Vessel Based Activities Commonwealth Waters Environment Plan Summary

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1. INTRODUCTION

To support Apache Energy Limited (AEL) offshore petroleum exploration, development and operational programs, AEL carry out a number of petroleum activities under Petroleum Instruments (AEL acreage) from vessels and/or jack-up rigs. These activities are collectively called vessel based activities (VBAs). VBAs are generally undertaken independently of other activities, are often isolated and can be required within short notice during all seasons. The VBAs covered under this Environment Plan (EP) relate to activities carried out on Apache's Commonwealth waters acreage where AEL is the titleholder and is eligible to take action on the permit. VBAs covered by this EP do not include activities such as exploration seismic and drilling, construction, facility operation or de-commissioning of offshore petroleum assets; these will be covered under separate EP's as required.

1.1 Compliance

The *Vessel Based Activities Commonwealth Waters Environment Plan* (EA-00-RI-10007/1) was prepared in accordance with the *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009* (OPGGS (E) Regulations) pre 28 February 2014 requirements; and requirements of the amended OPGGS (E) Regs (post 28 February 2014) for revisions, incident reporting, record keeping and other miscellaneous requirements. The EP has been reviewed and accepted by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) on 19th June 2014.

This EP summary has been prepared as per Regulation 11 (7) and (8) of OPGGS (E) Regulations (pre 28 February 2014 requirements).

2. ACTIVITY LOCATION

AEL acreage where VBAs may be conducted are summarised in **Table 2-1** and shown in **Figure 2-1** (current at the time of preparing the EP). The introduction of new Commonwealth acreage to this EP will be subject to a pre-activity Management of Change (MoC) assessment to determine if a revision of the EP is required.

Table 2-1: AEL acreage covered by this VBA EP (at May 2014)

Exploration Permit (P)				Production Licence (L)	Retention Lease (R)
Carnarvon Basin					
1. WA-1-P	12. WA-356-P			22. WA-35-L	33. WA-33-R
2. WA-155-P	13. WA-399-P			23. WA-13-L	34. WA-43-R
3. WA-192-P	14. WA-409-P			24. WA-15-L	35. WA-45-R
4. WA-208-P*	15. WA-418-P			25. WA-20-L	36. WA-48-R*
5. WA-209-P	16. WA-426-P			26. WA-29-L	37. WA-49-R
6. WA-214-P	17. WA-437-P			27. WA-41-L	38. WA-50-R
7. WA-290-P	18. WA-486-P			28. WA-42-L*	39. WA-52-R
8. WA-320-P	19. WA-450-P			29. WA-43-L*	
9. WA-334-P	20. WA-453-P			30. WA-45-L	
10. WA-335-P*	21. WA-475-P*			31. WA-49-L	
11. WA-351-P*				32. WA-55-L	
Roebuck Basin					
40. WA-435-P	41. WA-437-P				

