Environment Plan
Prelude Drilling & Completions

Summary
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1. Introduction

Shell Development (Australia) Pty Ltd (SDA) has commenced drilling and proposes to complete seven to eight production wells in the Petroleum Permit Area WA-44-L as part of the Prelude Floating Liquefied Natural Gas (FLNG) Project (EPBC 2008/4146) (Figure 1). Prelude will be located in Commonwealth marine waters in the northern Browse Basin, 200 km offshore northwest Australia and 475 km north-north east of Broome.

This Environment Plan summary has been prepared as per the requirements of Regulation 11 of the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations (2009) and covers all well activities up to and including drilling, completion, well testing and subsea christmas tree installation.

2. Description of the Activity

This section describes the activities, which includes the following scopes of work:

- Drilling;
- Completions and well testing; and
- Subsea christmas tree installation and associated activities.
Drilling and completions is the first stage of the Prelude FLNG Project and will be carried out by a Mobile Offshore Drilling Unit (MODU or rig). Two to four offshore vessels working from the main supply base in Broome will support the rig. Drilling commenced in September 2013 and is planned to be completed by approximately Q4, 2015 with contingency up to Q3, 2016.

The Prelude wells will be drilled as deviated wells, fanning out radially from a single drill centre (DC1) using the semi-submersible rig Noble Clyde Boudreaux (NCB). The Prelude FLNG Production wells are being drilled via a phased approach. The drill centre location for the Prelude wells is (Figure 2):

Longitude: 123°19’ 35.84” E  
Latitude: 13°49’0.82” S

Completions and well testing will occur after the drilling phase with earliest start date commencing Q3, 2014. Completions and well testing will take approximately 3 weeks per well to complete and will be undertaken in a batch process.

Following the completion of each batch of wells, a Multipurpose Vessel will be used to install subsea christmas trees. There are seven to eight planned subsea christmas tree installations
and each one will take approximately 24 hours to complete over two campaigns (approximately Q4, 2014 and Q1, 2016 respectively). It is planned to install 3 subsea Christmas trees during the first campaign, with the rest being installed during the second campaign.

Prior to FLNG arrival, well integrity monitoring is planned to occur on the Prelude wells after subsea tree installation using an acoustic data logger transmission system.

3. Description of the Environment

3.1. Physical

The permit area, WA-44-L, is located in waters on the continental slope between 200 and 300 m depth. There are no significant topographical features in the region of the Prelude FLNG facility project area. No reefs or extensive areas of rocky substrate have been observed. A number of small (up to 6 m diameter) anomalies have been detected. However, none of these occur within the vicinity of the Prelude drill centre and they will not be affected by the activity. Sediments at Prelude are described as very soft siliceous carbonate silts to a depth of about 10 m below the seabed were siliceous carbonate sands are found.

The most sensitive seabed features in the broader Browse Basin are the coral reefs and islands that occur in the region. The closest of these features, Browse Island, is located some 40 km south-southeast of the proposed drilling location. Due to the distance of Prelude from these features, planned activities are not expected to impact any of these features.

Significant land masses north (> 200 km) of WA-44-L includes Timor Island and the Southern Indonesian Archipelago. Areas of coastal ecosystems within the Indonesian and Timor Island region are characteristic of coastal tropical environments and show similar features to that of Australia’s North West coast.

WA-44-L is situated in the tropics and experiences a monsoonal climate with two predominant seasons. The Australian Northern monsoon generally occurs between December and March. It is associated with the inflow of moist west to north-westerly winds into the monsoon trough, producing convective cloud and heavy rainfall over northern Australia. During the cooler months, the subtropical ridge that lies over continental Australia drives stable and persistent easterly quadrant winds over the region. The Australian cyclone season officially runs from November to April, although very few storms have occurred in November. The chance of experiencing an intense category 4 or 5 cyclone is highest in March and April. At the start of the cyclone season, the most likely area to be affected is the Kimberley and Pilbara coastline and offshore areas including WA-44-L, with the area threatened later in the season, extending further south.

