spill will ensure that relevant government agencies support the OWR strategy • Utilising existing tracks and paths where possible • Wildlife is only approached or handled by DELWP-trained oiled wildlife responders.			
Likelihood	**Remote (E)**	**Residual Risk**	Low

8.3 Emergency (Oil Spill) Response Arrangements and Capability

The Cooper Energy implementation strategy for this activity includes an Emergency Response Plan (ERP)/Oil Pollution Emergency Plan (OPEP), which include details of the arrangements for testing the response arrangements contained within these plans.

Cooper Energy has in place a Cooper Emergency Management Plan (CEMP) and Offshore Victoria OPEP (VIC-ER-EMP-0001) for Offshore Victorian assets that will be implemented as part of emergency response escalation where hydrocarbons have been released offshore.

A Casino-5 well intervention and workover activity First Strike Plan (FSP) has been developed to specifically address the risks of this activity and subsequent response strategy which links to the accepted Offshore Victoria OPEP.

8.3.1 Oil Spill Response Capability

Cooper Energy ensures that adequate oil spill response capability is maintained by specifying response preparation controls in the Environment Plan. For the response strategies described in Section 8.1 the controls (both environmental performance and standards) are summarised in Table 8-7.

Table 8-7 Preparation Controls for Response Capabilities

Response Strategy	PREPARATION CONTROLS	
	Environmental Performance Outcomes	Environmental Performance Standards
Source Control		*Well Response Resources*

Response Strategy	PREPARATION CONTROLS	
	Environmental Performance Outcomes	Environmental Performance Standards
	Cooper Energy maintains capability to implement its Offshore VSCP (VIC-DC-EMP-0001)	Cooper Energy maintains the following agreements (or contractor pre-qualifications) to maintain source control capabilities: • Well Control Specialist (including capping stack capability). • ROV Contractors. • Subsea Engineering Company. • Well Engineering Contractor. • APPEA Mutual Assistance Agreement
		Cooper Energy conducts an annual source control desktop exercise.
Monitor and evaluate	Cooper Energy maintains capability to implement operational monitoring in a Level 2 or 3 spill event.	*Agreements* Cooper Energy maintains the following agreements (or contractor pre-qualifications) to maintain operational response capabilities: • AMOSC membership (Aerial Observers, RPS-APASA Contract). • AMSA MoU. • Aviation support (pre-qualification assessment). • Marine support services.
		Oil Spill Tracking Buoys MODU carries an oil spill tracking buoy and instructions for deployment.
Protect and deflect	Cooper Energy maintains capability to implement a "protect and deflect" response in a Level 2 or 3 spill event.	*Agreements* Cooper Energy maintains the following agreements (or contractor pre-qualifications) to maintain operational response capabilities: • AMOSC membership (equipment, personnel, CORE Group, Mutual Aid). • AMSA MoU (equipment, personnel). • Waste management contract.
Shoreline Clean-up	Cooper Energy maintains capability to implement SCAT and shoreline clean-up in a Level 2 or 3 spill event.	*Agreements* Cooper Energy maintains the following agreements to maintain shoreline assessment/clean-up response capabilities: • AMOSC membership (equipment, personnel, CORE Group. Mutual aid). • AMSA MoU (equipment, personnel). • Scientific resource support agreement (GHD or equivalent). • Waste management contract
Oiled Wildlife Response	Cooper Energy maintains capability to support oiled wildlife management in a Level 2 or 3 spill event.	Cooper Energy maintains the following agreements to maintain OWR response capabilities: • AMOSC membership (equipment, personnel). • Waste management contract. • Vessel Contract.

Response Strategy	PREPARATION CONTROLS	
	Environmental Performance Outcomes	Environmental Performance Standards
		• Vessel of Opportunity listing

8.3.2 Testing Oil Spill Response Arrangements

In accordance with the Commonwealth OPGGS(E)R Regulation 14 (8C) and in accordance with Cooper's HSEC management system, the OPEP will be tested:

- Prior to the commencement of a drilling campaign;
- When there is a significant amendment to the OPEP;
- Not later than 12 months after the most recent test; and
- In accordance with the schedule outlined in Table 8-8.

Exercises will be documented and any corrective actions/recommendations arising from the exercises will be managed in accordance with the *Incident Management, Non-Conformity and Corrective Action Standard Instruction (COE-MS-STI-0020)* and stewarded to closure by the Cooper Energy Drilling HSEC Advisor.

Where changes are required to the OPEP resulting from exercise outcomes, altered contractual arrangements, corrective actions, routine information updates (i.e. contact details change), or other items; the Cooper Energy General Manager Operations is responsible for ensuring changes are assessed against Commonwealth OPGGS(E)R Regulation 17 revision criteria and where necessary, the EP/OPEP submitted to NOPSEMA as a formal revision.