*AEL involved acreage

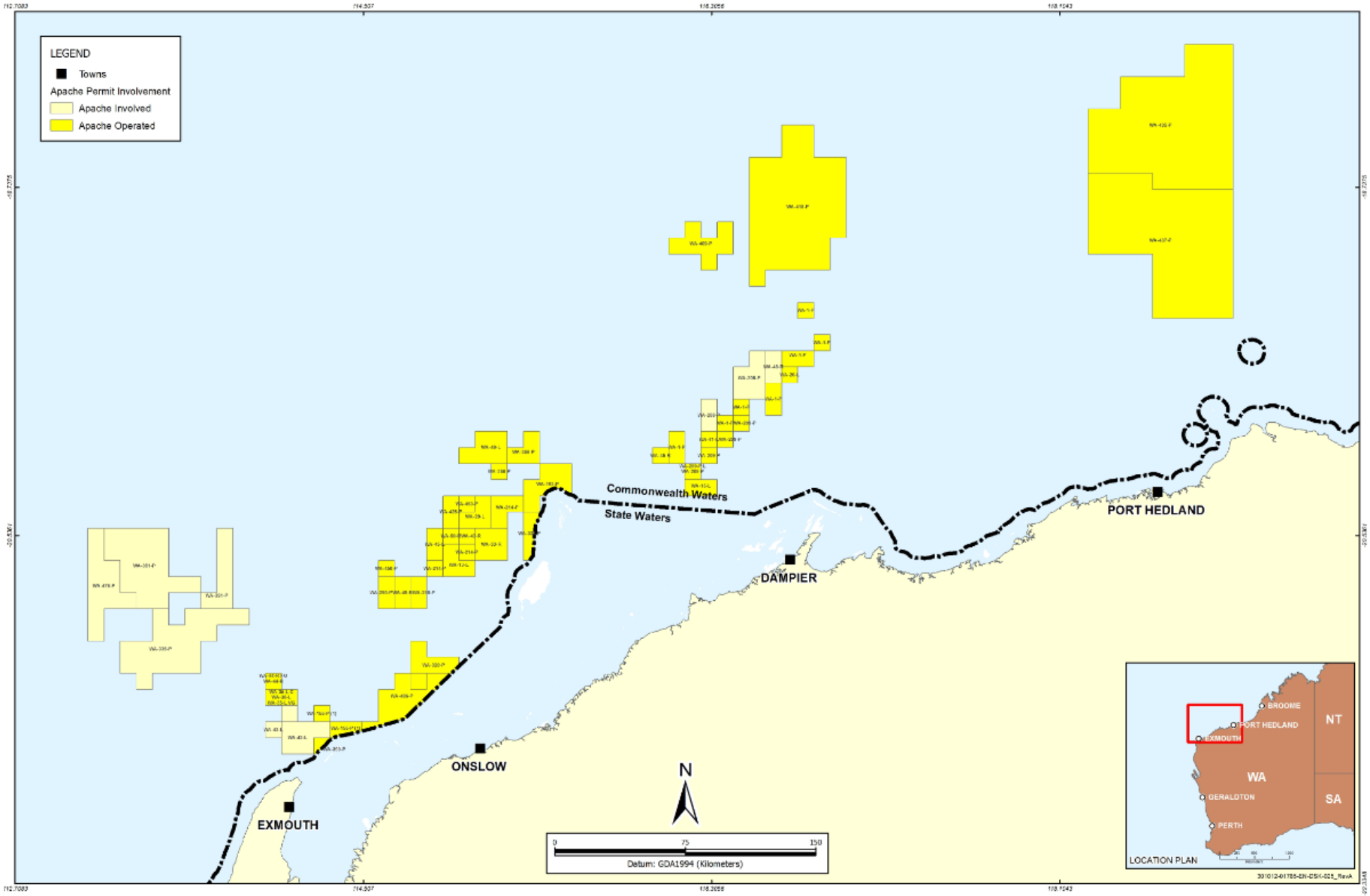

Figure 2-1: AEL acreage located within Commonwealth waters (at May 2014)

3. DESCRIPTION OF THE ACTIVITY

Commonwealth water VBAs covered in the EP are typically undertaken using offshore utility/support vessels, and includes the use of a shallow water geotechnical jack-up drilling rig. The actual vessel/rig that will be used for each VBA will be dependent on the specific requirements of the proposed activity, availability and AEL's contractual requirements.

Activities that are covered under the EP include the following activities:

- Towing of a jack-up geotechnical drilling rig;
- Vessel anchoring;
- Geophysical surveys (e.g. electromagnetic, sidescan sonar, sub-bottom profiling, Autonomous Underwater Vehicle (AUV) surveys);
- Hydrographic surveys (e.g. single beam and multibeam echosounder surveys);
- Geotechnical surveys (e.g. rotary or Hydraulic Piston Tube (HTP) coring, sediment sampling);
- Remotely Operated Vehicle (ROV) surveys;
- Metrology surveys;
- Metocean surveys;
- Environmental surveys (e.g. towed video camera surveys, water sampling, grab sampling, plankton tow nets and marine fauna surveys); and
- Material transfer and handling.

Diving activities have been included within the VBA EP in the remote chance that diving is required to support any of the vessel based survey activities. Helicopter support activities have also been included.

4. DESCRIPTION OF ENVIRONMENT

4.1 Physical environment

VBA activities will take place in Commonwealth waters in the North-west Marine Region (NWMR) which encompasses offshore waters from the WA/Northern Territory (NT) border in the north to Kalbarri in the south.

AEL's offshore acreage lies in the tropics experiencing high summer temperatures periodic cyclones and associated rainfall. The climate has two distinct seasons a 'dry' (or 'winter') season from April to September and a 'wet' (or 'summer') season from October to March, with rapid 'transition' seasons generally in April and September/October. Rainfall in the region is generally low but is also variable. Rainfall predominantly occurs during the summer months, with intense rainfall events resulting from the passage of tropical cyclones and thunderstorms (DEC 2006).

Winds and cyclone patterns are similar across the relevant areas. Winds in the NWMR in winter tend to be predominantly from the east as a result of high pressure systems which ridge across the Pilbara in winter. Summer winds are mainly from the west or south-west, while the seasonal changeover sees the most variable and weakest winds, occurring in April and September (DEC 2006).

AEL's offshore acreage overlies water depths between 30 m and 1,100 m. covering three of the four NWMR physiographic regions (see **Figure 2-1**):

- The inner shelf (0-50 m);
- Middle shelf (50-120 m); and
- Outer shelf/slope (120-4,000 m).

The tides of the NWMR have a strong semi-diurnal signal with four tide changes per day (Holloway & Nye 1985) and generally exhibit quite a large range, around 0.95 m near Exmouth and up to 10 m in the Kimberley, north of Broome (CSIRO & Department of Environment 2007). Peak tidal flows are from the north-northwest on the ebb, and to the south-southeast on the flood, (Holloway & Nye 1985, SSE 1993, King 1994). Internal tides are a frequent occurrence in the NWMR. Surface currents over the shelf are generated by several components, including tidal-forcing, local wind-forcing and residual drift. The major surface currents in the NWMR flow away from the equator in a polewards direction.