The large-scale ocean circulation on the Northwest shelf is linked with major Southeast Indian Ocean and Indo-Pacific current regimes, such as the Indonesian Pacific Through Flow, which contributes to the westward flowing South Equatorial Current (between 8° and 15°S latitude) and floods the Northwest shelf with relatively warm, low-salinity water. Wind-induced currents occur due to local wind forcing at the surface and are most pronounced during tropical cyclones.
3.2. Biological

3.2.1. Benthic and Pelagic Communities

In the general region of WA-44-L, at ~237 m depth, there is little evidence of hard substrates and extensive epibenthic communities. Thus, with little sea floor topography, such areas offered minimal habitat diversity or niches to occupy. Specifically, the absence of hard substrate is considered a limiting factor for the recruitment of epibenthic organisms.

3.2.2. Endangered and Vulnerable Species

The Environment Protection Biodiversity Conservation (EPBC) Protected Matters Database does not list any Threatened Ecological Communities occurring in the marine environment. The database lists nine Threatened Species that potentially transverse WA-44-L, which does not contain any recognised feeding, breeding or aggregation areas. Threatened species listed include two cetacean species, six reptile species and one shark species.

Table 1: Threatened Species that may transit through WA-44-L

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
<th>EPBC Act Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Megaptera novaeangliae</td>
<td>Humpback Whale</td>
<td>Threatened (Vulnerable)*</td>
</tr>
<tr>
<td>Balaenoptera musculus</td>
<td>Blue Whale</td>
<td>Threatened (Endangered)*</td>
</tr>
<tr>
<td>Natator depressus</td>
<td>Flatback Turtle</td>
<td>Threatened (Vulnerable)*</td>
</tr>
<tr>
<td>Chelonia mydas</td>
<td>Green turtle</td>
<td>Threatened (Vulnerable)*</td>
</tr>
<tr>
<td>Dermochelys coriacea</td>
<td>Leatherback Turtle</td>
<td>Threatened (Endangered)*</td>
</tr>
<tr>
<td>Eretmochelys imbricata</td>
<td>Hawksbill Turtle</td>
<td>Threatened (Vulnerable)*</td>
</tr>
<tr>
<td>Lepidochelys olivacea</td>
<td>Olive Ridley Turtle</td>
<td>Threatened (Endangered)*</td>
</tr>
<tr>
<td>Caretta caretta</td>
<td>Loggerhead Turtle</td>
<td>Threatened (Endangered)*</td>
</tr>
<tr>
<td>Rhincodon typus</td>
<td>Whale Shark</td>
<td>Threatened (Vulnerable)*</td>
</tr>
</tbody>
</table>

*Also listed as Migratory

The EPBC Protected Matters Database also lists sixteen species covered by the migratory provisions of the EPBC Act 1999 that may occur within the WA-44-L. Migratory species that may occur within the WA-44-L permit area include six cetacean species, one species of bird, six reptile species and three fish/shark species.

Table 2: Migratory species that may occur within WA-44-L

<table>
<thead>
<tr>
<th>Scientific name</th>
<th>Common name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calonectris leucomelas, Puffinus leucomelas</td>
<td>Streaked Shearwater</td>
</tr>
<tr>
<td>Balaenoptera bonaerensis</td>
<td>Antarctic minke whale</td>
</tr>
<tr>
<td>Balaenoptera edeni</td>
<td>Bryde’s whale</td>
</tr>
<tr>
<td>Balaenoptera musculus*</td>
<td>Blue whale*</td>
</tr>
<tr>
<td>Megaptera novaeangliae*</td>
<td>Humpback whale*</td>
</tr>
<tr>
<td>Orcinus orca</td>
<td>Killer whale</td>
</tr>
<tr>
<td>Physeter macrocephalus</td>
<td>Sperm whale</td>
</tr>
</tbody>
</table>
3.3. Marine Reserves

A search of the EPBC Protected Matters Database identified that WA-44-L is not located in any Marine Protected Areas. In the worst-case spill scenario of a blow-out there are a number of Marine Reserves lie within the zone of potential impact. These include: Ashmore Reef, Cartier Island, Argo-Rowley Terrace, Oceanic Shoals, Mermaid Reef, Eighty Mile Beach, Roebuck, Montebello, Kimberley Commonwealth Marine Reserve areas and parts of the Southern coastline of the Indonesian Archipelago and Timor Island.