For changes which do not trigger a formal revision, internal revisions to the OPEP will be in accordance with the *Cooper Energy Management of Change Standard Instruction (COE-MS-STI-0013)* with any change justified.

Table 8-8 OPEP Exercise Schedule (Victorian Operations)

EXERCISE NO:	SCOPE	OBJECTIVES	PURPOSE	FREQUENCY
1	Emergency Contact Verification	• Test emergency contact information;	• Maintain currency on contact information.	Bi-annual
2	Level 2/3 Spill Response (Desktop) (Infrastructure)	1. Alert and call-out of response teams to respective incident control centres (ICC).	• Test communication systems • Availability of personnel • Ability to transmit information quickly and accurately • Confirm ICC suitability	Annual *This will be tested on CHN infrastructure*
		2. Cooper Energy Emergency Management Team (EMT) to activate first-strike response operation (desk-top only); confirm external support resources are available to respond; and develop and implement an Incident Action Plan (IAP) for the next operational period	• Test Cooper Energy EMT knowledge and capability • Ensure personnel are familiar with roles • Ensure that support arrangements meet required timeframes within OPEP.	
		3. Test Cooper Energy crisis management arrangements including activation of the Cooper Energy crisis management team (CEMT) to support the Cooper Energy EMT during a significant oil spill event.	• Test communications systems • Test transmission of information • Evaluate CEMT support requirements to EMT	

EXERCISE NO:	SCOPE	OBJECTIVES	PURPOSE	FREQUENCY
		SCENARIO-BASED TESTING IN ANNUAL EXERCISE (As relevant to Scenario)		
		1. For Cooper Energy infrastructure scenarios (pipeline rupture) test Cooper Energy's interface with State response arrangements	• Confirm communication and information transfer protocols • Test alignment of Cooper Energy NEBA and IAP processes with DEDJTR; • Test interface processes.	
		2. For blowout scenario, test interface between source control team and oil spill response team (scenario interjects only)	• Test communication protocols • Provision of adequate information transfer	
3	Level 2/3 Spill Response (Desktop) (IMR Vessel)	1. Covered by Exercise 2, Objective 1 & 2		On IMR Inspection (if IMR activity occurs at a frequency greater than one year)
		2. For vessel-based inspection, maintenance and repair (IMR) scenarios, test interface between the vessel SMPEP, OPEP, NATPLAN and Victorian Maritime Emergency (non-search and Rescue) Plan.	• Test notification protocols and information/ documentation transfer with State and Commonwealth Regulators	
4	Discussion Exercise	1. Ensure consistent, effective approach to managing emergencies between Cooper Energy and State authorities	• Align Cooper Energy and State Regulator response management.	Every 2 years

8.4 Operational and Scientific Monitoring Plan (OSMP)

The Offshore Victoria Operational and Scientific Monitoring Program (OSMP) (VIC-ER-EMP-0002) contains detail regarding the triggers for commencing operational and scientific monitoring, who will conduct the monitoring and what will be monitored. This document supports the Offshore Victoria OPEP by:

- Detailing operational monitoring (Type I) requirements to be implemented in a spill to inform spill response activities; and
- Scientific monitoring (Type II) to quantify the nature of extent, severity and persistence of environmental impacts from a spill event and inform on appropriate remediation activities.

9.0 Stakeholder Consultation

Cooper has undertaken stakeholder engagement in preparation of the Casino-5 Well Intervention and Workover Environment Plan.

Determining the stakeholders for the Casino activity involved the following:

- Reviewing existing stakeholders identified as relevant and contained within the Cooper Energy stakeholder register (Otway and Gippsland Basins);
- Reviewing previous Casino Henry and Netherby (CHN) consultation records;
- Conversing with existing stakeholders to identify potential new stakeholders;
- Reviewing Commonwealth and State fisheries jurisdictions and fishing effort in the region; and
- Determining the Titleholders of nearby exploration permits and production licences through the National Offshore Petroleum Titles Administrator (NOPTA) website.

Cooper Energy has undertaken activities in the Otway Basin for an extended period as both Cooper Energy and previously as Santos, and in this time, has consulted with stakeholders in the region and established a good working relationship with them.

Stakeholders identified and contacted for this activity, grouped by the categories listed under OPGGS(E)R Regulation 11A, are listed in Table 9-1.