The wave climate along the NWMR is generally composed of four broad sources of waves: Southern Ocean and Indian Ocean swells propagating past the North West Cape (NWC); winter easterly swells generated across the Timor Sea; locally generated wind waves; and wind waves that are generated by tropical cyclones and thunderstorms (Chevron Australia 2010). Mean sea wave heights of less than 1 m with peak heights of less than 2 m are experienced in all months of the year (WNI 1995). Mean swell heights are low at around 0.4–0.6 m in all months of the year.

Seawater temperature during summer months average around 26°C, and during winter 22°C. Thermoclines often occur at water depths of between 30–60 m.

4.2 Biological environment

The marine habitats that could be impacted from routine activities associated with AEL's VBA (i.e. those within AEL acreage) include soft sediments with associated benthic fauna and hard substrates and supported assemblages. Unplanned events associated with AEL's VBA (i.e. hydrocarbon spills) could potentially impact shallow waters and shorelines of the mainland coast and offshore islands within and adjacent to the NWMR. These areas contain a high diversity of habitats and benthic primary producer habitats (i.e. habitats supporting photosynthetic organisms) that are absent from the deeper water areas within AEL's acreage. Benthic primary producer habitats of shallow waters and shorelines inshore from AEL acreage include coral reefs, macroalgae, seagrasses and mangroves. Other shallow water habitats include

hard substrates and supported assemblages, sediments and associated benthic fauna, sandy beaches, intertidal and subtidal zones and rocky shorelines.

Marine and coastal fauna that could potentially be impacted from routine and unplanned events associated with AEL's VBAs include plankton, invertebrates, fish, marine mammals, marine reptiles and seabirds/shorebirds. A number of threatened and/or migratory species, as defined under the Environment *Protection and Biodiversity Conservation Act 1999* (EPBC Act) may occur within the marine and coastal habitats within the NWMR and over or adjacent to the Carnarvon or Roebuck/Canning Basins and include various species of whales, dolphins, sea turtles, sharks and seabirds as well as dugongs and the short-nosed sea snake.

A number of protected areas and key ecological features (KEFs) could also potentially be impacted by unplanned events associated with AEL's VBAs. Protected areas include State marine reserves (e.g. Montebello/Barrow Islands Marine Conservation Reserves) and World Heritage Areas (e.g. Ningaloo Coast), Commonwealth marine reserves (e.g. Montebello and Ningaloo) other places classed as Matters of National Environmental Significance (NES) under the EPBC Act (National Heritage Places, Commonwealth Heritage Places, Ramsar wetlands). KEFs include Glomar shoals, Ancient coastline at 125 m contour, Continental Slope demersal fish communities, Canyons linking the Cuvier Abyssal Plain and the Cape Range Peninsula and Exmouth plateau.

4.3 Socio-economic environment

The population centres adjacent to the NWMR region are the port towns of Dampier and Port Hedland and the smaller coastal and fishing towns of Exmouth, Onslow and Point Samson. Socio-economic activities that may occur within AELs offshore acreage include commercial fishing and oil and gas exploration and production; and to a lesser extent, recreational fishing and tourism.

Water-based tourism activities undertaken within Commonwealth waters of the NWMR include whale watching, recreational boating and fishing, charter boat fishing, snorkelling and diving.

There are no World Heritage properties, National Heritage places, wetlands of international importance or Aboriginal heritage sites located within AELs offshore acreage. There are no historic shipwrecks in AELs offshore acreage although numerous shipwrecks occur within the Carnarvon Basin area (seven in the Montebellos area, 51 in the Dampier area and eight in the Onslow area).

A valuable and diverse commercial fishing industry is supported by both the offshore and coastal waters in the NWMR, mainly dominated by the Pilbara fisheries. The North West Slope Trawl Fishery and Western Deepwater Trawl Fishery are the only Commonwealth licensed fisheries with recent fishing effort within the NWMR.

Commercial shipping moves through the offshore waters *en route* to or from the marine terminals at Thevenard, Barrow and Varanus Islands in the Carnarvon Basin. The Australian Maritime Safety Authority (AMSA) has established a network of Shipping Fairways off the north-west coast of Australia designed to keep shipping traffic away from offshore infrastructure and aimed to reduce the risk of vessel collisions (AMSA 2012). Blocks of AELs offshore acreage located off Exmouth, Dampier and Port Hedland are intersected by AMSA shipping fairways.

