VIC/L29 Drilling Campaign
Environment Plan Summary

February 2015

LT-REG-PL-0010

Rev	Date	Description	Originator	Reviewer	Approved
0	5/02/2015	Issued for Use	KMa	RTy	JSe
1	11/02/2015	Updated to Address NOPSEMA Comments	KMa	RTy	JSe

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1. Introduction

Nexus Energy VICP54 Pty Ltd (Nexus Energy) is proposing to undertake a drilling campaign within the VIC/L29 licence area of the offshore Gippsland Basin, approximately 34 kilometres off the east coast of Victoria in Bass Strait. The campaign will consist of two gas/condensate wells – a directional production well within the existing Longtom gas field (Longtom-5) and a vertical exploration well within the adjacent Longtom South prospect (Gemfish-1). Nexus is also assessing the option of carrying out well intervention works on the current Longtom-4 gas production well during the drilling campaign.

The VIC/L29 drilling campaign will be carried out in accordance with an Environment Plan (EP), which was accepted by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) on the 29th January 2015 under Regulation 10 of the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 (OPGGS Regulations). This document has been prepared in accordance with the requirements of Regulation 11 (3) of the OPGGS Regulations and provides a summary of the key elements of the EP.

2. Location of the Activity

The VIC/L29 licence area, which encompasses the Longtom and Longtom South fields, is located in eastern Bass Strait, approximately 34 kilometres south-southwest of Orbost (see Figure 1). The proposed Longtom-5 and Gemfish-1 well locations are approximately 4 km apart (see Figure 2).

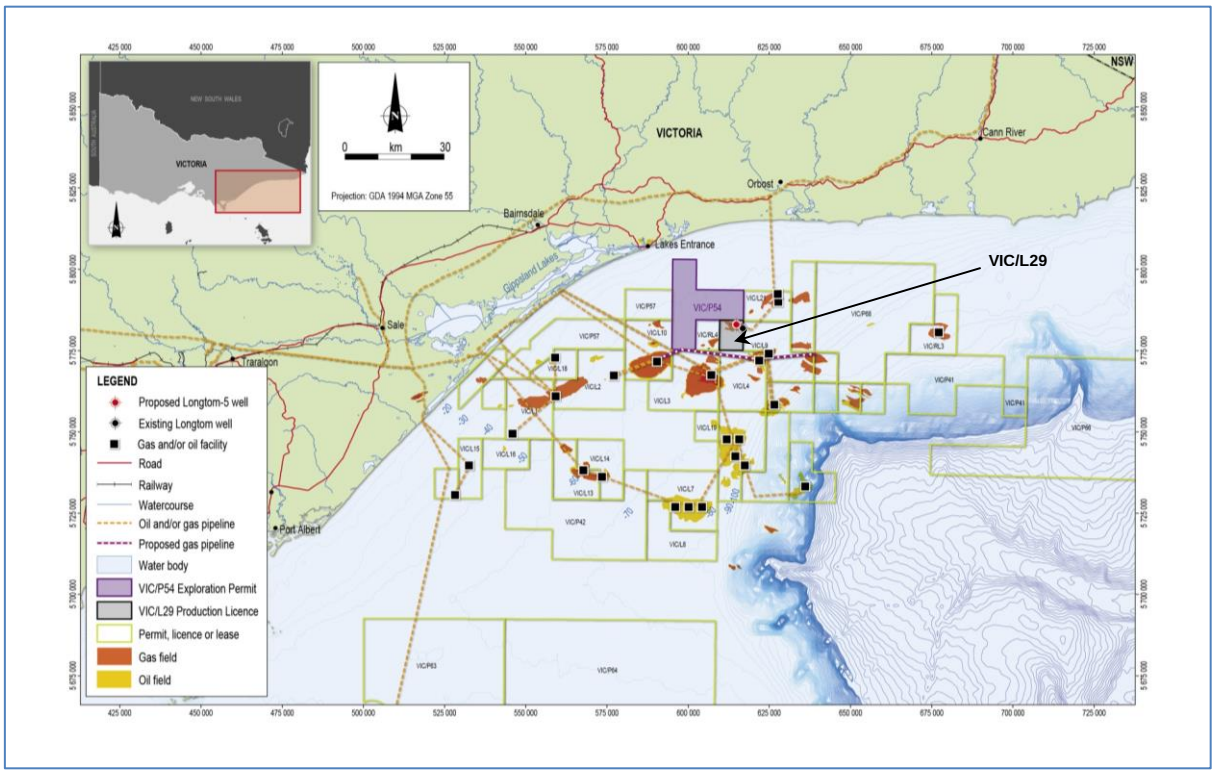

Figure 1 – VIC/L29 location map in relation to other oil and gas fields

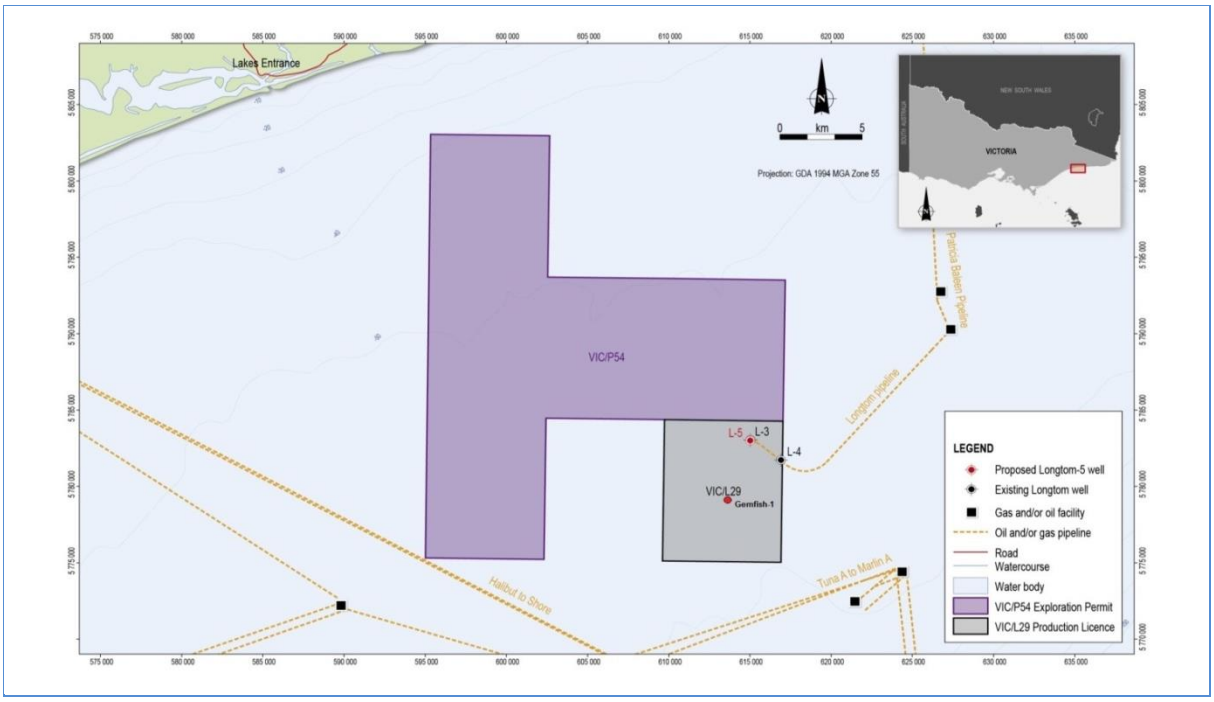

Figure 2 Location map for proposed Longtom-5 and Gemfish-1 drill sites

The coordinates of the proposed drilling locations, and the location of the Longtom-4 well (for well intervention activities) are provided below in Table 1.