3.4. Socio-Economic Environment

The project area overlaps with a variety of commercial fishing management areas. Commercial fisheries include tuna and tropical finfish, particularly emperor, snapper and cod. Within the northwest region there are also significant commercial fisheries for Spanish mackerel, barramundi, threadfin salmon and shark. WA State managed commercial fisheries permitted to operate within WA-44-L include Northern Dermersal Scale Fishery, North Coast Prawn Managed Fishery, Beche-de-mer Fishery, Mackerel Fishery, North Coast Nearshore and Estuarine Fishery, Northern Shark Fisheries, Pearl Oyster Fishery, Specimen Shell Managed Fishery, Marine Aquarium Fish Managed Fishery, West Coast Deep Sea Crustacean (Interim) Fishery, Roe’s Abalone Fishery, North Coast Prawn Managed Fishery and North Coast Nearshore and Estuarine Fishery.

Commonwealth managed commercial fisheries, which are permitted to operate within the Permit area include Southern Blue Fin Tuna Fishery, Western Skipjack Fishery, Western Tuna and Billfish Fishery, North West Slope Trawl Fishery and Northern Prawn.

Commercial fishing is concentrated mostly in coastal waters and minimum fishing occurs within the vicinity of the permit area, however should there be a spill resulting from a blow-out event, some fisheries may fall within the zone of potential impact.

In 1974, Australia recognised access rights for traditional Indonesian fishers in shared waters to the north of Australia, granting long-term fishing rights in recognition of the long history of traditional Indonesian fishing in the area. A Memorandum of Understanding (MOU) between the Governments of Australia and Indonesia enables Indonesian traditional fishers to continue their customary practices. This area is known as the ‘MOU Box’ and WA-44-L lies within this area. Given the shallow water target species, these traditional Indonesian fishermen are likely to be
found in deepwater areas only during transit to and from the reef locations; therefore, they are unlikely to be unaffected by the activity.

Currently, there are no known recreational fishing activities in the project area as the site is too far from shore to be accessed by recreational fishermen in small boats. Even at relatively high speed (30 km/hour), it would take at least fifteen hours for a recreational boat to reach the project area from the nearest port of Broome.

Oil exploration activities in the Timor Sea commenced in the late 1960s. Since this time numerous wells have been drilled throughout the region. Specifically, petroleum exploration has been active in the Browse Basin since the 1980s, with several commercial discoveries since that time. The Ichthys gas field in Exploration Permit Area WA-285-P is immediately to the south of WA-44-L and is the closest known field approximately 20 km away but is yet to go into production.

None of the major commercial shipping routes through the Timor Sea passes through WA-44-L. The nearest major shipping lane to the west of the project area is over 200 km away. The nearest shipping lane to the north of the project area is approximately 100 km. Given the distances between the proposed project area and shipping lanes, the drilling and completion activities for the Prelude FLNG will likely pose a minimal navigational risk to commercial shipping.

There are no known sites of Aboriginal cultural significance within WA-44-L. Given that the location of WA-44-L is approximately 200 km from the mainland, it is highly unlikely that the area is used for hunting or fishing by Australian Aboriginal people. There are no islands or land within the proposed drilling area and therefore there are no land based Aboriginal heritage sites.

Information on historic shipwrecks is maintained in the National Shipwrecks database, a searchable database of Australian shipwrecks containing shipwreck records provided by the Australian State and Territory governments. A search of the database revealed no known shipwrecks within the permit area.

4. Management Approach

The Shell Commitment and Policy on Health, Safety, Security, Environment and Social Performance (HSSE and SP) applies across Shell globally and is designed to protect people and the environment.

Key features of the policy are:

- Systematic approach to HSSE and SP management designed to ensure compliance with the law and to achieve continuous performance improvement;
- Targets for improvement and measurement, appraisal and performance reporting;
- Requirement for contractors to manage HSSE and SP in line with this policy; and
- Effective engagement with neighbours and impacted communities.

