East Spar CSEM Survey Environment Plan Summary

APACHE ENERGY LTD (ABN 39 009 301 964) 100 ST GEORGES TERRACE / PERTH / WA / 6000 TEL (08) 6218 7100 / FAX (08) 6218 7200

CONTENTS

1. INTRODUCTION

Apache Energy Ltd (Apache) is the operator of the activity described in this environment plan, a wholly owned subsidiary of Apache Corporation.

Apache, on behalf of the joint venture participants operates the East Spar field located in permit area WA-13-L, in 94 m of water approximately 40 km off the west coast of Barrow Island and 63 km west of Varanus Island (**Figure 1-1**).

The function of the East Spar operation is to produce and transport reservoir fluids from the East Spar Field to Varanus Island. The products are piped from the East Spar field to Varanus Island where the condensate and gas are separated and processed. The East Spar field is managed and maintained through the Varanus Island production facility.

The purpose of the controlled source electromagnetic (CSEM) survey of the East Spar field is to evaluate the potential for a bypassed compartment of the gas field.

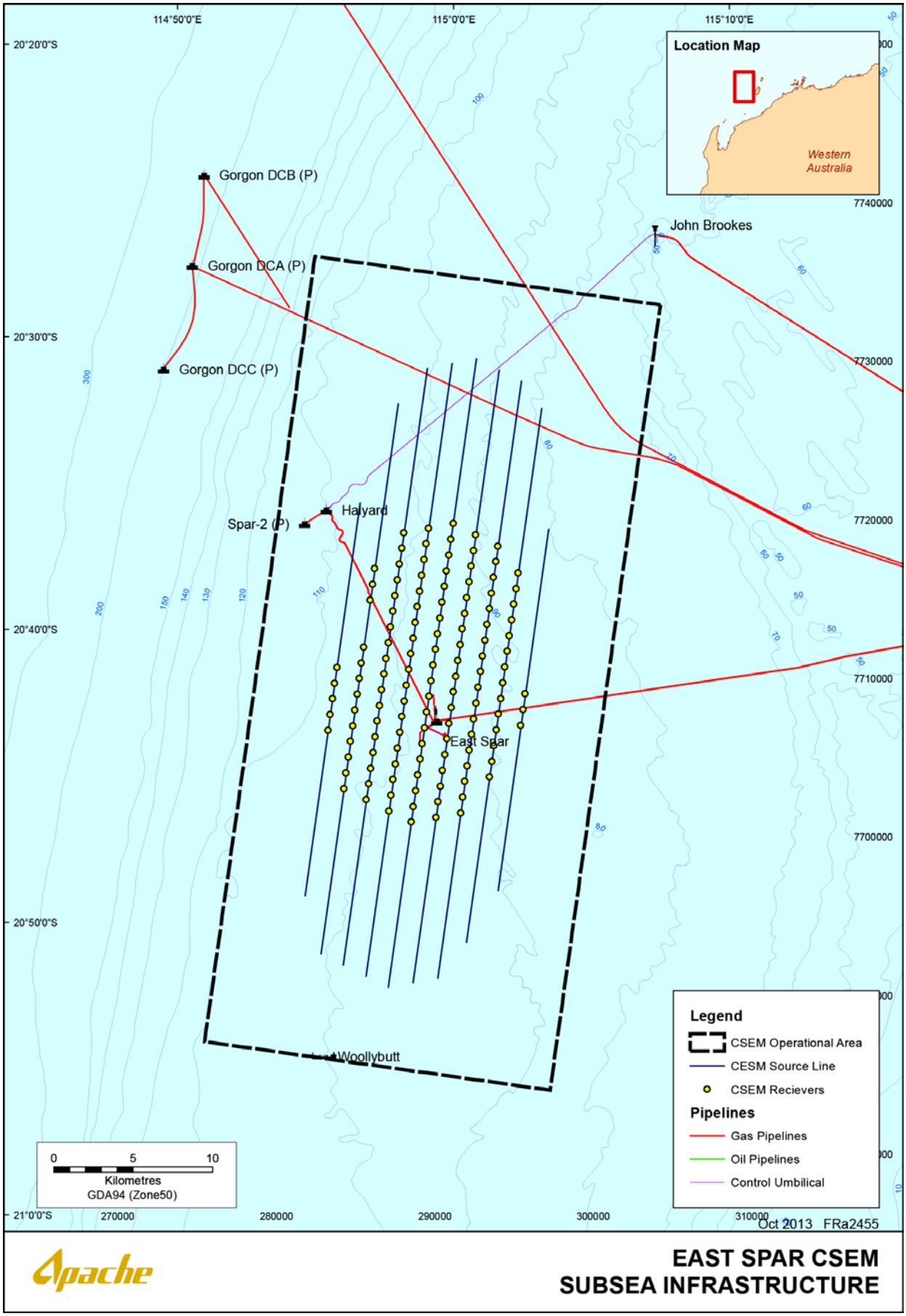

Figure 1-1: East Spar CSEM Survey location and operational area for the activity

2. ACTIVITY LOCATION

Activities associated with the CSEM survey will take place within the 'survey area', defined in **Figure 1-1** and **Table 2-1**. The survey area is approximately 50 km long and 22 km wide, in water depths ranging between approximately 50–150 m. There are no grounding hazards within the survey area and the area is approximately 25 km from the territorial sea baseline (nearest land – Barrow Island).

Existing facilities within the survey area include the Apache operated Halyard–East Spar pipeline. The proposed Greater East Spar installation operational area also coincides with the operational area for the survey activity.

Table 2-1: Coordinates of the operational area

Latitude (Decimal Degrees)	Longitude (Decimal Degrees)
-20° 29' 11.79"S	115° 07' 22.21"E
-20° 27' 23.68"S	114° 54' 51.92"E
-20° 54' 10.24"S	114° 50' 29.20"E
-20° 55' 58.84"S	115° 03' 01.56"E

3. DESCRIPTION OF THE ACTIVITY

The Controlled Source Electromagnetic (CSEM) survey method is used in the identification of the fluid contents of reservoirs previously defined with seismic survey methods. The method involves an array of stationary receivers on the seafloor which record signals from a transmitter towed behind the survey vessel. It involves the following steps:

- Placement of anchored dipole receivers in a grid pattern;