5. STAKEHOLDER CONSULTATION

AEL maintains a comprehensive stakeholder database for all AEL activities, containing fishing interest groups, government and non-government authorities and other stakeholder parties including the community. This database was used to identify stakeholders potentially affected by the VBAs described in the EP. AEL has built and maintained local stakeholder relationships for many years to assist information sharing with key stakeholders. AEL regularly communicates with these stakeholders on a variety of activities, always seeking comment and fielding enquiries.

Relevant interested parties for consultation directly relating to VBAs in Commonwealth waters were identified as listed in **Table 5-1**. Initial consultation regarding VBAs was distributed on July 25, 2013 to all listed stakeholders. These stakeholders are familiar with AEL projects as a result of regular consultation including briefings and meetings as requested and regular progress reports as well as AEL Energy's Quarterly Project Update document, supplied to all stakeholders. At each contact point, stakeholders are urged to contact AEL Energy should they require more information or have concerns with any activities showcased.

Table 5-1: Summary of stakeholders consulted

Group	Stakeholders	
Commercial, Government (State and Federal), Industry bodies and fishers	• A Raptis and Sons • Austral Fisheries • Australian Fisheries Management Authority (AFMA) • Australian Hydrographic Service (AHS) • Australian Marine Oil Spill Centre (AMOSC) • Australian Maritime Safety Authority (AMSA) • Commonwealth Fisheries Association (CFA) • Department of Defence • Department of Fisheries (DoF)	• Department of Mines and Petroleum (DMP) • Department of Parks and Wildlife (DPaW) • Department of Transport (DoT) • Marine Tourism WA • MG Kailis • Pearl Producers Association (PPA) • Recfishwest • Shark Bay Seafoods • Western Australian Fishing Industry Council (WAFIC) • WestMore Seafoods
Exmouth Stakeholder reference group SRG	• Cape Conservation Group (CCG) • DEC Exmouth • Department of Transport • Exmouth CCI • Exmouth District High School • Exmouth Game Fishing Club	• Gascoyne Development Commission • NWC Aboriginal Corporation • Ningaloo Station • Shire of Exmouth Council • TOLL Exmouth
Port Hedland SRG	• Care for Hedland Environmental Association • Pilbara Development Commission • Pilbara Sea Charters	• Port Hedland CCI • Port Hedland Port Authority • Port Hedland Yacht Club • Town of Port Hedland
Karratha SRG	• Dampier Port Authority • Karratha Chamber of Commerce and Industry	• King Bay Game Fishing Club • Nickol Bay Game Fishing Club • Shire of Roebourne

5.1 Consultation summary

AEL considers that consultation with regulators and key stakeholders has been adequate; all stakeholders and relevant parties have been actively engaged by AEL regarding VBAs on the NWS and also, where applicable, the proposed oil spill response strategies for these activities.

Given the unique nature of the VBA consultation (i.e. geographical distribution and the fact vessels regularly operate throughout the region); AEL did not anticipate a response from all stakeholders. However, through the pre-activity MoC assessment that will take place prior to each proposed activity, relevant stakeholders will be identified, and AEL will notify each potentially affected stakeholder prior to the activity, with activity specific information. Many stakeholders contacted previously have stated that they will contact AEL by exception, that is, if upon receiving the Stakeholder Information Package they feel the activity poses a risk to them, they will contact AEL.

While no stakeholders raised any objections to the initial consultation information provided, extensive consultation has occurred between AEL and the Department of Fisheries (DoF) and the Pearl Producers Association (PPA). The main concern raised by the PPA was in relation to exploration seismic work planned for the NWS. However, the activities described in the EP do not include low frequency exploration seismic programs using air guns; surveys described are for seabed and shallow sub-bottom profiling. As such, AEL will continue to liaise regularly with the PPA prior to each activity.

AEL also met with DoF to address their concerns and their request to comment on individual operations. The outcome of the meeting was AEL's commitment to incorporating a four week notification to DoF prior to commencement of VBAs.

AEL has also committed to addressing any concerns raised by individual stakeholders following an activity specific notification as part of the pre-activity MoC process, prior to commencing the activity. Records of consultation undertaken will be maintained by AEL's Stakeholder Coordinator.

6. ENVIRONMENTAL HAZARDS AND CONTROLS

Identification of hazards and assessment of risks and impacts were determined using a qualitative assessment process. *The Environmental Impact and Risk Assessment Methodology* identifies potential and expected hazards and environmental impacts and determines the risk of the impact occurring. For each hazard, the risk is determined prior to implementation of proposed management controls (inherent risk), and again after management controls have been implemented (residual risk). The control measures adopted are designed to eliminate the risk, or reduce the risk to a level that is tolerable or as low as reasonably practicable (ALARP). The environmental impact and risk assessment for the VBA Commonwealth Waters was held on 19th June 2013 and included relevant technical, operational and environmental personnel within AEL and key contractor companies.

The environmental impact and risk assessment identified seven (7) planned environmental risks and six (6) unplanned environmental risks. The key environmental hazards and control measures to be applied are provided in **Section 9**. These are consistent with Apache corporate and project specific performance objectives, standards and criteria. All commitments associated with these will be used to reduce environmental risk to ALARP and will be of an acceptable level.