All of Shell’s operations comply with the Shell HSSE and SP Control Framework, a comprehensive corporate management framework, comprising a simplified set of mandatory standards applicable to every Shell Company, contractor and joint venture under Shell’s operational control.
Within Shell, the HSSE and SP Control Framework requires people in HSSE Critical Positions to have their HSSE-MS competence assured. These people have to attain a set proficiency level in three competences: HSSE Lead; HSSE Prepare; and HSSE Apply. People in HSSE Critical Positions are responsible for the development and maintenance of effective barriers to prevent incidents.

The Prelude Drilling and Completion activities will be managed in compliance with relevant State and Commonwealth Acts and Regulations, industry standards and applicable international agreements.

The SDA Drilling Supervisor (DSV) is Shell’s representative aboard the NCB. The DSV are responsible for ensuring the operational requirements of the EP are communicated to the rig crew and implemented on a daily basis.

Shell has a program of audits that take place at pre-mobilisation and during the activities. An annual EP compliance audit will be undertaken to determine compliance with the requirements of this EP. The audit will assess and report against the established environmental objectives, standards and measurement criteria.

If any new or increased risks are identified during the activities, an assessment of the risk will be undertaken. If the risk is determined to be significant new or significantly increased risk, the associated activities will not continue until acceptance of the management approach to the new/changed risks has been provided and accepted by the Department of Environment and NOPSEMA.

All Environmental incidents and non-conformances are managed in accordance with the SDA HSSE Incident Reporting, Investigation and Follow Up Procedure that describes the process of reporting, classification, investigation, follow-up and close out.

Shell’s overall environmental objective for the activities is to avoid or reduce environmental risks to as low as reasonably practicable. Specific objectives, standards and measurement criteria for each aspect of these activities that have the potential to cause adverse environmental impacts have been identified with controls in place. Environmental performance will be measured and reported against these standards and criteria as part of Shell’s commitment to continuous improvement of environmental, health and safety performance.

Environmental Performance report will be submitted to NOPSEMA as required by OPGGS (E) Regulations 2009. This report will be submitted to NOPSEMA within 12 months of the activities commencement and every 12 months thereafter.

As required by the OPGGS (E) Regulations, Shell will store and maintain environmental documents and records for these activities for the period of 5 years.

The Prelude Drilling Oil Spill Contingency Plan (OSCP) was tested prior to activity commencement and will be tested periodically during the activity, to make all personnel aware of their personal responsibilities in these plans. Exercises are critical to ensure there is appropriate level of response readiness should there be an incident and is an important part of continually managing the risks associated with an oil spill to ALARP from a response readiness perspective. A summary of Shell’s response strategies in the Oil Spill Contingency Plan is provided in Appendix A.
An Implementation Strategy has been incorporated into the Environment Plan per the OPGGS (E) Regulations 2009. This includes:

- Measures, systems, practices to ensure environmental performance objectives and standards are met;
- Chain of Command;
- Measures to ensure workers are aware of their responsibilities;
- Monitoring and management;
- Records and reporting;
- Oil Spill Contingency Plan; and
- Consultation.

5. Environmental Hazards and Controls

A risk analysis has been undertaken for all aspects of operations, in accordance with the Shell HSSE and SP Control Framework and in line with the principles outlined in the Australian Standard AS/NZS ISO 31000:2009 Risk Management and HB 203:2006 Environmental Risk Management.

The risks for each planned and unplanned event have been determined using a qualitative assessment process. The level of risk has been determined by assessing risk likelihood and consequence using the Shell Risk Assessment Matrix (RAM).

The RAM is a 6 by 5 matrix that is used for qualitative assessments of Risk and assists determination of appropriate controls and mitigation measures:

- The vertical axis represents increasing Consequences (Severity levels 0 to 5) in terms of harm to people, damage to assets, effect on the environment and impact on reputation (PAER categories), with 5 having the greatest severity; and
- The horizontal axis represents increasing Likelihood (levels A to E) of the Consequence under consideration, with E having the greatest likelihood.