Table 9-1: Stakeholders for the Casino-5 well workover activity

Department or agency of the Commonwealth to which the activities to be carried out under the EP may be relevant	
Australian Fisheries Management Authority (AFMA)	Australian Hydrological Service (AHS)
Australian Border Control	Australian Maritime Safety Authority (AMSA)
Department of Agriculture and Water Resources (DAWR)	Department of Communications
Department of Defence (DoD)	Department of Environment and Energy (DoEE) - Marine Protected Areas Branch
Department of Innovation, Industry and Science (DIIS)	Geoscience Australia
Marine Border Command	National Native Title Tribunal (NNTT)
Each Department or agency of a State or the Northern Territory to which the activities to be carried out under the EP may be relevant	
DEDJTR – Earth Resources Regulation (ERR)	DEDJTR – Victorian Fishery Authority
DEDJTR - Transport Victoria - Marine Pollution Team	DELWP - Marine National Parks and Marine Parks
DELWP -Victorian Coastal Council	DELWP - Wildlife Emergencies and Biodiversity Regulation
Transport Safety Victoria (Maritime Safety)	
The Department of the responsible State Minister, or the responsible Northern Territory Minister	
DEDJTR – Earth Resources Regulation (ERR)	

A person or organisation whose functions, interests or activities may be affected by the activities to be carried out under the EP	
Fisheries:	
Abalone Council Australia	Abalone Victoria (Central Zone) (AVCZ)
Apollo Bay Fisherman's Cooperative	Commonwealth Fisheries Authority
Eastern Zone Abalone Industry Association	Port Campbell Professional Fisherman's Association
Port Franklin Fisherman's Association	Portland Professional Fisherman's Association
San Remo Fishing Cooperative	Seafood Industry Victoria (SIV)
South-east Fishing Trawl Industry Association (SETFIA)	Southern Rock Lobster Ltd
Southern Shark Industry Alliance	Sustainable Shark Fishing Inc. (SSF)
Victorian Recreational Fishers Association (VRFish)	Victorian Rock Lobster Association (VRLA)
Victorian Scallop Fisherman's Association	Warrnambool Professional Fisherman's Association
Western Abalone Divers Association (WADA)	
Oil spill preparedness and response agencies:	
Australian Marine Oil Spill Centre (AMOSC)	DEDJTR – Marine Pollution Branch
Parks Victoria	Department of Environment, Land, Water and Planning (DELWP)
Nearby Petroleum Titleholders:	
Lattice Energy Limited (Origin Energy Resources Ltd)	
Other entities:	
Aboriginal Affairs Victoria	Australian Oceanographic Services P/L
Native Title Services Victoria	Southern Cross Cables
Victorian Fish and Food Marketing Association	
Any other person or organisation that the Titleholder considers relevant	
Community interests:	
Port Campbell Boat Charters	Scuba Divers Federation of Victoria (SDFV)

9.1 Consultation Approach

9.1.1 Initial Consultation

2018 Offshore Drilling Campaign Brochure

A 2018 Offshore Campaign Stakeholder Information Brochure outlining upcoming Cooper Energy activities in the Otway and Gippsland Basins, including Casino-5 workover activities, was disseminated to stakeholders in September 2017. The brochure provides information concerning the location, timing and nature of the proposed activities, information on potential risks and

impacts, and provides contact details should stakeholders wish to seek further information or have an objection.

Distribution of Survey Information via Fishing Associations

To ensure broader communications with new and existing commercial fishers; entities or individuals holding commercial fishing licences have been informed of the activities via government and private associations such as AFMA, SIV, VFA and SETFIA.

Cooper Energy Website

The 2018 Offshore Campaign Stakeholder Information Brochure has been made available on the Cooper website (http://www.cooperenergy.com.au/) for all interested members of the public to access. Information prepared for future project milestones will also be made available on the website.

9.1.2 Summary of Stakeholder Consultation

Stakeholder engagement has involved a combination of email exchanges and phone conversations.

A summary of stakeholder responses, Cooper Energy's assessment of any objections or claims and response or proposed response, are provided in Table 9-2. It should be noted that most of responses are generic and relate equally to other activities that may occur as part of Cooper Energy's 2018 Offshore Campaign. Only two (2) responses (AMOSC and AMSA) refer directly to the Casino activities.

9.2 Ongoing Consultation

Consultation with relevant stakeholders will be ongoing. Cooper Energy will comply with requests by stakeholders for additional information or updates during the activity itself. In addition, stakeholders will be notified of any changes to scope of the EP that may affect their interests or activities at a minimum two (2) weeks in advance of an activity to be undertaken under that change.