7. MANAGEMENT APPROACH

VBAs on AEL acreage in Commonwealth waters will be managed in compliance with the *Vessel Based Activities EP Commonwealth Waters (EA-00-RI-10007/1)* accepted by NOPSEMA under the OPGGS (E) Regulations, other environmental legislation and AEL's Management System (e.g. Apache Environmental Management Policy).

The objective of the EP is to ensure that potential adverse environmental impacts and risks associated with VBAs during both planned operational activities and unplanned events, are identified and assessed and to stipulate mitigation measures to avoid and/or reduce any adverse impacts to the marine environment to ALARP and be of an acceptable level for the activity to be undertaken.

The EP details, for each environmental hazard identified (and assessed in the Environmental Impact and Risk Assessment) specific performance objectives, standards and procedures and identifies the range of controls to be implemented (consistent with the standards) to achieve the performance objectives. The EP also identifies the specific measurement criteria and records to be kept to demonstrate the achievement of each performance objective.

The goals of the environmental implementation strategy as detailed in the EP are to direct, review and manage activities so that environmental impacts and risks are continually being reduced to ALARP, and performance objectives and standards are met. The implementation strategy includes the following elements:

1. Management of Change;
2. Systems, practices and procedures;
3. Key roles and responsibilities;
4. Training, competencies and ongoing awareness;
5. Monitoring and inspection, auditing, and management of non-conformance
6. Review;
7. Incident response;
8. Record keeping; and
9. Routine reporting and incident reporting.

The reporting requirements for routine activities and environmental incidents (recordable and reportable) and reporting on EP compliance are also detailed. This includes environmental performance reporting, which will be prepared at the end of each VBA campaign to assess compliance against performance objectives, standards and the implementation strategy described in the EP; an environmental performance report will be submitted at least annually from the date of acceptance of the EP. NOPSEMA will be notified of the start and end of each VBA.

7.1 Oil Spill Response

If a tier 1 hydrocarbon spill occurs whilst undertaking a petroleum activity, this will be responded to using resources available at location without the need to mobilise external assistance (i.e. implementation of the Shipboard Oil Pollution Emergency Plan (SOPEP) or shipboard marine pollution emergency plan (SMPEP)).

A tier 2 hydrocarbon spill will be responded to in accordance with the VBA Oil Spill Contingency Plan (OSCP) (EA-00-RI-10007/2). Tier 2 spills include:

- An incident that cannot be controlled by the use of vessel resources alone and requires external support and resources to combat the situation; or
- An incident that can be controlled by vessel resources but which may have an adverse effect on the public or the environment.

The OSCP details Apache's response preparedness and strategies, monitoring and evaluation strategies, termination criteria and performance objectives and measurement criteria for each of the critical controls described in the OSCP.

8. CONTACT DETAILS

Further information about VBAs in Commonwealth waters can be obtained from:

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9. ENVIRONMENTAL HAZARDS AND CONTROLS SUMMARY

The following tables (refer to **Table 9-1** and **Table 9-2** below) provide a summary of potential environmental hazards and impacts that could be expected from the vessel based activities for planned activities and unplanned events. It lists the activities which might give rise to environmental hazards and impacts and the subsequent controls and measures which eliminate or ensure the environmental risk is reduced to ALARP and is of an acceptable level.

Table 9-1: Environmental risk summary for planned activities

PLANNED ACTIVITIES			
Hazard	**Cause**	**Potential Impacts**	**Risk Treatment** **Avoidance, Mitigation & Management Controls**
Interference with other marine users	The physical presence of the vessel carrying out the petroleum activity.	Potential loss of fishing area and/ or disruption to shipping or other operators.	• A pre-activity MoC assessment will be conducted to identify relevant persons and potential impacts and risks presented to them by proposed activities; • Any relevant persons identified will be issued pre-activity notifications at least 4 weeks prior to commencement of a VBA; • For geotechnical drilling involving a jack-up rig, AEL will notify AHS at least 2 weeks prior to the activity commencing; • If the geotechnical drilling jack-up rig does not have an automatic identification system (AIS), the Rig Master will notify AMSA's RCC as required; • The activity description in the MoC assessment confirms no more than two (2) vessels will be used for a VBA at a single location at the same time (not including a jack-up geotechnical drilling rig); • All offshore vessels shall maintain a current (<12 months) Common Marine inspection Document (CMID) inspection or equivalent (such as Oil Companies International Marine Forum (OCIMF) Offshore Vessel Inspection Database (OVID) audit); • Navigation equipment is compliant with marine navigation and vessel safety requirements under the *International Convention of the Safety of Life at Sea (SOLAS) 1974* and *Navigation Act 2012*; • Offshore vessels greater than 400 gross tonne will be equipped with an automatic identification system (AIS) and an automatic radar plotting aid (ARPA); • Navaids and reflector tape will be equipped to all buoys used for marking metocean equipment; • In accordance with the International *Convention of Standards of Training, Certification and Watch-keeping for Seafarers* (STCW95), competently trained crew shall maintain a constant bridge-watch to prevent a vessel collision.
Artificial light	Safety and operational lighting on vessels during night time activities.	Potential attraction/ disturbance to marine biota including, most relevantly, marine turtles and seabirds.	• Deck floodlights turned off outside port limits if not illuminating operational activities; • VBAs proposed to be undertaken at a single location for more than two consecutive nights in permits adjacent to known significant turtle nesting beaches during peak turtle hatchling emergence periods will complete a lighting impact assessment as part of the MoC process prior to commencement of the activity; • Night time operations will not occur for more than one consecutive night within 3 km of turtle nesting beaches between peak turtle hatchling emergence periods of 1 October and 1 March.