To demonstrate that risks are as low as reasonably practicable and at an acceptable level, all mitigation measures have been considered and where these measures are practical, they have been included.

Incidents with a consequence severity equal to or greater than level 3 (i.e. moderate to massive) are considered ‘Reportable Incidents’ in line with Regulation 26 of the OPGGS (E) Regulations. Based on the risk assessment, though the probability of occurrence is low, three possible events are considered to have a moderate or greater consequence, if they occur:

- Death or injury of a member of a threatened or migratory or cetacean species as a result of a collision with a vessel;
- A diesel spill resulting from a vessel to vessel collision; and
- Any spill resulting from a well blow out.

Recordable incidents in the OPGGS (E) Regulation are defined as ‘an incident arising from the activity that breaches a performance objective or standard in the Environment Plan that applies to the activity and is not a reportable incident’.
A summary of the key environmental hazards and control measures to be applied to the activities are shown in Appendix B. All control measures associated with the hazards will be used to reduce environmental risk to as low as reasonably practicable and will be of an acceptable level.

6. Consultation

Shell has been undertaking wide-ranging consultation with key stakeholders who have an interest in Prelude FLNG Project in the Browse basin. The specific consultation around Prelude’s well program is following on from the regular updates that stakeholders and interested parties receive periodically on Prelude.

In the process of initially identifying and engaging with relevant persons, Shell considered relevant government agencies and persons or organisations whose functions, interests or activities may be affected by the activity. Stakeholders consulted include:

- Commonwealth government departments;
- Western Australia government departments;
- Northern Territory government departments;
- Broome community stakeholders;
- Broome local government agencies;
- Commercial fishing industry associations;
- Recreational fishing industry associations; and
- Individual commercial fishing licence holders.

Prior to the submission of the Environment Plan, stakeholders were notified of our intent to undertake the activity and submit environmental approval from NOPSEMA. Engagement on the activity will continue throughout the project leading up to and post the completion of the activity as appropriate. Shell has a communications plan in place to ensure stakeholders are kept informed of project progress and outcomes. Stakeholders are able to raise questions/concerns at any time via the following email address, which is posted on the Shell website: sda-preludeflng@shell.com.

Some stakeholders raised concerns that additional stakeholders may have an interest in these activities and Shell contacted the relevant parties, with no further concerns raised. There was a query seeking clarity around the rig’s exclusion zone and it was confirmed the safety zone around the rig was 500 m. Relevant stakeholders requested a copy for the approved OSCP, which Shell has provided. No other major issues were raised by stakeholders during the consultation process.

7. Contact Details

For further information about this activity, please contact:
Lauren Gorton
Address: 2 Victoria Avenue, Perth, Western Australia, 6000
Tel: +61 (0) 8 9338 6000
APPENDIX A: Summary of response strategies in the oil spill contingency plan

The Prelude Drilling Oil Spill Contingency Plan (OSCP) supports the Prelude drilling and completion activities in the Permit Area WA-44-L and sets out Shell and Contractor responsibilities and response actions in the unlikely event of an oil spill during these operations.

For offshore petroleum exploration and production activities, NOPSEMA is the statutory authority in Commonwealth waters. Shell is the Combat Agency for all spills emanating from petroleum facilities in Commonwealth waters, including from the Prelude drilling and completions activity. The scope of the OSCP is to respond to spills originating directly from the drilling and completion activities at the Prelude location.

Marine pollution response is based on a graduated or tiered scale of response whereby the amount of resources mobilised for a response and the agency in control may vary according to the scale and location of the incident, allowing escalation and de-escalation of the response.

Shell has a number of formal arrangements in place to access external assistance if required. These include:

- Australian Marine Oil Spill Centre (AMOSC) resources;
- Australian Maritime Safety Authority (AMSA) has access to resources under the National Plan;
- Shell’s AMOSC managed shared Broome Stockpile;
- Mutual Aid arrangements (industry support from other participating petroleum companies);
- Oil Spill Response Ltd (OSRL); and
- Shell Global Response Support Network (GRSN).