Prior to the workover activity commencing, Cooper Energy will provide relevant stakeholder's further information including:

- Confirmation on the timing and duration;
- Name and call sign of any associated vessels (if known);
- A description of the activities which are being undertaken;
- A request to provide feedback on the activities;
- The opportunity for face-to-face meetings; and
- Contact details of where any claims, objection or concerns may be directed.

As part of this process, Cooper Energy shall check that identified stakeholders are still relevant and correct, and identify new stakeholders (via organisational bodies such as AFMA, AMSA, SIV, SETFIA, lessons learnt etc.).

Cooper will follow-up with stakeholders providing notifications approximately five days prior to activity commencement (or as requested by the individual stakeholder) and a demobilisation notification within 10 days of completion of the activity (or at a period requested by stakeholder).

Activity notification may be a stand-alone notice or part of another Campaign Brochure (or equivalent)

Table 9-2: Stakeholder Feedback and Cooper Assessment of Claims/Objections

Stakeholder	Relevance to Activity	Information provided (Date, Method, Record, Number)	Summary of Response	Assessment of Merits to Adverse Claim / Objection	Operators Response to each Claim / Objection
Aboriginal Affairs Victoria	Responsible for the implementation of the Aboriginal Heritage Act 2006 and the Aboriginal Lands Act 1970. Determines RAPs.	19/9/2017– emailed 2018 Offshore Campaign Stakeholder Information brochure.	Your message was received. Thank You.	No assessment required	Not applicable
			Thanked COE for the information and that it will be passed on to major projects senior officer for consideration. If he determines a cause for response he will get back to you.	No assessment required	Responded with thanks and offer of further information if required.
Australian Fisheries Management Authority	Management of Commonwealth Commercial Fisheries from 3nm to 200nm (EEZ)	19/9/2017– emailed 2018 Offshore Campaign Stakeholder Information brochure.	Replied with thanks	Not Applicable	Not Applicable
			Requested that all correspondence be via the generic petroleum@afma.gov.au address and it will then be disseminated to relevant managers.	No claims or objection to be assessed. All emails to only go via generic petroleum email address.	COE confirmed that the information was sent to the appropriate fishing industry contacts as outlined in the link. requested confirmation then that any information about upcoming activities only be emailed to the 'petroleum' address and not to individual fishery managers.
Australian Hydrographic Services	Commonwealth Agency responsible for Hydrographic Services such as Notice to Mariners Details of infrastructure placed on Navigation Charts Charting and Information Management	19/9/2017– emailed 2018 Offshore Campaign Stakeholder Information brochure.	Requested to provide finalised information at least three weeks prior to commencement of any works to allow for publication of notices to mariners.	No claims or objections to be assessed.	COE confirmed information would be provided to AHS at least 3 weeks prior to activities commencing

Stakeholder	Relevance to Activity	Information provided (Date, Method, Record, Number)	Summary of Response	Assessment of Merits to Adverse Claim / Objection	Operators Response to each Claim / Objection
Australian Maritime Safety Authority	Safety Regulator for Marine Safety and Vessel-based Oil Spill Response in Commonwealth Waters Impacts on Shipping Routes & Navigation Warnings Marine Pollution Controller in Commonwealth Waters for Vessels	19/9/2017– emailed 2018 Offshore Campaign Stakeholder Information brochure.	22/9/2017: Thanked COE for providing information on PSZ, NtM and AUSCOAST warnings. Provided updated data traffic plots for Otway and Gippsland basins. Identified where greater traffic may be encountered. Noted that vessels entering and exiting the Traffic Separation Scheme (TSS) slightly encroach on BMG and Sole. Requested JRCC be contacted 24-48 hours before activity commences with vessel details etc to promulgate AUSCOAST warning. Requested AHS be contacted at least 4 weeks prior to activities for NtM (vis hyrdo email) and to update charts (via datacentre email).	22/9/2017: No claims or objections to be assessed. COE acknowledge increased traffic in areas	23/9/2017: COE acknowledged increased traffic in the areas and that the TSS slightly encroaches on BMG and Sole. COE acknowledge the timeframes and requirements for notification to AMSA in relation to the Auscoast warnings and NtM as well as any petroleum safety zones. This information will be carried through into EP and future correspondence requirements.
Department of Environment, Land Water and Planning (DELWP)	Pipeline Regulation, Regulation and Approvals Energy, Environment and Climate Change Group	19/9/2017– emailed 2018 Offshore Campaign Stakeholder Information brochure.	20/9/2017: Replied with thanks	20/9/2017: No claims or objections to be assessed.	No response required
			19/9/2017: Thanked COE for the update. Requested confirmation that the 'single point of contact' is for general communications rather than statutory reporting obligations, and that legal arrangements for the transfer of Victorian land based pipelines will continue as is and the current contacts will not be affected	19/9/2017: COE acknowledge confusion regarding point of contact and provided clarity as requested	19/9/2017: COE confirmed that the parties involved in reporting etc. will not change but If any changes do occur, DELWP will be notified immediately and amend and resubmit documentation as required.