Table 1 Proposed Drilling/Intervention Locations

	Latitude	Longitude
Proposed Longtom-5 well location	38° 05’ 34.69” S	148° 18’ 43.16” E
Proposed Gemfish-1 well location	38° 07’ 44.08” S	148° 17’ 47.07” E
Longtom-4 well	38° 06’ 18.00” S	148° 20’ 00” E

3. Description of the Activity

A suitable jack-up or semi-submersible Mobile Offshore Drilling Unit (MODU) will undertake the drilling campaign. Final MODU selection will be based on technical suitability and availability. At least two vessels will be used for the duration of the drilling campaign, to tow the MODU to location, deploy and accurately position anchors (if a semi-submersible) and act as support and supply vessels for the drilling operations. The MODU will be refuelled by vessel offshore and helicopter refuelling will also take place on the MODU.

The Longtom-5 well location is within an existing petroleum safety zone, while an additional safety zone will be established around the Gemfish-1 well location during drilling operations.

3.1 Longtom-5 Well

The Longtom-5 production well will be drilled in a water depth of approximately 56 metres using Water Based Mud (WBM) for the upper hole sections, and Non Aqueous Drilling Fluid (NADF) for the lower hole sections. The drilling procedure will generally be as follows:

- The top hole sections (36 and 22 inch) will be drilled riserless with sea water and gel sweeps. The WBM and cuttings will be discharged continuously during drilling of the upper hole sections.
- A casing string will be installed into the hole and cemented into position.
- The marine riser (if a semisubmersible MODU is used) or the HP Riser (if a jack-up MODU is used) and Blow Out Preventers (BOP) will then be installed and pressure tested.
- The bottom hole sections (13½ and 9½-inch) will be drilled using NADF. The NADF will be collected in a closed mud system for reuse, with the whole mud returned to shore at the completion of the well. NADF drill cuttings will be treated in the MODU's mud recovery system (shale shaker, centrifuges and a cuttings dryer) to minimise the residual mud loading on the cuttings prior to discharge overboard.
- Casing strings will be installed into the hole, cemented into position and pressure tested.
- The well will be suspended and the riser and BOP removed to allow installation and testing of the Subsea Tree (SST).
- Following installation of the SST, the BOP and riser will be re-installed and tested.
- The drilling mud will be displaced to water based completion fluid and completion equipment installed and tested.
- After completion, the well will be cleaned up to remove drilling mud and fluids and enable future production to the Longtom pipeline. As part of this clean up process, the well will be flowed back to the MODU and hydrocarbons will be flared in a similar manner to a production test. Flaring will be reduced to the minimum level required to achieve the required clean up (24-48 hours).

Once drilling operations are complete the well will be suspended. The tie in of the Longtom-5 and production from this well are covered in a separate EP (LT-ENV-PL-0001 - Longtom Gas Project Operations EP).

3.2 Gemfish-1 Well

The Gemfish-1 exploration well will be drilled using only water-based mud (WBM) in a water depth of approximately 50 metres. The drilling procedure will generally be as follows:

- The top hole sections (36 and 17½ inch) will be drilled riserless with sea water and gel sweeps. The WBM and cuttings will be discharged continuously during drilling.
- A casing string will be installed into the hole and cemented into position.

- The marine riser/HP riser and Blow Out Preventers (BOP) will then be installed and pressure tested.
- A 12 ¼ inch hole will be drilled, with a casing string installed if hole conditions require it.
- A contingent 8 ½ inch hole may be drilled if required.
- In the event that Nexus decides to suspend the well as a future producer, a string of 9⅝ inch casing may be run and cemented across the productive intervals.
- The plug and abandon (P&A) program will involve plugging any permeable formation with cement, cutting the casing below the seabed and removal of all well construction infrastructure above this level.
- Wireline logging, including vertical seismic profiling (VSP) may take place at the end of the well if hydrocarbons are discovered. Production testing (flaring) is not planned.

3.3 Longtom-4 Well Intervention

Well intervention activities at Longtom-4 will involve opening a sliding sleeve to allow gas production from the upper production zone. Following opening of the sleeve, the upper production zones will be produced concurrently with the lower production zones. The intervention is planned to be carried out either by the MODU during the drilling campaign, or via a well intervention vessel, with these two options still being assessed at the time of EP submission.

There will be no discharge of fluids to sea as a result of the well intervention operations. A small amount of gas will be flared when the well is circulated back to the surface in preparation for the wireline operations.

3.4 Timing

The drilling campaign is scheduled to commence in Quarter 3, 2015. The Longtom 5 well is anticipated to take approximately 70 days to complete, the Gemfish-1 well 20 days and well intervention activities at Longtom-4 are expected to take 10-15 days. The timing and eventual length of the campaign may vary depending on weather conditions and MODU availability, therefore the EP has assessed drilling and well intervention activities for all seasons of the year to provide for operational flexibility.

4. Description of the Receiving Environment

4.1 Physical Environment

The drilling campaign will be carried out within licence area VIC/L29 in Commonwealth waters within the Gippsland basin, approximately 34 km off the Victorian coast in Bass Strait. Bass Strait is located on the northern edge of the westerly wind belt known as the Roaring Forties, where wind speeds are typically in the range of 10 to 45 knots (APASA, 2012), with maximum gusts reaching 100 km/hr. Over winter, the wind direction is predominantly westerly, especially when stronger winds occur. During summer, winds from the east and northeast become common.

Bass Strait is a high energy environment exposed to frequent storms and significant wave heights, with highest wave conditions generally associated with strong west to southwest winds caused by the eastward passage of low pressure systems across Bass Strait.

The mean maximum temperature in coastal Victoria (Lakes Entrance) varies from 14.6°C in July to 23.8°C in February, with the mean minimum temperature being 6.0°C in July and 14.8°C in February. From 1965 to 2006, the average annual rainfall was 710 mm, with the highest total rainfall occurring in November and the lowest total rainfall occurring in February (BoM, 2011).