Response Actions

Should an oil spill incident occur, Shell will immediately follow the vessel / rigs procedures to protect human life, equipment and reduce the risk of fire or explosion. This may involve cutting off supply to the spillage, containing spill on deck if safe to do so and implementing vessel’s and / or rigs Shipboard Oil Pollution Emergency Plan (SOPEP). NOPSEMA and other relevant authorities such as AMSA, Department of Fisheries, Department of Transport and Department of the Environment will be notified, if required.

For spills extending beyond the initial actions, an Incident Action Plan (IAP) will be developed at the time of a spill, appropriate to the nature, size and scale of the activity and utilising the appropriate response strategies. The pre-spill planning assessment of the applicability of each response strategy, including the Net Environmental Benefit Assessment (NEBA), will be revisited and updated if required based on the actual characteristics of the spill at hand.

Primary response strategies that may be employed in parallel with monitor and evaluate in worst case oil spill scenarios include oiled wildlife response and operational and scientific monitoring program (OSMP).

Monitor and Evaluate

The monitor and evaluate strategy will be conducted for all spills including the worst case spill scenario to inform response decision making, maintain situational awareness and keep the IAP current. The available tools to support the monitor and evaluate strategy include:
Satellite imagery;
Observation from vessels;
Modelling;
Metocean Data; and
Aerial Surveillance.

*Oiled Wildlife Response*

The oiled wildlife response strategy may be implemented, if there is a potential for oiling of fauna, to reduce damage to fauna threatened by a spill. Trained personnel and necessary equipment would be mobilized to ensure fauna are appropriately assessed and treated.

*Operational and Scientific Monitoring Program*

The operational and scientific monitoring program may be implemented, if a spill is deemed significant to trigger this response. Shell has developed the Prelude Operational and Scientific Monitoring Program to determine the fate and ecological consequences of a spill to enable environmental impacts and recovery to be measured.
### APPENDIX B: Summary of key environmental hazards and control measures

<table>
<thead>
<tr>
<th>Hazard / Event</th>
<th>Potential Environmental Impact</th>
<th>Controls – Mitigation Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Planned Activities- Rig and Vessels</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical presence of the rig</td>
<td>Disruption of commercial or recreational fishing or shipping activity.</td>
<td>A ‘Notice to Mariners’ advising of the presence of the rig will be issued through the Australian Maritime Safety Authority. The rig will be equipped with suitable navigation aids and regulatory equipment. Communication with the Australian Fisheries Management Authority and WA Fisheries.</td>
</tr>
<tr>
<td>Anchoring of the rig and other infrastructure</td>
<td>Smothering and disturbance of benthic communities.</td>
<td>Prelude Mooring and Riser Study has been developed using side scan sonar and 3D seismic survey data, which informed positioning of anchor, mooring line and chain locations to avoid shallow geological hazards including hard substrates. Prelude wells drilled from a single drill centre limiting anchor disturbance to single location. As-laid survey carried out to confirm the final location.</td>
</tr>
<tr>
<td>Noise generated by vessels/ rig activities/ acoustic array</td>
<td>Disruption to behaviour patterns of sensitive marine fauna from the rig operations and/or noise generated by vessel movements.</td>
<td>Drilling location in open ocean, well away from coastal environments and fauna migration routes. Routine drilling and vessel noise thoroughly studied and documented - below levels likely to cause physiological damage to marine fauna. Acoustic data logger noise studied and documented – unlikely to cause physiological damage to marine fauna. Adherence to EPBC Policy Statement 2.1 as required.</td>
</tr>
<tr>
<td>Hazard / Event</td>
<td>Potential Environmental Impact</td>
<td>Controls – Mitigation Measures</td>
</tr>
<tr>
<td>----------------</td>
<td>--------------------------------</td>
<td>--------------------------------</td>
</tr>
<tr>
<td>Discharge of deck drainage waste from the rig and vessels and produced formation water.</td>
<td>Localised and temporary acute toxic effects caused by contaminants in waste stream.</td>
<td>Deck spills cleaned up using adsorbents (spill kits) and/ or diverted to slops tanks. Potentially contaminated water drained to slops tanks and passed through the oil/ water separator at &lt;15 ppm or stored for onshore disposal (MARPOL 73/78 Annex I – Regulation for the Prevention of Pollution by Oil from Ships under the Commonwealth Protection of the Sea (Prevention of Pollution from Ships) Act 1983). Discharge quality of oil/ water separator automatically monitored with diversion. Produced Formation Water discharge is treated via a water filtration system designed to meet hydrocarbon content &lt; 30 mg/L.</td>
</tr>
<tr>
<td>Drill cuttings and bulk water based muds (WBM) discharge</td>
<td>Disturbance to benthic communities as a result of smothering and pelagic communities as a result of increased turbidity from WBM/ cuttings disposal.</td>
<td>42” and 30” sections drilled riserless with seawater/ prehydrated bentonite sweeps, cuttings deposited directly on seafloor minimising zone of impact and turbidity. WBM used for 24” and 17½” sections, planned to be returned to surface using a Riserless Mud Recovery system and WBM cuttings directed over the shale shakers to recover WBM for reuse prior to cuttings discharging to ocean.</td>
</tr>
<tr>
<td>Synthetic based mud (SBM) coated drill cuttings discharge</td>
<td>Disturbance to benthic communities as a result of smothering and burial with SBM coated cuttings.</td>
<td>SBM only used to drill lower sections (311 and 216 mm), as technically required. No bulk SBM discharged to ocean at any time throughout the duration of the activity. Synthetic Base Fluid on cuttings discharge within % specification limit.</td>
</tr>
</tbody>
</table>
### Environment Plan Prelude Drilling and Completions Summary

