

Summary of impacts and risks – Well completions, well interventions and P&A activities EP



Aspect - Planned	Relevant activities	Potential impact	Summary of Beach control measures
Light emissions	Drill rig and support vessel operations Well intervention and workovers Well clean-up and flowback	Drill rig and vessel lighting is required for navigational and safety purposes. Artificial light may attract light sensitive species such as shorebirds, seabirds and turtles. Flaring/well flowback will occur at up to four wells for up to 24 hours per well.	• Drill rig and vessel lighting complies with Australian Maritime Safety Authority (AMSA) Marine Orders Part 30 (Prevention of Collisions). • Beach Seabird Lighting Management Plan is implemented on the drill rig and vessels, and details: ○ Non-essential lights are turned off when not in use. ○ Lighting is directed onto work areas. ○ Window screens or blinds are closed at night. ○ Crew environmental induction covers handling and reporting requirements for grounded or injured birds.
Seabed disturbance	Drill rig and support vessel operations Remotely Operated Vehicle (ROV) operations Drill rig positioning Completions/interventions operations	Temporary and localised seabed disturbance with associated loss of benthic habitat or disturbance to cultural or heritage feature may occur from: • Drill rig positioning/anchoring (semi-submersible) • ROV parking • Completions and interventions operations	• Assessment of the seabed to identify and avoid, where possible, any key environmental, heritage or cultural features. • Drill rig anchoring procedures. • Vessel use of dynamic positioning rather than anchor. • Beach Chemical Management Plan requires that drill fluids, cement and grout are selected to ensure the lowest toxicity, most biodegradable and least accumulative products selected that meet the technical requirements of the application.
Underwater sound	Drill rig and support vessel operations Pre-lay moorings	Temporary disturbance to marine fauna may occur from underwater sound emissions from: • Vessel engines and thrusters	• Engines and thrusters are maintained in accordance with manufacturer's instructions via the Planned Maintenance System to ensure they are operating efficiently. • Vessel and helicopters comply with the EPBC Regulations 2000 – Part 8 Division 8.1 interacting with cetaceans, which details minimum separation distances.

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	- Completions/ interventions operations - Plug and abandonment (P&A) - Helicopter operations	- Helicopters - Drill rig engines and rig equipment - Wellhead cutting – up to six hours for contingent P&A of Artisan 1	- Beach Whale Management Procedure is implemented on vessels and drill rig and requires: - Monitoring undertaken by a Marine Mammal Observer (MMO) of the Pre-survey Zone (PSZ) for 30 minutes to identify whales that may be within the activity area affected by underwater sound. - Anchor pre-lay: - Anchor pre-lay can commence when absence of whales (no whales observed for 30 minutes within the PSZ or whales observed leaving the PSZ). - If a whale is observed while anchor deployment is occurring, vessel to reduce thrusters if safe to do so. Anchor deployment will cease as soon as it is safe and will only recommence when absence of whales in the PSV is confirmed. - Rig mooring: - Prior to commencing mobilisation of the rig to a new well location (new anchor pattern), monitoring by a MMO will be undertaken of the PSZ. The rig can commence to new location and securely anchor when the absence of whales in the PSZ is confirmed. - Monitoring will commence prior to the rig moving to the new location. If whales are observed within the PSZ while the rig is in transit to a new location, the sighting will be communicated to the Beach Senior Drilling Supervisor (SDSV) and steps taken to allow time for the whales to move away. - Once the move has commenced, if whales have been observed within the PSZ the rig can only enter the PSZ and commence mooring if no whales are observed for 30 minutes or whales observed leaving the PSZ. - Completions/Interventions/Resupply: - Survey next positive test of well integrity prior to commencing drilling/resupply, only proceeding when absence of whales is confirmed.