While the seabed bathymetry across Bass Strait is highly variable, the seabed in the licence area is essentially flat with gently undulating bathymetry with no steep slopes or bathymetric anomalies.

The shallow geology within the licence area is characterised by a surface layer of fine to coarse unconsolidated sands with shells and shell fragments overlying more consolidated bedded sedimentary sequences (Fugro, 2005). This layer varies between 1.7 and 5.6 metres in thickness. This geology is indicative of a high energy environment and is not conducive to forming more stable habitats where marine flora and fauna can establish itself.

The oceanography of the licence area is similar to that of the eastern Bass Strait region due to the absence of seafloor anomalies that may influence local oceanographic conditions.

Currents in eastern Bass Strait are tide and wind-driven. Tidal movements in eastern Bass Strait are predominantly in a northeast-southwest orientation. The main tidal constituents in Bass Strait vary in phase by about 3 to 4 hours from east to west.

Sea surface temperatures in the area range from a minimum of 12.6°C in winter to a maximum of 18.4°C in summer (APASA, 2012).

4.2 Biological Environment

Bass Strait supports a high diversity of a wide range of invertebrate groups. Many species are widely distributed across the Strait, suggesting heterogeneous sediments and a number of microhabitats.

The VIC/L29 licence area has been found to display a relative homogeneity of seafloor sediment suggesting that the diversity of benthic invertebrates in the area is low. There was no evidence of unusually high benthic invertebrate diversity in the sediment samples collected in the area. In addition, there is an absence of hard substrate or emergent reefs in the licence area and the sediment flats present are generally devoid of emergent fauna but benthic invertebrates such as polychaetes, bivalves, molluscs and echinoderms are present (Wilson and Poore, 1987).

4.3 Species listed under Environment Protection and Biodiversity Conservation (EPBC) Act 1999

4.3.1 Fish and Shellfish

It is estimated there are over 500 species of fish found in the waters of Bass Strait, including a number of species of importance to commercial and recreational fisheries (LCC, 1993).

Fish species that may occur in the licence area and surrounds that are listed as threatened under the EPBC Act include the Australian Grayling (*Prototroctes maraena*), the Black Rockcod (*Epinephelus daemelii*) and the Eastern Dwarf Galaxias (*Galaxiella pusilla*). All three species are listed as vulnerable.

Macro-algal (seaweed) habitat in shallow waters provides the key habitat for most species of signathids (pipefishes, seahorses and seadragons). Kelp species such as *Macrocystis angustifolia* and *Eklonia radiata* and the seagrass *Heterozostera tasmanica* (eel seagrass) are the three most common species that provide essential resources for the signathids. The lack of suitable habitat in the licence area makes it unlikely that signathid species occur there.

4.3.2 Whales

A number of whale species occur in Bass Strait, most being seasonal visitors during their migrations. There are eleven whales that may inhabit the waters within the licence area and surrounds (SEWPaC, 2013) including; Minke whale (*Balaenoptera acutorostrata*); Bryde's whale (*Balaenoptera edeni*); Blue whale (*Balaenoptera musculus*); Pygmy right whale (*Caperea marginata*); Southern right whale (*Eubalaena australis*); Humpback whale (*Megaptera novaeangliae*); Killer whale (*Orcinus orca*); Sei Whale (*Balaenoptera borealis*); Fin Whale (*Balaenoptera physalus*); Antarctic Minke Whale (*Balaenoptera bonaerensis*); and Sperm Whale (*Physeter macrocephalus*).

Five of these species are listed as nationally threatened under the EPBC Act; the blue (listed as endangered), southern right (listed as endangered), humpback (listed as vulnerable), sei (listed as vulnerable) and fin (listed as vulnerable) whales.

4.3.3 Dolphins

There are four dolphin species that may occur in the surrounding area (SEWPaC, 2013) including; Common dolphin (*Delphinus delphis*); Risso's dolphin (*Grampus griseus*); Dusky dolphin (*Lagenorhynchus obscurus*); and Bottlenose dolphin (*Tursiops truncates*). These species are classified as 'listed migratory species' (they are not threatened) under the EPBC Act.

4.3.4 Seals

Two seal species, the Australian fur seal (*Arctocephalus pusillus*) and the New Zealand fur seal (*Arctocephalus forsteri*) may occur in the licence area and surrounds. This area is remote from seal colonies, however seals do use the nearby oil and gas platform structures for resting and were recorded during a previous installation campaign in the area hauled out on the installation vessels. The licence area is not within close proximity to any breeding colonies.

4.3.5 Sharks and Rays

Shark species that may occur in the licence area and surrounds, and that are listed as threatened under the EPBC Act include the great white shark (*Carcharodon carcharias*) (listed as vulnerable), the whale shark (*Rhincodon typus*) (listed as vulnerable) and the grey nurse shark (*Carcharis Taurus* - east coast population) (listed as critically endangered).

Two other species of shark were recorded as potentially migrating within the licence area and surrounds (SEWPaC, 2013); the Shortfin Mako (*Isurus oxyrinchus*) and the Porbeable/Mackerel Shark (*Lamna nasus*). There is no critical habitat for these species in or around the licence area or the Gippsland Basin in general.

4.3.6 Seabirds

The Victorian coast and islands of Bass Strait provide feeding, breeding and nesting habitats for many important coastal and migratory bird species. There are no islands or seabird colo-

nies in the immediate vicinity of the licence area. Forty-three EPBC Act-listed bird species may occur within the licence area and surrounds. These bird species are listed as vulnerable and endangered, with the majority being migratory species. The nearest breeding site to the licence area is Albatross Island, off the northwest coast of Tasmania, 405 km to the south-west.

4.3.7 Reptiles

One reptile species is known to regularly occur in Bass Strait, the leathery or leatherback turtle (*Dermochelys coriacea*). Four other potential, but rare, visitors to Bass Strait include the loggerhead turtle (*Caretta caretta*) (listed as endangered under the EPBC Act), the green turtle (*Chelonia mydas*) (listed as vulnerable under the EPBC Act), the hawksbill turtle (*Eretmochelys imbricata*) (listed as vulnerable under the EPBC Act) and the flatback turtle (*Natator depressus*) (listed as vulnerable under the EPBC Act).

4.4 Conservation Areas and Sensitivities

Australia has developed a marine reserve system through the establishment of a National Representative System of Marine Protected Areas (MPAs). The conservation of natural and anthropological heritage in Commonwealth marine areas is grouped into the following categories:

- Commonwealth marine reserves.
- RAMSAR sites
- World heritage
- Commonwealth heritage places
- National heritage

There are no sensitive marine areas within the licence area. Commonwealth marine conservation areas and RAMSAR sites closest to the licence area and surrounds include the East Gippsland Commonwealth Marine Reserve (approximately 148km to the east); Beagle Commonwealth Marine Reserve (approximately 153km to the south-west); Flinders Commonwealth Marine Reserve (approximately 260km to the south-southwest); the Gippsland Lakes RAMSAR Site (approximately 38 km to the north-west) and the Logan Lagoon RAMSAR site (approximately 185km to the south-southwest). There are no World Heritage, Commonwealth Heritage or National Heritage areas in or abutting Bass Strait.