<table>
<thead>
<tr>
<th>Hazard / Event</th>
<th>Potential Environmental Impact</th>
<th>Controls – Mitigation Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disposal of excess or contaminated cement</td>
<td>Impacts to benthic communities as a result of smothering and pelagic communities as a result of increased turbidity of cement disposal.</td>
<td>Mixing of cement in small batches, limiting the volume of cement that may require disposal. Unused additives returned to shore for reuse or disposal.</td>
</tr>
<tr>
<td>Atmospheric emissions from fuel combustion, venting, flaring and burners on MODU and combustion on vessels</td>
<td>Reduction in air quality through combustion of liquid fuel in the energy units of MODU and vessels.</td>
<td>Emissions (including the use of low sulphur diesel) will be compliant with MARPOL 73/78 Annex VI – Regulation for the Prevention of Air Pollution from Ships, enforced under the Commonwealth Protection of the Sea (Prevention of Pollution from Ships) Act 1983).</td>
</tr>
<tr>
<td>Well bore clean up and completions fluids discharge</td>
<td>Disturbance to benthic communities, as a result of smothering, and pelagic communities caused by discharge of water containing chemicals.</td>
<td>Recovered fluid interfaces isolated in pits, tested for non-aqueous fluid content allowed to settle and free oil recovered prior to discharge to the ocean at &lt; 10% v/v.</td>
</tr>
<tr>
<td>Hazard / Event</td>
<td>Potential Environmental Impact</td>
<td>Controls – Mitigation Measures</td>
</tr>
<tr>
<td>---------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Unplanned Impacts</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vessel collision with marine life</td>
<td>Injury and/or death of a cetacean or other protected fauna.</td>
<td>The project area is not nearby to known cetacean feeding or breeding areas and is distant to humpback whale migration routes. Animals are expected to alter course away from slow-moving or stationary support vessels.</td>
</tr>
<tr>
<td>Sourcing of the rig/vessels with overseas last port of call that may be carrying non-native marine species</td>
<td>Introduction of exotic marine species via ballast water exchange or biofouling causing alteration to community composition and function, competition with indigenous species.</td>
<td>The rig was dry towed and cleaned of biofouling prior to arrival in Australia. Vessels sourced with an overseas last port of call will have had an anti-foul treatment within 12 months or their hulls inspected and cleaned, if required, before arrival in Australia. All vessels and the rig compliant with Australian biosecurity and quarantine requirements.</td>
</tr>
</tbody>
</table>
| Accidental discharge of hazardous/non-hazardous solid wastes into the ocean | Reduction in habitat/water quality, acute/chronic toxic effect on marine organisms.            | Waste managed in accordance with MARPOL 73/78 Annex V – *Regulation for the Prevention of Pollution by Garbage from Ships* and Annex II – *Regulation for the Prevention of Pollution by Noxious Liquid Substances in Bulk from Ships* and Annex III – *Regulation for the Prevention of Pollution by Harmful Substances Carried by Sea from Ships* under the *Commonwealth Protection of the Sea (Prevention of Pollution from Ships) Act 1983*, and local requirements including:  
- a list of all hazardous substances planned to be used including safety data sheets, storage requirements, details of provider, Australian regulatory requirements for disposal and procedures for managing accidental discharges/spills;  