Stakeholder	Relevance to Activity	Information provided (Date, Method, Record, Number)	Summary of Response	Assessment of Merits to Adverse Claim / Objection	Operators Response to each Claim / Objection
AMOSC	Oil Spill Response Organisation Review and comment on Cooper Energy Offshore Victorian Oil Pollution Emergency Plan (OPEP) reviewer	19/9/2017– emailed 2018 Offshore Campaign Stakeholder Information brochure. Cooper Energy maintains an Associate Membership with AMOSC	19/9/2017: AMOSC does not distribute member information amongst the membership group. We will however, be very interested in receiving a draft copy of the OPEP to confirm with Cooper AMOSC's resources and processes and comment on the same.	20/9/2017: Cooper apologized for not removing the sentence regarding distribution from the covering email. No issue with comments provided	Responded stating that OPEP is being finalised and will be forwarded to AMOSC for review in the near future. OPEP was supplied to AMOSC for review. Comments were received and incorporated as appropriate.
Department of the Environment and Energy	Commonwealth Department formally overseeing offshore petroleum activities.	Offshore Campaign Stakeholder Information brochure.	19/9/2017 - Generic response: Requested all information be via NOPSEMA. Provided links to further guidance material.	COE acknowledge the advice from DOE.	19/9/2017: COE will no longer send information to DOE offshore petroleum email address. No response necessary as it's a generic response email from DOE. Remove from stakeholder register.
DEDJTR Victorian Fishery Authority (VFA)	Department of Economic Development, Jobs, Transport and Resources Peak State Fisheries body Regulator offshore to 3mn Victorian coastal Waters	19/9/2017– emailed 2018 Offshore Campaign Stakeholder Information brochure.	4/10/2017: Response to BMG notice. Requested all info be sent to nominated officer. 10/10/2017: VFA confirmed that all correspondence to now go via nominated officer and that all VFA emails are now VFA and not ecodev.	no assessment required	4/10/2017: COE acknowledged request and will update database 9/10/2017: COE reverted back to VFA to request whether ALL correspondence now goes to nominated officer and whether they were using new email addresses. 10/102017: COE will ensure all correspondence goes to nominated officer and that the VFA emails will be used.
Geoscience Australia		19/9/2017– emailed 2018 Offshore Campaign Stakeholder Information brochure.	19/9/2017: Out of office reply, but noting officer has access to emails	no assessment required	No response required

Stakeholder	Relevance to Activity	Information provided (Date, Method, Record, Number)	Summary of Response	Assessment of Merits to Adverse Claim / Objection	Operators Response to each Claim / Objection
Australian Oceanographic Services Pty Ltd	Oil and Gas Fishery Liaison	19/9/2017– emailed 2018 Offshore Campaign Stakeholder Information brochure.	22/9/2017: Representative outlined their experience in O&G, fishing, energy transmission and provision of services and requested opportunity to talk that day. 23/9/2017: Agreed talks can wait. Representative spoke with COE management and service boat owners regarding their vessels being used for future support activities.	22/9/2017: No assessment required. COE acknowledge representatives experience and welcome the opportunity to work with him. 23/9/2017: no adverse claim or objection to assess. COE acknowledge possible use of fishing vessels	22/9/2017: COE acknowledged representative but stated that the COE liaison would be out of the country until the 12th and requested that the discussion be delayed. 23/9/2017: COE agreed that use of fishing vessels where possible has merit as builds good relations. Confirmed will be in touch on return.
Department of Agriculture and Water Resources - MNCC		19/9/2017– emailed 2018 Offshore Campaign Stakeholder Information brochure.	20/9/2017: Auto reply outlining requirements for vessels entering Australian waters to enter info in the the MARS system including: • Pre-Arrival Report (PAR) – 96 and 12 hours prior to arrival in Australia. • Ballast Water Report (BWR) – no later than 12 hours prior to arrival in Australia if the vessel is fitted with ballast tanks. Ballast water must be managed in accordance with the Australian Ballast Water Requirements. • Non First Point of Entry Application (NFP) submitted no less than 10 working days prior to arrival in Australia (if applicable). Changes in health of crew to be reported Links to information provided	No assessment required	20/9/2017: No response required as automated reply. Information provided shall be included in subsequent EPs as necessary