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			▪ Drilling/resupply can commence if monitoring cannot be undertaken such as night or low visibility conditions if no more than three whales have been seen three hours prior to sunset or confirmed absence of foraging whales. ▪ At all times, noise producing operations on the rig should be minimised including optimising load on generators, minimising crane movements, continuing monitoring from all in-field vessels, reduce load on mud pumps and rotary drilling equipment. ▪ If drilling has commenced and whales are observed, proceed to the next positive test of well integrity. Once well integrity has been confirmed, reduce load on mud pumps, generators and rotary drilling equipment. ▪ If resupply has commenced and whales are observed within the resupply zone while resupply is occurring, vessel to reduce thrusters if safe to do so and resupply will cease as soon as it is safe and not recommence until absence of whales is confirmed. ○ When undertaking noise emitting activities, at least one vessel with a MMO on board shall be in the field to carry out whale observations. If only one vessel is observing, it should sail around the rig approximately every six hours to minimise the blind spot behind the rig. If 2 vessels are available, the blind spot shall be minimised by stationing at opposing sides of the rig. ○ If daylight hours are greater than 12 hours, two MMOs should be on each vessel. MMOs must be trained, experienced and familiar with the activity zones. MMOs will record all observations and track all species of concern while communicating with onshore whale experts and the SDSV and vessel captains.
Physical presence	Drill rig and support vessel operations	The physical presence of Petroleum Safety Zones, pre-laid anchors, vessels and drills rigs can result in the displacement of other marine users and snagging of fishing equipment.	• Consultation with relevant persons that may be affected by the activity is undertaken as part of developing the environment plan and is ongoing prior to and during the activity to avoid or limit any displacement. • Petroleum Safety Zones, administrated by NOPSEMA under the OPGGS Act, are clearly marked on navigational charts.

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			- Beach's Fair Ocean Access Procedure details the process whereby a commercial fisher can claim compensation for an economic loss associated with Beach's offshore activities where impacts cannot be avoided. - Vessels and drill rigs comply with: - AMSA MO 30: Prevention of collisions requires that onboard navigation, radar equipment, and lighting meets the International Rules for Preventing Collisions at Sea (COLREGs) and industry standards. - AMSA MO 27: Safety of navigation and radio equipment gives effect to SOLAS regulations regarding radiocommunication and safety of navigation and provides for navigation safety measures and equipment and radio equipment requirements. - Pre-laid anchors are equipped with a surface buoy with a navigation light to ensure any marine users know of their presence. - The position of the pre-laid anchor buoys are monitored to ensure that the buoys and anchor chains remain in place. - The Australian Hydrographic Office is notified of the activity at least three weeks prior to commencement to enable the promulgation of Notice to Mariners and AusCoast navigational warnings.
Marine discharges	Drill rig and support vessel operations Completions and intervention operations Subsea tree installation Well clean-up and flowback	Drill rig and vessels may discharge the following, which can result in changes in water quality such as increased temperature, salinity, nutrients, chemicals and hydrocarbons: - Cooling water, brine, bilge water, deck drainage, putrescible waste, sewage, and grey water. - Completion fluids (completion brine and formation water/condensate present in wellbore), packer fluids (brine, corrosion inhibitors, alkalinity control),	- Drill rig and vessels comply with Protection of the Sea (Prevention of Pollution from Ships) Act 1983, which gives effect to MARPOL Annex IV relating to discharge of noxious liquid substances, sewage, and putrescible waste. - Equipment to treat marine discharges are maintained in accordance with manufacturer's instructions via the Planned Maintenance System to ensure they are operating efficiently. - Oil contaminated water is treated via a MARPOL (or equivalent) approved oily water separator and only discharge if oil content less than 15 ppm. - Sewage discharged at sea is treated via a MARPOL (or equivalent) approved sewage treatment system. - Food waste only discharged when macerated to ≤ 25 mm and at distance greater than 3 nm from land. - Beach Chemical Management Plan requires that any chemicals within marine discharges are selected to ensure the lowest toxicity, most biodegradable and least accumulative products selected which meet the technical requirements of the application.

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		control fluids, reservoir fluids	
Drilling/ Completions discharges	Blow-out Preventer (BOP) installation and testing Completions activities P&A	Discharges of the following can result in localised changes in water and sediment quality: • BOP hydraulic/control fluids • Drill fluids and cuttings • Cement • Brine/sweeps fluids (with drilled cement) • Metal shavings (P&A) • In-situ fluids: inhibited water and NaCl/KCl brine • Suspension fluids with MEG • Viscosifiers and surfactants • Packer fluid (brine with corrosion inhibitors) •	• Drill rig BOP function and pressure testing is a safety requirement and is undertaken in accordance with manufacturer's specifications and in alignment with Drilling Contractors Preventative Maintenance System. • Beach Chemical Management Plan requires that any chemicals within drilling discharges are selected to ensure the lowest toxicity, most biodegradable and least accumulative products selected which meet the technical requirements of the application. • Non-water-based fluids and cuttings are circulated to the drill rig for treatment via the solids control equipment prior to discharge. • Cementing procedures are implemented to minimise the amount of cement discharged to the marine environment, including the minimisation of excess cement discharge upon completion of the drilling program.
Atmospheric emissions	Drill rig and support vessel operations Well intervention and workovers Well clean-up and flowback P&A activities	Combustion of marine diesel oil (MDO) from the vessel and drill rig engines, generators and deck equipment, waste incineration, flaring well test fluids and cold venting during well interventions at up to two wells may cause a localised and temporary decrease in air quality and add greenhouses gas into the atmosphere.	• Drill rig and vessels comply with Marine Orders – Part 97: Marine Pollution Prevention – Air Pollution (appropriate to vessel class) for emissions from combustion of fuel including: ○ hold a valid International Air Pollution Prevention certificate and a current international energy efficiency certificate. ○ have a Ship Energy Efficiency Management Plan to reduce emissions. ○ engine NOx emission levels comply with Regulation 13 of MARPOL 73/78 Annex VI. ○ low-sulphur (<0.5% m/m) diesel used. • Combustion equipment maintained in accordance with manufacturer's instructions via the Planned Maintenance System to ensure they are operating efficiently.