- requirement that all wastes be tracked and logged, sent to shore for recycling or disposal in a government approved waste disposal site; and  
- the rig has dedicated storage area for containers and tanks that contain segregated maintenance waste.  
Shipboard Oil Pollution Emergency Plans. Regulator accepted Oil Spill Contingency Plan. |
<table>
<thead>
<tr>
<th>Hazard / Event</th>
<th>Potential Environmental Impact</th>
<th>Controls – Mitigation Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diesel or aviation fuel spill during refuelling at sea</td>
<td>Potential loss of diesel or aviation fuel to the marine environment causing localised and temporary acute toxic effects and direct physical smothering of marine organisms.</td>
<td>At sea refuelling will occur with strict adherence to refuelling procedures, reinforced hoses with dry break couplings and fail-safe fittings; operation will commence in daylight under normal conditions; Favourable wind and sea conditions as determined by the Master of the vessels; Fuel hoses changed annually and refuelling constantly observed by crew member in radio contact with Vessel Masters. Shipboard Oil Pollution Emergency Plans. Regulator accepted Oil Spill Contingency Plan. Oil Spill Modelling indicates surface spilt hydrocarbons from a refuelling incident have no probability of reaching environmental sensitivities at levels above thresholds that may impact sensitivities in the area.</td>
</tr>
<tr>
<td>Dirty Oil spill resulting from a collision between a vessel and the rig</td>
<td>Potential acute/ chronic toxic effects and direct physical smothering of marine organisms.</td>
<td>A ‘Notice to Mariners’ advising of the presence of the rig will be issued through AMSA prior to the commencement of the activity. Ongoing communication with AFMA, and other commercial mariners such that that presence of the MODU and vessels widely communicated. A safety zone of 500 m radius around the drilling unit will be maintained at the well site. The rig will be located in open waters with no navigation constraints and will be well lit at night and during times of poor visibility. Support vessels to be equipped with suitable navigational systems. Regulator accepted Oil Spill Contingency Plan.</td>
</tr>
<tr>
<td>Diesel spill resulting from a collision with another vessel</td>
<td>Potential acute/ chronic toxic effects and direct physical smothering of marine organisms.</td>
<td>A ‘Notice to Mariners’ advising of the presence of the rig prior to the commencement of the activity. Support vessels routes are pre-determined and risk assessed. Vessels equipped with suitable navigation systems. Regulator accepted Oil Spill Contingency Plan.</td>
</tr>
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| Loss of well control/ well blow-out | Potential loss of gas and condensate to the marine environment causing acute/chronic toxic and physical effect on marine organisms and habitats. | Regulator accepted Well Operations Management Plan and drilling program meeting the following Shell requirements:  
  • Training;  
  • Global Standards for Well Design Integrity;  
  • Risk identification and mitigation through Safety Cases;  
  • Robust barriers to protect against blow-out prevention; and  
  • Real-time monitoring during drilling operations.  
A worst case scenario well blow out may result in entrained and dissolved concentrations that are above thresholds that may impact sensitivities in the area.  
Regulator accepted Oil Spill Contingency Plan outlines response activities to reduce the environmental impact and links to the blowout contingency plan. |