Stakeholder	Relevance to Activity	Information provided (Date, Method, Record, Number)	Summary of Response	Assessment of Merits to Adverse Claim / Objection	Operators Response to each Claim / Objection
National Native Title Tribunal		19/9/2017– emailed 2018 Offshore Campaign Stakeholder Information brochure.	20/9/2017. email from representative stating that there were no registered claims over the area of proposed activities. However stated that for pipelines that crossed the coast that it may impacts on interests of two groups. Stated: The proposed activities will take place within the Representative Aboriginal Torres Strait Islander Body Area of the Native Title Services Victoria Ltd. You may wish to, if you have not already consult with that body. It is not appropriate for the Tribunal to comment further. 5/10/2017 - NNTT confirmed contact details for NTSV and also provided a link to geospatial maps outlining RATSIB areas	No assessment required Area unlikely to be affected by offshore activities at Casino	5/10/2017: COE acknowledged that no registered native title claims or determined native title claims appear to overlap the proposed offshore areas and that where a new pipeline crosses the coast and becomes onshore that native title holders may be impacted. Confirmed that relevant parties will be contacted as required. Acknowledged that the Native Title Services Victoria Ltd have not been contacted and requested NNTT confirm the contact details for the group. COE also acknowledge that the Tribunal cannot comment any further on the activities. NTSV sent flyer on 9/10/17. 5/10/17 - COE thanked NNTT for the assistance and that the maps would be reviewed.
Parks Victoria	Marine Park	19/9/2017– emailed 2018 Offshore Campaign Stakeholder Information brochure.	19/9/2017: automated response email	No assessment required	No response required

Stakeholder	Relevance to Activity	Information provided (Date, Method, Record, Number)	Summary of Response	Assessment of Merits to Adverse Claim / Objection	Operators Response to each Claim / Objection
South-East Trawl Fishing Industry Association	Peak Industry Group for Trawl Fishermen in the SE Region Interests: Activity Notifications Increased impacts that may affect upcoming FIS	19/9/2017– emailed 2018 Offshore Campaign Stakeholder Information brochure.	No response received in relation to emailed brochure 26/9/2017: Generic email sent to all O&G stakeholders outlining the upcoming Fish Survey and request to not undertake any activities between Feb and mid-Sept 2018 and then again between Feb and mid-Sept 2018. Noted that an earlier request was sent out asking that no seismic be undertaken but that SETFIA has received 2 notices re non-seismic activities 28/9/2017: Confirmed may be available 9/10/2017: SETFIA stated the outcome was not what they were after. They will decide whether to proceed with the FIS shot(s) in question for that survey, but suspect not.	Assessment of claims and objections is required as the activity will be within the 6 months prior to the FIS and in close proximity. Initial notice only asked that seismic not be undertaken. COE are not undertaking seismic activities. Cooper have assessed that the offshore activities will not negatively impact the FIS.	28/9/2017: COE acknowledged the email stating that an official response was being drafted. Requested confirmation of meeting date for the Mon or Tues 30/9/2017: Meeting invite sent 5/10/2017: Official response addressing claims and objections emailed. COE acknowledged: importance of FIS and potential impacts of seismic, but that our activities are not seismic and that any noise emissions would be similar to those currently generated by existing O&G operations or transiting vessels in the region. Provided supporting information on likely produced sound levels of the activities and that the noise from the vessels is greater than from drilling itself. Based on studies it is likely received levels will be less than 120dB within only 2-4 km from the activity, while seismic may only reach such levels 35 km away. As such, the activities cannot be compared to each other as stated in the SETFIA letter. It is anticipated that the drilling program will be completed before the FIS commences in August and pipelay activities will commence in nearshore waters adjacent to the Orbost Gas Plant between September and November 2018, and so likely not impact the FIS. 9/10/2017: Meeting confirmed for Tuesday 17th to discuss the issues raised 11/10/2017: COE replied with thanks and that the issues would be discussed in the meeting on the 17th.