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	Helicopter operations		- Waste incineration is managed in accordance with MARPOL and AMSA Marine Orders. - For well test flaring the minimum volume of hydrocarbons is used and flared via an efficient test flare burner head.

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Introduction and establishment of invasive marine species (IMS)	Drill rig and support vessel operations	The introduction of IMS may occur as a result of discharge of drill rig and vessel ballast water containing foreign species or translocation of foreign species through biofouling on hulls, niches or in-water equipment. The potential impacts of marine pest introduction include: - Change in native marine species diversity and abundance. - Change in commercial fish stocks and associated socio-economic effects. - Changes to conservation values of protected areas.	- Prior to the initial mobilisation for an activity by a vessel, drill rig or submersible equipment, Beach shall undertake a domestic IMS biofouling risk assessment to: - Validate compliance with regulatory requirements (Commonwealth and State) in relation to biosecurity. - Identify the potential IMS risk profile. - Identify potential deficiency of IMS controls and additional controls to manage IMS risk profile at low. - Prevent the translocation and potential establishment of IMS into non-affected environments. - Suspected or confirmed IMS introduction are reported to Agriculture Victoria.
Vessel collision or disturbance of fauna	Support vessels	Vessels have the potential for collision with marine mammals which may cause injury or death. Marine fauna entanglement in drill rig anchor chains is not identified as a risk due to the thick chain links.	- Vessels comply with the EPBC Regulations 2000 – Part 8 Division 8.1 interacting with cetaceans which details minimum separation distances. - Vessels have a dedicated MMO with experience in whale observation, distance estimation and reporting to implement the Beach Whale Management Procedure. - If daylight hours are greater than 12 hours, two MMOs should be on each vessel. MMOs must be trained, experienced and familiar with the activity zones. MMOs

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			will record all observations and track all species of concern while communicating with onshore whale experts and the SDSV and vessel captains. Vessel strike causing injury to, or death of, a cetacean is reported to the Department of Climate Change, Energy, the Environment and Water.
Accidental discharge materials and waste	Drill rig and support vessel operations	The handling and storage of materials and waste on board a vessel or drill rig has the potential to result in accidental overboard release creating marine debris.	- Waste is managed in accordance with the Garbage Management Plan. - Waste with potential to be windblown shall be stored in covered containers. - Solid waste that is accidentally discharged overboard is recovered if reasonably practicable. - Crane handling and transfer procedures implemented to avoid objects being dropped overboard. - Lifting gear is maintained in accordance with the Preventative Maintenance System and inspected regularly to ensure they are operating efficiently.
Minor spills	Drill rig and support vessel operations Helicopter operations ROV operations	Minor spill from vessels and drill rig can occur from: - use, handling and transfer of hydrocarbons and chemicals - hydraulic line failure from equipment - bunkering of material between the drill rig and support vessel A minor spill would be limited to a localised and temporary change in water quality and the potential change to fauna behaviour within surface waters affected by the spill, such as avoidance.	- Bunkering is undertaken in accordance with Drilling Contractor bunkering procedures which include: - Bunkering operation supervised at all times by trained and experienced personnel. - Hoses have dry-break couplings and floats. - Transfer equipment (hoses, pumps) maintained in accordance with manufacturer's instructions via the rig and vessel Planned Maintenance System and inspected prior to use. - Tanks have level indicators and level alarms. - Communications (visual and audio) between vessel and drill rig tested prior to commencing bunkering. - Materials and equipment that have the potential to spill onto decks or marine environment are stored within a contained area. - The following plans are implemented in the event of a spill: - Shipboard Marine Pollution Emergency Plan (SMPEP) or Shipboard Oil Pollution Emergency Plan (SOPEP) (according to class). - Beach Offshore Victoria Oil Pollution Emergency Plan (OPEP). - Project-specific Operational and Scientific Monitoring Program (OSMP).