Other marine conservation areas closest to the licence area and surrounds include:

- Victoria: Point Hicks Marine National Park (approximately 87km from licence area); Croajingolong Biosphere Reserve and National Park (87km); Cape Howe Marine National Park (150km); Beware Reef Marine Sanctuary (40km); and the Gippsland Lakes Coastal Park (54km).
- Tasmania: Kent Group (Deal, Erith and Dover Islands) – approximately 173km from licence area.
- NSW: Nadgee Nature Reserve and Wilderness Area – approximately 157km from licence area.

4.5 Cultural Environment

There are no historic shipwreck protected zones in or near the licence area (SEWPaC, 2011).

There are no records of Aboriginal or non-Aboriginal archaeological sites in or around the licence area (SEWPaC, 2012).

4.6 Socio-economic Environment

The communities of Lake Tyers, Lakes Entrance, Orbost and Marlo are closest to the licence area. They are located approximately 31 km, 37 km, 38 km and 44 km northeast, respectively, in the Shire of East Gippsland.

The key towns servicing the tourist trade of the region are Lakes Entrance, Metung, Loch Sport and Paynesville. The Ninety Mile Beach is a key draw card to the region, with this stretch of sand and dunes separating the ocean from the Gippsland Lakes. Lakes Entrance has a fishing port that supports offshore commercial (South East Trawl) and recreational fishing.

4.6.1 Oil and Gas Production

Bass Strait contains large oil and gas deposits. In 1996, the Gippsland Basin produced over 40% of Australia's total crude oil and all of Victoria's natural gas requirements. As of 2011, Victoria (mostly the offshore Gippsland Basin), accounts for 14% of Australia's oil and condensate production, and 17% of Australia's gas production, second behind WA.

4.6.2 Shipping

Bass Strait is one of the busiest shipping routes in Australia, with more than 3,000 vessels transiting through the area each year (NOO, 2002). The VIC/L29 licence area is located approximately 60 km northwest of the main shipping lane and therefore interaction with commercial shipping vessels is expected to be negligible.

4.6.3 Commercial Fishing

The licence area is overlapped by the jurisdiction of several Commonwealth and State-managed fisheries, including the; Southern and Eastern Scalefish and Shark (SESS); incorporating; Bass Strait Central Zone Scallop; Southern Squid Jig; Southern Bluefin Tuna; Eastern Skipjack (Tuna); Eastern Tuna and Billfish; and Small Pelagic fisheries (AFMA, 2011).

Victorian-managed fisheries with jurisdictions to fish over the licence area include the; Abalone; Rock lobster (incorporating giant crab); Scallop; Snapper; Shark; and Squid fisheries.

4.6.4 Recreational Fishing

Recreational fishing is a significant activity in the nearshore area along Ninety Mile Beach, comprising beach-based fishing and boat-based fishing. Rocky reefs near Marlo, Cape Conran and Lakes Entrance are the main sites for boat angling (and also recreational diving), with boat ramps located at Port Albert, Port Welshpool, McLoughlins Beach, Manns Beach and Lakes Entrance. Most marine recreational fishing in the area is coastal, surf, inland lakes and estuary fishing with only a small proportion of recreational boating activities venturing offshore.

5. Environmental Impacts, Risks and Controls

Nexus Energy has undertaken an environmental risk assessment to identify the potential impacts and risks associated with the VIC/L29 drilling campaign and to identify controls to reduce the impacts and risks to as low as reasonably practicable (ALARP) and acceptable levels.

The risk assessment methodology was consistent with HB 203:2006 (Environmental risk management - principles and process), AS/NZS 31000: 2009 (Risk management - Principals and guidelines) and the Nexus Energy Risk Assessment Protocol.

The main steps undertaken during the risk assessment process were:

1. Identify the environmental hazard/risk – a list of risks was compiled based on the hazards or incidents that could result in an adverse environmental impact;
2. Analyse the risk - an assessment of the likelihood of the hazard occurring and the consequences of that hazard on the environment was undertaken:
   - Determine the likelihood - the likelihood was determined based on the worst credible risk and is the likelihood of the specific consequence being realised. The likelihood was assessed and given a ranking of 'almost certain' through to 'rare'.
   - Determine the consequence – the consequence was determined based on the worst credible risk and is the outcome of an event on the receptor. The consequence was assessed and given a ranking of 'insignificant' to 'catastrophic'.
3. The environmental risk ranking was determined by a combination of the likelihood of the impact and the consequence. The risk was given a ranking of 'low', 'moderate', 'significant' or 'high' based on the Nexus Risk Matrix.
4. Risks identified as being anything other than low were examined for potential risk reduction measures. The ALARP 'Hierarchy of Control', which is the preferred order of control methods, was implemented when considering controls. The hierarchy of control is: eliminate, substitute, engineering, isolation, administrative and protective.

Environmental hazards were identified, assessed and ranked within hazard identification (HAZID) workshops. Once the MODU and drilling contractor are confirmed for the VIC/L29 drilling campaign, an additional workshop will be held between all parties to review and confirm the hazards identified in this EP, the controls in place and to identify additional risk reduction measures (if required) to ensure the risk is managed to an acceptable level and ALARP.

The risk assessment process is summarized in Figure 3.

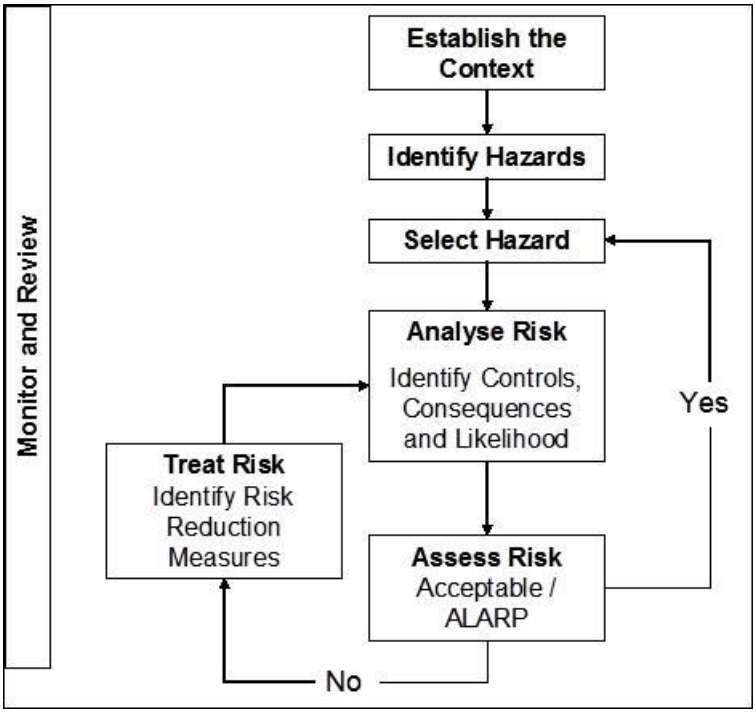

Figure 3 Summary of Risk Assessment Process

The risk assessment process must also demonstrate that that all identified environmental impacts and risks of the drilling campaign are of an 'acceptable level'. Nexus assesses acceptability based on, but not limited to, the following factors:

- ALARP has been demonstrated.
- Consideration of the level of risk and the Nexus risk matrix
- Consideration of the potential extent of the impact on the environment.
- Comparison with other oil and gas companies practices and developments.
- Comparison with other activities/industries that are currently taking place in the area / or similar areas and which are accepted by the community (i.e., the fishing and shipping in-dustries).
- Results from community consultation

The final part of the risk assessment process is to monitor and review the performance of the controls, to ensure that the assessment is valid and that controls have reduced the risk to ALARP and acceptable levels and continue to do so.

A summary of the risks, potential impacts and control measures for the VIC/L29 drilling campaign is provided in Appendix A.

6. Ongoing Monitoring of Environmental Performance

The drilling campaign will be managed in accordance with the VIC/L29 Drilling Campaign EP, as accepted by NOPSEMA under the Environment Regulations, and the Nexus Energy HSEC Management Standards.

The Nexus HSEQC Management Standards consist of 15 standards, each of which is supported by several procedures or protocols:

1. Policy, Leadership and Commitment
2. Organisation, Responsibility and Resources
3. Planning, Objectives and Targets
4. Regulatory Requirements and Document Control
5. Competence, Training and Behaviours
6. Risk and Change Management
7. Projects, Facility Design, Construction and Commissioning
8. Operations and Maintenance
9. Incident Management
10. Contractors, Suppliers and Partners
11. Performance Measurement, Reporting and Communication
12. Crisis and Emergency Management
13. Health and Fitness for Work
14. Audits, Inspections and Reviews
15. Community.

This implementation strategy for the EP specifically details the systems, practices and procedures required to ensure the environmental performance objectives, standards and measurement criteria in the EP are met and environmental impacts and risks are reduced to ALARP.

Monitoring of environmental performance and compliance with the EP will be regularly reviewed through the following means:

- An Environmental Compliance report will be submitted to NOPSEMA at the completion of the drilling campaign. This report details compliance against each of the performance objectives, standards and measurement criteria outlined in the EP.
- Audits and inspections – Nexus will undertake formal and informal audits and inspections throughout the drilling campaign to assess environmental performance against the EP. The findings and recommendations of audits and inspections will be documented and distributed to relevant personnel for review and corrective actions will be tracked to closure.
- Environmental performance and routine monitoring results will be reviewed on daily calls with onshore and offshore personnel, toolbox talks onboard the MODU and regularly scheduled management meetings.
- The Nexus HSEC Manager specifically reviews compliance with the EP as part of their general activities.

Nexus has an Incident Management Procedure that details the actions to be undertaken in the event of a safety or environmental incident, with all incidents reported to the Nexus Project Manager. All breaches of the EP will be treated as non-compliances. Incident reporting procedures and expectations will be reinforced at inductions and regularly throughout the campaign. All non-

compliances and incidents will be investigated and following an investigation, remedial actions developed to prevent recurrence and tracked to completion.

6.1 Environment Plan Revision

The Nexus HSEQC Management Standard No. 16 (Risk and Change Management) defines how Nexus manages change. When changes to the drilling campaign are proposed a risk assessment is undertaken which considers the impact of the proposed change on the environmental risks and the environmental performance objectives outlined in the EP. In the event the proposed change introduces a significant new environmental impact or risk, or results in a significant increase to an existing risk, the EP will be revised for resubmission. Similarly, if the proposed change results in non-compliance with a performance objective, the EP will be revised for resubmission.

6.2 Oil Spill Response Arrangements

Nexus Energy has developed an Oil Spill Contingency Plan (OSCP) for the drilling campaign in order to allow an effective response in the event of a spill event.

The Longtom fields produce predominantly gas with some associated condensate. In the event of a release from the wells the gas will flash off leaving the remaining condensate. The condensate will tend to evaporate quickly leaving a waxy residue. Should the condensate reach the shore (in the unlikely event of a gas/condensate release ongoing for greater than 50 days), it would be in a waxy flake form, non-toxic and have minimal impact on benthic habitat and fauna.

Two worst case credible spill scenarios for the drilling campaign have been considered in the EP and are able to be managed through the framework of the OSCP. These are:

- A loss of well control event, resulting in a surface or subsea release of condensate over a 90 day period.
- A release of marine diesel oil due to a vessel collision incident.

In the event of a significant spill event, the Nexus Oil Spill Response Team (OSRT) will be mobilised to support the Nexus Crisis Management Team (CMT). The OSRT and the Nexus OSCP will be supported by, and interface with, the procedures and resources of the:

- Australian Marine Oil Spill Centre Plan (AMOSPlan);
- National Plan to Combat Pollution of the Sea by Oil and Other Noxious and Hazardous Substances (NatPlan); and
- Victorian Marine Pollution Contingency Plan (VicPlan).

A Net Environmental Benefit Analysis (NEBA) has been carried out to determine the preferred response strategies in the event of a spill. Prior to deployment of the proposed response strategies, the NEBA will be re-assessed to confirm that the selected response strategies provide the most effective and acceptable environmental outcome for the conditions at the time. The preferred response strategies for the VIC/L29 drilling campaign, as described in the OSCP, are;

- Monitoring including aerial surveillance, satellite tracking of the spill and visual coastline monitoring.
- Natural weathering (evaporation) and dispersion.
- Water sampling and laboratory analysis for Total Petroleum Hydrocarbon (TPH) concentration in the water column at both impacted and control sites.
- Deflection and recovery of the spill near estuarine inlets, including use of absorbent booms if the inlets are under threat.
- Manual and mechanical beach cleanup if amenity of the shoreline is affected.

Nexus is a member of the Australian Marine Oil Spill Centre (AMOSC). In the event of a spill Nexus would request assistance from AMOSC to initiate spill trajectory modelling and for access to industry response equipment and personnel from the core group as part of its Service Level Agreement.

The OSCP includes an Operational and Scientific Management Plan (OSMP) that can be initiated in the event of a spill to monitor the effect of the spill on the environment.

The OSCP is subject to regular drills and exercises to test the organizational responsiveness to an incident.