Stakeholder	Relevance to Activity	Information provided (Date, Method, Record, Number)	Summary of Response	Assessment of Merits to Adverse Claim / Objection	Operators Response to each Claim / Objection
Seafood Industry Victoria	Peak Industry Body for Victorian seafood and fisheries	19/9/2017– emailed 2018 Offshore Campaign Stakeholder Information brochure.	19/9/2017: Out of office reply. Alternate email address provided.	Email was already also sent to alternative email address and so not further action is required.	No action required
			19/9/2017: Representative responded requesting when feedback is required as they would like to discuss this and sit down and work through an appropriate approach to consulting with the fishing industry of Victoria.	No assessment required	19/9/2017: COE responded stating first EP to be submitted within 1 month. Reminded SIV that consultation is ongoing and understood that they need time to discuss the approach with their members. 9/10/2017: Follow up email sent to see if SIV had any response or required a meeting 11/10/2017: Meeting organised for Monday 16th September.
Southern Cross Cable Network		19/9/2017– emailed 2018 Offshore Campaign Stakeholder Information brochure.	19/9/2017: Thank you for the information and notice, we will share this with our members in the Submarine Cable community and advise you of any issues or concerns.	No assessment required Unlikely to be affected by activities at Casino	20/9/2017: COE sent thanks and offer for more info if required.
Southern Shark Industry Alliance	Peak Group for Gummy Shark fishing southern Australia	19/9/2017– emailed 2018 Offshore Campaign Stakeholder Information brochure.	20/9/2017: Auto reply	No assessment required	No action required
Marine Border Control	Integrated defence/customs organisation which provides security for offshore marine areas	2017.10.10 – emailed 2018 Offshore Campaign Stakeholder Information brochure.	10/10/2017: MBC confirmed that they are the catch all for oil and gas industry and will forward all information to the relevant parties within MBC	No assessment required	No action required 11/10/2017: COE replied with thanks

Stakeholder	Relevance to Activity	Information provided (Date, Method, Record, Number)	Summary of Response	Assessment of Merits to Adverse Claim / Objection	Operators Response to each Claim / Objection
Department of Communications and the Arts Submarine Cables Team	Submarine Cables Team	19/9/2017– emailed 2018 Offshore Campaign Stakeholder Information brochure.	10/10/2017: The department had no comments on the proposals noting that there are three submarine cables across Bass Strait connecting Victoria and Tasmania, but they do not appear to be in the vicinity of the activity areas	No assessment required	No action required 11/10/2017: COE replied with thanks and questioned whether the department still wanted to receive updates since their assets were not in the vicinity

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11.0 Acronyms and Units

11.1 Acronyms

Acronym	Description
ADIOS	Automated Data Inquiry for Oil Spills
AFMA	Australian Fisheries Management Authority
AHS	Australasian Hydrographic Society
AHTS	Anchor Handling, Tow and Support
ALARP	As Low As Reasonably Practical
AMOSC	Australian Marine Oil Spill Centre
AMP	Australian Marine Park
AMSA	Australian Maritime Safety Authority
API	American Petroleum Institute
APPEA	Australian Petroleum Producer & Exploration Association
APPEA	Australian Petroleum Production and Exploration Association
AQIS	Australian Quarantine and Inspection Service
AVCZ	Central Zone Abalone Association
BAOAC	Bonn Agreement Oil Appearance Code
BIA	Biologically Important Areas
BOD	Biological Oxygen Demand
BOM	Bureau of Meteorology
BOP	Blowout Preventer
CAMBA	Agreement between the Government of Australia and the Government of the People's Republic of China for the Protection of Migratory Birds and their Environment
CBTA	Competency Based Training Assessment
CFSR	Climate Forecast System Reanalysis
CHN	Casino Henry and Netherby
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CoEP	Code of Environmental Practice
DAFF	Department of Agriculture, Fisheries and Forestry
DAWR	Department of Agriculture, Water and Resources
DEDJTR	Department of Economic Development, Jobs, Transport and Resources
DELWP	Department of Environment, Land, Water and Planning
DIIS	Department of Innovation, Industry and Science

Acronym	Description
DoD	Department of Defence
DoE	Department of Environment
DSV	Diving support vessel
EHU	electro-hydraulic umbilical
EIA	Environmental Impact Assessment
EMBA	Environment that May Be Affected
EMP	Emergency Management Plan
EMS	Environmental Management System
EMT	Emergency Management Team
EP	Environment Plan
EPA	Environment Protection Authority
EPBC	Environmental Protection and Biodiversity Conservation
EPO	Environmental Performance Outcomes
EPS	Environmental Performance Standards
ERP	Emergency Response Plan
ERR	Earth Resources Regulation
ESD	Ecologically Sustainable Development
FFG	Flora and Fauna Guarantee
FSP	First Strike Plan
FSP	First Strike Plan
GEMS	Diamond's Global Excellence Management System
GHG	Global Greenhouse Gas
HSEC	Health, Safety, Environmental and Community
HSEC-MS	Health, Safety, Environmental and Community Management System Management System
HSEQ	Health, Safety, Environmental and Quality
HXT	Subsea Horizontal Tree
IADC	International Association of Drilling Contractors
IAP	Incident Action Plan
IC	Incident Controller
ICC	Incident Control Centres
IGP	Iona Gas Plant
IMPs	Invasive Marine Pests