PLANNED ACTIVITIES			
Hazard	**Cause**	**Potential Impacts**	**Risk Treatment** **Avoidance, Mitigation & Management Controls**
Air emissions	Power generation; Engine exhausts; Ozone depleting substances in closed system rechargeable refrigeration systems.	Reduction in air quality; Greenhouse gas emissions.	• No HFO will be used; • No intentional discharge of ODS will occur; • As per MARPOL 73/78 Annex VI: - An International Air Pollution Prevention Certificate (IAPP) is required for every ship of 400 gross tonnage and above; - Vessel engines (by class) shall meet prescribed NOx emission levels; - Incinerators shall be approved by the Administration and the manufacturer's operating manual shall be on-board; - Every vessel of 400 gross tonnage and above shall comply with a Ship Energy Efficiency Management Plan (SEEMP); - The sulphur content of any fuel oil used on-board shall not exceed 3.50% m/m.; - Certain substances shall not be incinerated; and - ODS shall not be deliberately released. • Details of fuel oil (marine grade oil only) for combustion purposes delivered to and used on the vessel shall be recorded by means of bunkering delivery note that shall contain the information prescribed in MARPOL 73/78 Annex VI; • Combustion engines are maintained in accordance with vessel/ rig Preventative Maintenance System; • As per the *Protection of the Sea (Prevention of Pollution from Ships) Act 1983*, an ODS Record Book shall be maintained if the vessel has a rechargeable system that contains ozone-depleting substances. The record may form part of an existing logbook or electronic recording system as approved by the Administration. Records shall be maintained without delay.
Noise emissions	Noise generated by vessels and helicopters	Physiological or behavioural effects to fauna.	• Engines, machinery and geophysical equipment are maintained in accordance with vessel/ rig Preventative Maintenance System; • AEL will complete a project kick-off meeting with the vessel contractor. The meeting will outline the key environmental risks and impacts, Vessel/ Rig Master and crew roles and responsibilities and control measures to be complied with for VBA as described in the VBA Commonwealth Waters EP. The contractor is responsible to demonstrate that all the vessel crew are aware of their roles and responsibilities as well as these key environmental risks, impacts and controls prior to commencing the activity; • Marine fauna (being whales, dolphins, turtles, dugongs and whale sharks) sightings shall be recorded on AEL Marine Fauna Sighting Datasheets and submitted to AEL within 24 hours of the sighting; • Fauna observation kits including identification posters and Marine Fauna Sighting Datasheets shall be present on-board the vessels and rigs undertaking VBAs.
Liquid waste discharges	Deck drainage;	Reduction in water quality	• Sewage treatment plant and food macerator are maintained in accordance with vessel/ rig Preventative

PLANNED ACTIVITIES			
Hazard	**Cause**	**Potential Impacts**	**Risk Treatment** **Avoidance, Mitigation & Management Controls**
	Bilge water; Sewage and grey water; Putrescible waste; Desalination brine; Cooling water.	Potential toxicity to marine biota	Maintenance System; • Persons-on-board (POB) shall not exceed the maximum carrying capacity of the vessel's sewage treatment plant; • As per *the Protection of the Sea (Prevention of Pollution from Ships) Act 1983*, any oily water discharged to sea will be processed through oil filtering equipment, will not exceed 15 ppm oil content and will be discharged while proceeding en route; • Oily water filtering equipment by-pass valve shall be locked or designed to prevent accidental discharge of unprocessed oily water; • As per MARPOL 73/78 Annex I: - Vessels shall have oily water filtering equipment of a design approved by the Administration; - An International Oil Pollution Prevention (IOPP) Certificate is required for any vessel of 400 gross tonnage and above. • As per MARPOL 73/78 Annex V: - Food waste can only be discharged to sea if ground or comminuted to 25 mm or less and discharged en route when greater than 3 nautical miles from the 'territorial sea baseline'; - If food is not ground or comminuted to 25 mm or less it must be discharged greater than 12 nautical miles from the territorial sea baseline while en route. • As per MARPOL 73/78 Annex IV: - Vessels shall have a STP of a type approved by the Administration; - An International Sewage Pollution Prevention Certificate (ISPP) is required for any vessel of 400 gross tonnage and above, and any vessel certified to carry more than 15 persons; - Sewage will be treated and discharged in compliance with one of the following: 1) Via a sewage treatment plant certified to meet the requirements of MARPOL Annex IV Regulation 9.1.1, providing the effluent does not produce visible floating solids or cause discolouration of the waters of the sea; or 2) Via a comminuting and disinfecting system certified to meet the requirements of MARPOL Annex IV Regulation 9.1.2, where the discharge is made no less than 3 nm from the territorial sea baseline, discharges are to be made at a moderate rate while the vessel is proceeding en route at a speed of not less than 4 knots; or 3) If not comminuted or disinfected, the discharge is made no less than 12 nm from the territorial sea baseline, discharges are to be made at a moderate rate while the vessel is proceeding en route at a speed of not less than 4 knots; or 4) If options 1–3 are not available, sewage will be stored in holding tanks and transferred ashore for