7. Consultation

Nexus Energy has undertaken extensive consultation with stakeholders in relation to the VIC/L29 drilling campaign and will continue to consult with stakeholders in the lead up to, and during, the drilling campaign.

7.2 Consultation Already Undertaken

In accordance with the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 R11A & R14(9) the following stakeholders and interested parties have been identified and consulted as part of the stakeholder engagement process. Individual names have not been provided in accordance with data privacy regulations.

Commonwealth Department or Agency

- Australian Fisheries Management Authority (AFMA)
- Australian Maritime Safety Authority (AMSA)
- Australian Hydrographic Office (AHO)
- National Offshore Petroleum Titles Administrator (NOPTA)
- Department of Sustainability, Environment, Water, Population and Communities (SEWPaC)
- Department of Resources, Energy and Tourism (DRET).

Victorian Departments, Agencies and NGOs

- Department of Environment and Primary Industries (DEPI) – now Department of Environment, Water, Land and Planning (DEWLP)
- Department of Transport, Planning and Local Infrastructure (DTPLI) – now part of the Department of Economic Development, Jobs, Transport and Resources (DEDJTR) and DEWLP
- Department of State Development, Business and Innovation (DSDBI) – now DEDJTR
- Environment Protection Agency (EPA)
- Victorian National Parks Association – Coasts and Inlets

Tasmanian Government

- Tasmanian Department of Primary Industries, Parks, Water and Environment (DPIPWE)
- Oil Spill Response Agencies
- Australian Marine Oil Spill Centre (AMOSC)
- Asia Pacific Applied Science Associates (APASA)
- Australian Maritime Safety Authority (AMSA)
- Gippsland Ports

Fishing Interest Groups

- Lakes Entrance Fisherman's Cooperative Pty Ltd (LEFCOL)
- South - East Trawl Fishing Industry Association (SETFIA)
- Sustainable Shark Fishers Association
- Commonwealth Fisheries Association (CFA)
- Seafood Industries Victoria (SIV)
- San Remo Fisherman's Co-operative
- South East Fishery Association (SEFA)

- Southern Shark Industry Alliance
- Tasmanian Fish Industry Council
- Tasmanian Scallop Fishermans Association
- Seafish Tasmania
- Southern Squid Jig Fishery
- Lakes Entrance Scallop Fishing Industry Association
- Victorian Scallop Industry Association
- Eastern Rock Lobster Industry Association
- Victorian Abalone Divers Association
- Mallacoota Abalone Co-operative
- Eastern Abalone Association
- VRFish and
- Individual Licenced Small Pelagic Fishermen.

Adjacent Oil and Gas/Commercial Operators

- Esso Australia Resources Pty Ltd
- ROC Oil
- Hibiscus / 3D Oil
- Origin Energy
- Santos

A number of mechanisms to communicate with stakeholders have been utilised to ensure stakeholders are fully informed about the operations and its potential environmental and social impacts. This has included; project briefings, one-on-one technical discussions, information releases and an information website and telephone number. The latest Invitation to Comment was sent out in early January 2015. Results of consultation have fed into the description of the existing environment (with regards to fisheries) and the impact assessment.

A summary of the feedback received from stakeholders to date and the Nexus response is provided below in Table 2. Where further information was provided to a stakeholder in relation to a query, this was followed up with a phone call and the offer of a face to face meeting.

Table 2 Summary of Stakeholder Feedback

Stakeholder Feedback/Query	Summary of Nexus Response
Drill sediment (mud and cuttings) – what is the impact on any food sources or early life stages? Understand the relative small area but what are the cumulative impacts from multiple drilling campaigns? What is the impact from sediment on the seafloor?	Nexus provided further information to the stakeholder in January 2015 – a summary of which is provided below: Both WBM and NADF will be used during the drilling campaign. In terms of WBM, the main environmental impacts are smothering of sediment dwelling flora and fauna. Numerous studies (including those carried out in Bass Strait) have confirmed that the effects are localised (within close proximity to the drilling area) and temporary (recovery expected within 4-6 months). The potential impacts on marine fauna from NADF discharge are caused by physical impacts from burial or changes in substrate grain size (similar to WBM), the chemical toxicity of the NADF and oxygen depletion due to the biodegradation of NADF in the sediment. Field studies on areas impacted by NADF cuttings show that most drill cuttings accumulate in close proximity to the point of cuttings discharge. Once cuttings are deposited on the seabed, the physical persistence of cuttings and potential for elevated NADF levels depends on the natural energy of the environment coupled with the biodegradation of the base fluid. Recovery time for benthic organisms is more rapid under dispersive conditions, as the effects of smothering and burial are less pronounced. The high energy environment of Bass Strait is not conducive to the formation of cuttings piles, and cuttings tend to be re-suspended and dispersed. This was confirmed following the Longtom-3 and Longtom- 4 drilling campaigns, with ROV surveys providing no evidence of cuttings piles on the seabed around the drilling location. In addition, these ROV surveys show the Longtom wellheads and subsea structures covered with marine growth and an abundance of fish. NADF cuttings from the Longtom-5 well will be treated by a processing system consisting of shale shakers, centrifuges and a cuttings dryer. This process will reduce the base fluid content of the cuttings to as low as reasonably practicable before disposal, thus limiting the effects of oxygen depletion through biodegradation of the NADF in the sediment Given the temporary and localised nature of the impacts resulting from the discharge of drilling fluids and cuttings and the low level of drilling activity in the Gippsland Basin in recent times, cumulative impacts as a result of drill cuttings discharges are considered to be unlikely. A study carried out in Norway, where drilling activity was extensive during the period studied, concluded that the effects of cuttings discharges were limited in time and space. While cumulative effects in a greater area could not be ruled out, if these were likely to be significant they would very probably have been detected in the environmental monitoring.

Stakeholder Feedback/Query	Summary of Nexus Response
Cutting contaminants – what is in the rock? Have any tests been carried out to ensure that when the cuttings are left on the seafloor they don't create a toxic dump?	The predicted geological formations that will be penetrated by the proposed Longtom-5 and Gemfish-1 wells are typical of that entered by the many existing wells drilled to date in the Gippsland Basin, including Longtom-3 and Longtom-4, therefore the geology is well understood. These sedimentary sections range in geological age from Recent to early Late Cretaceous. The Gippsland Limestone and Lakes Entrance Formation contain dominantly calcareous/carbonate rock bodies, and the underlying greater Latrobe Group contains siliciclastic bodies of rock with minor weathered volcanics. None of these naturally occurring rock types are known to be toxic and there are no known formations that could result in potentially toxic drill cuttings being produced.
Stakeholder queried if Nexus could confirm which drilling rig would be used for the drilling campaign and if it would be entering any Victorian ports before mobilising to the drilling site.	Nexus responded to the stakeholder and indicated that the MODU likely to be contracted will be mobilised from prior drilling operations within Bass Strait. Stakeholder will be kept informed when further details of the MODU are confirmed.