Acronym	Description
IMR	Inspection, maintenance and repair
IOGP	International Association of Oil and Gas Producers
IOPP	International Oil Pollution Prevention
ISM	International Safety Management
ISO	International Organisation for Standardisation
IWCF	International Well Control Forum
IWOCS	Installation Workover and Control System
JAMBA	Agreement between the Government of Australia and the Government of Japan for the Protection of Migratory Birds and Birds in Danger of Extinction and their Environment
JHA	Job Hazard Assessments
JRCC	Joint Rescue Coordination Centre
JSA	Job Safety Analysis
KEF	Key Ecological Features
LOC	Loss of Containment
LOWC	Loss of Well Control
MAA	Mutual Assistance Agreement
MARPOL	International Convention for the Prevention of Pollution from Ships
MARS	Maritime Arrivals Reporting System
MBC	Maritime Border Command
MC	Measurement Criteria
MDO	Marine Diesel Oil
MEG	Mono Ethylene Glycol
MFO	Marine Fauna Observation
MNES	Matters of National Environmental Significance
MO	Marine Orders
MoC	Management of Change
MODU	Mobile Offshore Drilling Unit
MoU	Memorandum of Understanding
NCEP	National Centre for Environmental Prediction
NEPM	National Environmental Protection (Air Quality) Measures
NES	National Ecological Significance
NMFS	National Marine Fisheries Service
NOPSEMA	National Offshore Petroleum Safety and Environmental Management Authority

Acronym	Description
NOPTA	National Offshore Petroleum Titles Administrator
NORMS	Naturally Occurring Radioactive Materials
NP	National Park
OCNS	Offshore Chemical Notification System
ODME	Oil Detection Monitoring Equipment
OEM	Original Equipment Manufacturer
OIM	Offshore Installations Manager
OPEP	Oil Pollution Emergency Plan
OPGGS	Offshore Petroleum and Greenhouse Gas Storage
OPGGS(E)R)	Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009
OPRC	International Convention on Oil Pollution Preparedness, Response and Cooperation
OSMP	Operational and Scientific Monitoring Program
OSRL	Oil Spill Response Limited
OSTM	Oil Spill Trajectory Modelling
OWR	Oiled wildlife Response
OWS	Oily Water Separator
PLONOR	Posing Little Or No Risk to the environment
PMS	Planned Maintenance System
PNEC	Predicted No Effect Concentration
POB	Persons on Board
POWBONS	Pollution of Waters by Oil and Noxious Substances Act
PPE	Personal Protective Equipment
PSZ	Petroleum Safety Zone
PTS	Permanent Threshold Shift
PTW	Permit to Work
RAMSAR	Convention on Wetlands of International Importance especially as Waterfowl Habitat
RCP	Risk Control Practices
RMS	Root Mean Squared
RO	Reverse Osmosis
ROV	Remotely Operated Vehicle/S
SCAT	Shoreline Clean-Up Assessment Technique
SDFV	Scuba Divers Federation of Victoria

Acronym	Description
SEMS	Diamond's Safety and Environmental Management System
SETFIA	South-east Fishing Trawl Industry Association
SIMAP	Spill Impact Mapping Analysis Program
SIV	Seafood Industry Victoria
SMPEP	Shipboard Marine Pollution Emergency Plan
SOPEP	Shipboard Oil Pollution Emergency Plan
SPL	Sound Pressure Level
SSF	Sustainable Shark Fishing Inc.
SSTs	Subsea Trees
SSTT	Sub-Sea Test Tree
STP	Sewage Treatment Plan
TEC	Threatened Ecological Communities
TPCs	Third Party Contractors
TRSSV	Tubing Retrievable Subsurface Safety Valve
UAV	Unmanned Aerial Vehicles
VADA	Victorian Abalone Divers Association
VRFish	Victorian Recreational Fishers Association
VRLA	Victorian Rock Lobster Association
VSCP	Offshore Victoria Source Control Plan
WADA	Western Abalone Divers Association
WBM	Water Based Muds

11.2 Units

Unit	Description
‘	Minutes
“	Seconds
µg/m3	Micrograms per Cubic Metre
cP	Centipoise
dB	Decibel
hrs	Hours
kg/m^3	Kilograms per Cubic Meter

Unit	Description
kHz	Kilohertz
km	Kilometres
km^2	Kilometres Squared
L	Litres
m	metres
$m.s.^{-1}$	Metres Per Second
m^2	Metres Squared
m^3	Metres Cubed
m^3/h	Metres Cubed per Hour
^{o}	Degrees
^oC	Degrees Celsius
ppb	Parts per Billion
ppm	Parts Per Million
µPa	Micro Pascals