PLANNED ACTIVITIES			
Hazard	**Cause**	**Potential Impacts**	**Risk Treatment** **Avoidance, Mitigation & Management Controls**
			appropriate treatment.
Sedimentation and turbidity from geotechnical activities	Generation of materials at the seabed from geotechnical activities	Reduction in water quality; Smothering of infauna and epifauna; Potential toxicity to marine biota.	• The chemicals selected for use in geotechnical investigations are either Gold/Silver/D or E rated through OCNS or AEL's risk assessment procedure as per AEL's *Drilling Fluid and Chemical Selection* (EA-91-II-007) to ensure product is environmentally acceptable; • Chemicals which are not Gold/Silver/D or E rated have a complete risk assessment of the environmental impact of the chemicals as per AEL's *Drilling Fluid and Chemical Risk Assessment Procedure* (EA-91-II-008) to ensure product is environmentally acceptable; • As per MARPOL 73/78 Annex III: - Hazardous substances are separated, labelled and stored onboard within secondary containment; - Bunded areas (fixed and portable) shall be maintained to retain their storage capacity, including deck bunding inspection following rainfall.
Seabed disturbance	Placement of equipment directly on the seabed and completion of scientific and geological investigations.	Physical disturbance to seabed, benthic habitats and associated biota.	• While under contract to AEL, there will be no fishing from the vessel; • Geotechnical drilling equipment placed on the seabed outside of high value benthic habitats with location for placement determined from geophysical site survey data; • Anchoring locations outside port limits shall be agreed with AEL prior to anchoring and complied with by the Vessel Master: - AEL will define the coordinates (Latitudes and Longitudes) of suitable anchoring areas that are restricted to soft sediment types; and - The assessment of seabed type is supported by geophysical survey data.

Table 9-2: Environmental risk assessment summary for unplanned events

UNPLANNED EVENTS			
Hazard	**Cause**	**Potential Impacts**	**Risk Treatment** **Avoidance, Mitigation & Management Controls**
Dropped objects	Loss of survey equipment; Material transfers.	Physical disturbance to seabed, benthic habitats and associated biota. Water quality reduction from loss	• Surface marker buoys are attached to the tail of any negatively buoyant streamers; • Material handling and lifting equipment maintained in accordance the preventative maintenance system; • Lifting equipment shall be certified; • Transfers to and from offshore vessels (e.g. cargo, diesel, victuals, etc.) in accordance with relevant contractors procedures for berthing, lifting and bunkering, etc.;

UNPLANNED EVENTS			
Hazard	**Cause**	**Potential Impacts**	**Risk Treatment** **Avoidance, Mitigation & Management Controls**
		of containment	• Vessel Master shall report environmental incidents in accordance with AEL's Environment Incident Notification Matrix for Support Vessels; • If subsea infrastructure is present in VBA operational area, AEL will complete a dropped objects analysis prior to commencement of activity and evaluate the findings of the analysis through the MoC process; • If the dropped objects analysis determines that damage to subsea infrastructure resulting in release of hydrocarbon to the marine environment is a credible scenario, then the VBA cannot take place under this EP. For the activity to proceed, either an accepted revision or new EP must be submitted.
Marine pest introduction	Biofouling on submerged surfaces/niche areas on vessels; Biofouling on immersible equipment; Ballast water exchange.	increased competition, predation or displacement of native species	• Following Commonwealth government approval to enter Australian waters, vessels shall maintain the Ballast Water Management System; • Vessel anti-foulant systems are maintained in compliance with *International Convention on the Control of Harmful Anti-fouling Systems on Ships*; • An AEL VRASS will be completed prior to mobilisation to Australia waters as defined within the *National Biofouling Management Guidance for the Petroleum Production and Exploration Industry* (Commonwealth of Australia 2008). Through completion of a VRASS and associated mitigating actions the risk of introducing marine pests to Australian waters shall be 'low'.
Vessel collision with marine fauna	Movement of vessel	Behavioural impacts to marine fauna; Injury or death of marine fauna	• In accordance with Part 8 of EPBC Regulations, Vessels Masters must: - Operate the vessel at a constant speed of less than 6 knots and minimise noise within 300 metres of a whale. - Not change the course of the vessel suddenly in the presence of a whale. - Not restrict the path of a whale. - Not drift or approach closer than 100 metres of a whale. - Not approach within 300 metres of a whale calf.
Accidental release of hazardous solid or liquid wastes or non-hazardous solid waste	Equipment failure; Human error; Dropped objects.	Reduction of water quality; Harm to marine fauna; Seabed disturbance.	• As per MARPOL 73/78 Annex V: - A Garbage Management Plan is required for every ship of 400 gross tonnage and above, and every ship which is certified to carry 15 persons or more. The plan shall provide written procedures for collecting, storing, processing and disposing of garbage, including the use of equipment on-board. The plan shall be in accordance with guidelines developed by IMO; - A Garbage Record Book shall be maintained for every ship of 400 gross tonnage and above, and every ship which is certified to carry 15 persons or more; - Placards shall be displayed to provide guidance on garbage disposal requirements. • As per the *Protection of the Sea (Prevention of Pollution from Ships) Act 1983*:

UNPLANNED EVENTS			
Hazard	**Cause**	**Potential Impacts**	**Risk Treatment** **Avoidance, Mitigation & Management Controls**
			- No garbage, other than macerated food scraps, shall be disposed into the sea; - Recyclable garbage shall be segregated from general waste on the vessel; - Recyclable garbage shall be disposed of onshore for recycling; - Vessel-specific garbage receptacles on deck shall have lids or covers; - Vessel-specific garbage receptacles to be clearly labelled as to content. • Scupper plugs or equivalent deck drainage control measures shall be available where chemicals and hydrocarbons are stored and frequently handled; • Secondary containment shall be available for all machinery or equipment with potential to leak chemicals or hydrocarbons to the marine environment; • Hazardous substances separated, labelled and stored on-board within secondary containment; • Drip trays shall be used under portable equipment and machinery; • Bunded areas (fixed and portable) shall be maintained to retain their storage capacity, including deck bunding inspection following rainfall; • Only non-hazardous, biodegradable detergents shall be used during deck washing; • Material Safety Data Sheets (SDS) shall be available at the place of storage for all chemicals on the vessel; and chemicals shall be managed in accordance with the MSDS as a minimum; • A manifest of chemicals stored on the vessels shall be maintained; • Spill clean-up equipment shall be located where chemicals are stored and frequently handled.
Hydrocarbon release	Collisions, refuelling failures or miscellaneous spills (i.e. loss of equipment)	Reduction of water quality; Potential toxic impact on flora and fauna	• No HFO used as fuel; • Any vessel-to-vessel bunkering or bulk transfers require prior written approval from AEL; • Transfers to and from offshore facility (e.g. cargo, diesel, victuals, etc.) in accordance with relevant facility procedures for berthing, lifting and bunkering, etc.; • Vessel bunkering checklist must be completed; • Deck drains closed prior to fuel transfer; • Hydrocarbon and chemical transfer hoses maintained in accordance with the preventative maintenance system; • A copy of the in force VBA EP and *VBA OSCP (EA-00-RI-10007/2)* is present onboard the vessel; • A pre-activity MoC assessment is conducted for each VBA to evaluate the suitability of the VBA OSCP for the proposed VBA; • Visible traces of oil on or below the surface of the water in the immediate vicinity of a vessel shall be

UNPLANNED EVENTS			
Hazard	**Cause**	**Potential Impacts**	**Risk Treatment** **Avoidance, Mitigation & Management Controls**
			investigated and reported to AEL; • As per MARPOL Annex I, a Shipboard Oil Pollution Emergency Plan (SOPEP) approved by the Administration is required for any vessel of 400 gross tonnage and over. Defined within MARPOL, a SMPEP may be required instead of SOPEP depending on the vessel; • Regular drills and exercises shall be carried out on support vessels in-line with IMO (e.g. SOLAS and MARPOL) requirements to refresh the crew in using response equipment and implementing incident response procedures. SOPEP/SMPEP spill response exercise shall be conducted every three months. This includes emergency drills (weekly) and oil spill response drills (quarterly). Record drills in daily vessel report, including any lessons learnt.
Hydrocarbon spill response	Implementation of hydrocarbon spill response strategies.	Hydrocarbon spill response activities can exacerbate or cause further environmental harm	• All response activities will be implemented in accordance with the *VBA OSCP (EA-00-RI-10007/2)*, which contains numerous control measures to reduce the environmental impacts of all response strategies. • All response activities will be selected based on an ongoing Net Environmental Benefit Analysis (NEBA).

10. REFERENCES

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