7.2 Ongoing Consultation

The latest consultation carried out in January 2015 will be followed up by further contact with relevant stakeholders via email, phone and face to face meetings as the particulars of the drilling campaign are confirmed. Consultation will continue in the lead up to and throughout the drilling operations. Any feedback or queries received will be responded to by the Nexus HSEC Manager and evaluated against the risks outlined in the EP. If issues are raised that are considered to change the EP risk assessment, the EP will be revised as necessary.

The stakeholder consultation log will continue to be maintained throughout the drilling campaign.

8. Contact Details

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9. References

1. AFMA. 2011. Commonwealth Fisheries. A WWW database accessed in November 2011 at http://www.afma.gov.au/managing-our-fisheries/fisheries-a-to-z-index/
2. Australian Fisheries Management Authority. Canberra.
3. APASA. 2012. Quantitative oil and diesel spill modelling study for Longtom-5 production well, in Permit VIC/L29. Prepared for Nexus Energy by Asia-Pacific ASA Pty Ltd.
4. BoM. 2011. Climate statistics for Lakes Entrance Climate. A WWW database accessed in November 2011 at http://www.bom.gov.au/climate/data/. Bureau of Meteorology.
5. Fugro, 2005. Longtom to Patricia Baleen Pipeline Route Survey and Culverin Site Survey. Report prepared for Nexus Energy Australia NL by Fugro Survey Pty Ltd, April 2005.
6. LCC. 1993. Marine and coastal descriptive report. (special investigation). June 1993. Land Conservation Council. Melbourne.
7. NOO. 2002. Ecosystems - Nature's Diversity. The South-east Regional Marine Plan Assessment Reports. National Oceans Office, Hobart, Tasmania.
8. SEWPaC. 2011. Historic Shipwreck Protected Zones. A WWW database accessed in October 2011 at http://www.environment.gov.au/heritage/shipwrecks/protected-zones.html. Department of Sustainability, Environment, Water, Population and Communities. Canberra.
9. SEWPaC. 2012. Commonwealth Heritage List. A WWW database accessed in October 2011 at http://www.environment.gov.au/heritage/shipwrecks/protected-zones.html. Department of Sustainability, Environment, Water, Population and Communities. Canberra.
10. SEWPaC. 2013. Protected Matters Search Tool for the ZPI (including a 1 km radius). A WWW publication accessed in June 2013 at http://www.environment.gov.au/coasts/ mbp/about/index.html. Department of Sustainability, Environment, Water, Population and Communities.
11. Wilson, R.S. and Poore, G.C.B. 1987. The Bass Strait Survey: biological sampling stations, 1979 1984. Occ. Papers Museum of Victoria 3: 1 14.

Appendix A Environmental Impacts, Risks and Control Measures

Environmental Impacts, Risks and Control Measures

Known & Potential Impacts	Potential Consequence	Avoidance, Mitigation & Management Controls
ROUTINE IMPACTS		
Seabed disturbance from anchoring, spud can placement and wellhead installation	Minor temporary and localised smothering of benthic organisms	• A post campaign ROV survey will be undertaken to check for any debris. Any identified will be removed if practicable.
Underwater noise - MODU, vessels and Vertical Seismic Profiling (VSP)	Very minor temporary physiological impacts on sensitive fauna, such as cetaceans. Disruption to migration, feeding or breeding patterns.	• Noise levels from drilling activities are not expected to have any significant impact on the marine environment based on surveys and monitoring on other drilling campaigns. • Drilling will not be undertaken in key migration paths of threatened cetaceans. There are no known critical feeding, breeding or resting habitats for threatened cetacean species in the drilling area. • The Gemfish-1 well VSP survey will be short in duration and carried out in accordance with published guidelines (EPBC Act Policy Statement 2.1) to avoid impacts to sensitive fauna.
Lighting of the MODU and support vessels	Temporary impacts to migrating birds and other marine species attracted to the light source	• Consequence deemed to be non-credible given the nature and scale of the activity.
Atmospheric emissions	Very minor temporary and localised reduction in air quality	• MODU and vessels will meet international air pollution prevention requirements. • All engines and machinery will be maintained in accordance with planned maintenance systems to operate at maximum efficiency. • Well clean up (involving flaring) will be kept to the minimum time possible (generally no more than 24-48 hours).
Discharge of drill cuttings and adhered mud	Minor temporary and localised smothering/burial and disturbance of immediate seabed area. Minor temporary and localised reduction in water quality	• No significant sensitive seabed features at drill locations. • Use of low toxicity Non Aqueous Drilling Fluid (NADF) and Water Based Mud (WBM) and additives (ranked under the CHARM/OCNS system with a minimum of either 'D', Silver or better). The use of fluid or additives that do not meet this criteria will be subject to the Nexus chemical selection process, including a risk assessment and require management approval. • Use of a cuttings processing system (shale shakers, centrifuges and a vertical cuttings dryer) to minimise adhered NADF on cuttings before discharge. • No disposal of whole NADF overboard.
Contaminated deck drainage discharge to sea	Very minor temporary and localised reduction in water quality.	• MODU and vessels hold International Oil Pollution Prevention Certificates, ensuring they are designed, maintained and operated to minimise discharges to sea. • Chemical storage and fuel transfer areas bunded. • Shipboard Oil Pollution Emergency Plan (SOPEP) kits available on board for rapid clean-up response on deck. • Drains in hydrocarbon or chemical use areas are routed to an oily waste tank with an oily water treatment system in place, with no discharge over 15 ppm oil-in-water (OIW).