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Loss of containment – marine diesel oil (MDO)	Drill rig and support vessel operations	MDO is used in offshore vessels. A collision between a Beach contracted vessel and third-party vessel has the potential to result in a spill of fuel. Causes of a vessel collision may include mechanical failure, loss of dynamic positioning, navigational error or foundering due to weather.	• Vessel collisions are avoided by: ○ Consultation with relevant person that may be affected by the activity is undertaken as part of developing the environment plan and is ongoing prior to and during the activity to ensure they know where activity vessels are and how to contact. ○ The Australian Hydrographic Office is notified of the activity at least three weeks prior to commencement to enable the promulgation of Notice to Mariners and AusCoast navigational warnings. ○ Vessels comply with: ▪ AMSA MO 30: Prevention of collisions requires that onboard navigation, radar equipment, and lighting meets the International Rules for Preventing Collisions at Sea (COLREGs) and industry standards. ▪ AMSA MO 27: Safety of navigation and radio equipment gives effect to SOLAS regulations regarding radiocommunication and safety of navigation and provides for navigation safety measures and equipment and radio equipment requirements. ▪ AMSA MO 21: Safety and emergency arrangements gives effect to SOLAS regulations dealing with life-saving appliances and arrangements, safety of navigation and special measures to enhance maritime safety. • Vessels have an automatic identification system (AIS) transceiver enabling them to receive the data broadcasted by surrounding vessels. • Vessels contracted to conduct activities only carry marine diesel. • The following plans are implemented in the event of a spill: ○ Shipboard Marine Pollution Emergency Plan (SMPEP) or Shipboard Oil Pollution Emergency Plan (SOPEP) (according to class). ○ Beach Offshore Victoria Oil Pollution Emergency Plan (OPEP). ○ Project-specific Operational and Scientific Monitoring Program (OSMP).
Loss of containment – Condensate	Completions operations	A loss of containment resulting in a spill of condensate could occur from:	• Part 5 of the Offshore Petroleum and Greenhouse Gas Storage (Resource Management and Administration) Regulations 2011 set out the requirements for

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	Well intervention and workovers P&A activities	- loss of well control during completions and testing - loss of well control during P&A	Well Operations Management Plans (WOMP). Producing, suspended and wells being drilled must have a NOPSEMA accepted WOMP detailing: - identify the risks to well integrity. - describe how the risks are controlled. - describe the management system in place to ensure the controls are effectively and consistently applied. - describe the design, construction, operations, management and monitoring of the wells showing how risks to well integrity is reduced to ALARP. - Drill rig BOP is routinely function and pressure tested in accordance with manufacturer's specifications and in alignment with drill rig's Preventative Maintenance System. - Beach emergency response capability to implement timely source control in the case of a loss of well integrity is maintained in accordance with well-specific Source Control Contingency Plan (SCCP) and Relief Well Plan (RWP). - The following plans are implemented in the event of a spill: - NOPSEMA accepted Beach Offshore Victoria Oil Pollution Emergency Plan (OPEP). - NOPSEMA accepted Project-specific Operational and Scientific Monitoring Program (OSMP).
Hydrocarbon spill response activities	Spill response	Spill response strategies may be accompanied by a range of environmental and socio-economic impacts.	Preparedness measures: - Beach undertakes a spill response drill prior to an activity commencing to test internal and external spill response arrangements and capability. - Beach maintains a current contract with Australian Marine Oil Spill Centre (AMOSOC) for access to spill response resources and personnel. - Beach maintains access to spill response capabilities (including capable personnel and equipment) to implement well-specific Source Control Contingency Plan (SCCP) and Relief Well Plan. Response measures: - NOPSEMA accepted Beach Offshore Victoria Oil Pollution Emergency Plan (OPEP) details: - Notification and reporting requirements.

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			○ Priority protection areas. ○ Response strategies including resources and equipment required. ○ Response actions and responsibilities. ○ Environmental monitoring requirements as per the NOPSEMA accepted Project-specific Operational and Scientific Monitoring Program (OSMP). ● Implementation of response strategies is undertaken in consultation with/or under direction of the Commonwealth and/or State Control Agency.