Sewage, grey water and putrescible (food) waste discharge to sea	Very minor temporary and localised reduction in water quality. Modification of fauna feeding patterns.	• MODU and vessels hold International Sewage Pollution Prevention Certificates, ensuring they are designed, maintained and operated to minimise sewage discharges to sea. • No discharge of sewage and putrescible waste within 12 nm of land. • MARPOL-approved sewage treatment systems used. • Putrescible waste macerated prior to discharge. • All non food galley waste and cooking oils and greases transported back to shore for disposal/recycling.
Cement discharges to sea	Minor temporary and localised reduction in water quality Minor localised smothering of benthic habitat and fauna.	• Use of low toxicity cement and cementing additives. • The volume of cement mixed will be accurately calculated to ensure only that which is necessary for drilling requirements is mixed. • No discharge of leftover dry cement – transferred back to shore • Cement hose flushing and minor releases rapidly diluted and dispersed by ocean currents.
Discharges during well completion, clean up and tank washing	Minor temporary and localised reduction in water quality.	• Use of low toxicity clean up and completion chemicals. • Interface fluids captured and sent onshore for disposal. • During well clean up fluids will be treated through an oily water filtration system. Fluid will not be discharged overboard unless the oil in water content is less than 15ppm. • Discharges will rapidly disperse in the marine environment.
Discharge of hydraulic fluid from operation of valves during subsea tree testing and Blow Out Preventer (BOP) function testing.	Minor temporary and localised reduction in water quality.	• Use of a low toxicity, water based hydraulic fluid for subsea tree (SST) testing. • The hydraulic fluid used in the BOP will be reviewed as part of a review of the environmental risk assessment that will be undertaken once a MODU has been contracted • The very small volume of hydraulic fluid released will be dispersed quickly through the water column in the high energy environment of Bass Strait.
Discharge of cooling water and desalination brine	Minor temporary and localised increase in the surface water temperature and near-surface water salinity of surrounding waters. Addition of liberated chlorine to marine waters	• Consequence deemed to be non-credible given the nature and scale of the activity.
Socio-economic impacts		
Commercial fishing and merchant shipping	Collision risk. Trawling gear snagging on anchors and anchor lines. Exclusion from fishing areas or shipping routes due to exclusion zone	• Longtom-5 drill site located within the Longtom-3 petroleum safety zone – hence no additional exclusion zone. • The Gemfish-1 well location requires an additional exclusion zone. This will be temporary and removed once drilling is complete and equipment removed to below the sea bed. • Longtom-5 and Gemfish-1 drill locations are located within the Bass Strait ‘Area to be Avoided’ by shipping. • A ‘Notice to Mariners’ and AusCoast warnings will be issued to notify of the MODU location.

		• Consultation has taken place with potentially affected fishing and shipping stakeholders. This will continue in the lead up to, during and after the drilling campaign. • A support vessel will patrol the MODU safety exclusion zone and intercept and divert any unauthorised vessels.
Unplanned events		
Introduction of foreign organisms from MODU and vessel hulls and/or ballast	Establishment of foreign species to open ocean and/or seabed, competing with and displacing native species.	• MODU and support vessels must clear AQIS quarantine requirements prior to entering Australian waters. • MODU and support vessels will meet international anti-fouling requirements and have a valid International Anti-fouling System Certificate in place. • A risk assessment in accordance with the 'National Biofouling Management Guidance for the Petroleum Production and Exploration Industry' will be completed prior to mobilisation of the MODU and AHTS vessels. • Ballast water discharge will only occur outside 12 nautical miles of land. • The MODU and AHTS vessels will be have a biofouling record book in place and this will be checked during the premobilisation audits.
Waste discharges	Minor marine pollution. Land and/or groundwater contamination if waste disposed of inappropriately onshore.	• The MODU and vessels will implement a Waste Management Plan – with no offshore disposal of waste. • Waste streams will be segregated and sorted on the MODU and vessels to enable correct onshore disposal and recycling. • Environmentally hazardous chemicals and hydrocarbons will be stored in bunded areas. • An EPA-licenced shore based waste contractor will be contracted for the campaign
Loss of well control (i.e., condensate blowout)	Tainting of commercial fisheries species (e.g., shellfish). Injury and death of species such as seabirds. Pathological effects on fish larvae and plankton. Pollution of shoreline habitats such as sandy beaches and cliff faces.	• Adherence to the Well Operations Management Plan (WOMP), which addresses how the integrity of the well will be managed. • Adherence to MODU Safety Case (and revisions for Longtom activities such as well clean up operations) which address the control of major accidental events such as loss of containment. • Blow out preventer (BOP) will be tested and installed before entering the hydrocarbon zone. • An accepted Oil Spill Contingency Plan (OSCP) and Emergency Response Plan (ERP) will be in place and implemented in the event of a blowout. • Well control procedures developed and agreed before commencement of drilling activities by MODU operator and Nexus. • Source control - implementation of a Well Kill Plan and potential relief well to drill, intersect and kill a blowout • Nexus is a full member of the Australian Marine Oil Spill Centre (AMOSC), giving it ready access to expert response personnel and equipment. • Spill drills and exercises will be conducted.
Diesel or helifuel spill due to vessel collision or during fuel transfer	Temporary localised marine pollution. Injury or death of exposed	• MODU equipped with sophisticated navigation aids and radar to provide advance warning of vessels that may pose a collision risk.

	marine fauna	• AHTS vessel will patrol the MODU petroleum safety zone and intercept and divert any unauthorised vessels. • MODU and vessel refuelling procedures will be in place. • Use of observers during refuelling on both the MODU and the vessel • Refuelling during daylight hours and in suitable weather conditions only • Use of dry-break hose couplings and flotation collars. • Job hazard analysis will be undertaken prior to refuelling. • Drain scuppers used in fuel transfer area to contain deck spills. • Any spilled diesel would evaporate very quickly, likely within 24 hours. • Spill control material available on board the MODU and AHTS vessels and personnel trained in its use. • OSCP and ERP will be in place and implemented in the event of a spill.
Release of NADF	Temporary localised marine pollution. Disturbance to the benthic community by smothering or displacement	• Readiness audit carried out before NADF use. • A low toxicity NADF will be used. • An NADF Management Plan will be in place during NADF operations. This will include containment and management principles for NADF, training and awareness and spill management. • MODU and vessel bulk transfer procedures will be in place. • Use of dry break couplings and flotation collars. • All transfer hoses are certified, inspected and fit for purpose before use. • Transfers of NADF will generally only occur in periods of high visibility and during daylight hours. If this is not possible, NADF transfer will only proceed if adequate flood lighting to allow visual monitoring of the process is in place. • A competent, experienced contractor specialising in NADF applications is on board at all times during NADF use. • Spill control material available on board the MODU and AHTS vessels and personnel trained in its use. • OSCP and ERP will be in place and implemented in the event of a spill.
Hydrocarbon fall out during well clean up	Minor short-lived, surface slick of condensate with temporary and very localised decrease in water quality.	• The use of a well clean-up package that has been designed and installed in accordance with approved standards and subject to external validation (for Safety Case acceptance), including the use of an efficient burner (ie'EverGreen') to reduce liquid drop out risks • Well flows will be initiated during suitable weather conditions as defined by pre-start checks. • The early flow will be directed to separator tanks. • A liquids 'knock out' vessel will be used if deemed necessary.

		• A flare watch will be used for immediate system shutdown in the event of a drop out being observed. • SOPEP kits will be in close proximity to flaring equipment.
Loss of hydraulic fluid from closed systems	Small volumes (typically around a hundred litres) of hydraulic fluid could be lost in the event of major equipment failure or hose damage. Pathological effects on fish larvae and plankton.	• BOP's and ROV's are designed and maintained to prevent leaks. • Isolation of feed supply is available in the event of a leak to prevent further loss. • Hydraulic fluid is stored and supply systems located within bunded areas. • Spill control material available on board the MODU and AHTS vessels and personnel trained in its use.