- Introduction of an electromagnetic field through the use of a towed, very low frequency electromagnetic alternating current (AC), transmitter. The shelf express system that will be used for this survey is surfaced towed – the antenna will always be at 10 m depth below the sea surface hanging beneath floats;
- Recording of the electrical field by the dipole receivers;
- Retrieval of receivers using acoustic releases; and
- Subsequent onshore data analysis of the recorded data.

Activities are scheduled to occur between January and March 2014, although in the event of a delay the environment plan considered activities until the end of April. Activities will be 24 hours per day, seven days per week. It is envisaged that the total duration of all activities covered by this environment plan will take up to approximately 15 days to complete.

4. DESCRIPTION OF ENVIRONMENT

4.1 Physical environment

The East Spar CSEMS operational area lies in the arid tropics experiencing high summer temperatures and periodic cyclones. Rainfall in the region is low with evaporation generally exceeding rainfall throughout the year, although intense rainfall may occur during the passage of summer tropical cyclones and thunderstorms (Condie *et al*., 2006).

The summer and winter seasons fall into the periods September–March and May–July, respectively. Winters are characterised by clear skies, fine weather, predominantly strong east to southeast winds and infrequent rain. Summer winds are more variable, with strong south-westerlies dominating. Three to four cyclones per year are typical, with the official cyclone season being November through to April (BoM, 2013).

During September–March, the prevailing non-storm winds are from the southwest ranging up to a maximum speed of approximately 30 knots. Winds from the southwest direction are generally strongest between September and January with wind speed frequently reaching 24 knots and weaker between February and March with wind speed generally less than 16 knots (APASA, 2011). During April–August, winds are generally lighter and more variable in direction. Non-storm winds prevail from the east–south quadrant and can attain a maximum speed of up to 30 knots, but are generally less than 16 knots, particularly during April and May (APASA, 2011).

Sea surface currents over the NWS are generated by several components such as tidal forcing, local wind forcing and residual drift. The dominant offshore sea surface current (typically seaward of the 200 m isobath) is the Leeuwin Current (**Figure 3-1**), which carries warm tropical water south along the edge of WA's continental shelf, reaching its peak strength in winter and becoming weaker and more variable in summer (CMAR, 2007; Condie *et al*., 2006). The Leeuwin Current is described as a surface current, extending in depth to 150 m (BHPB, 2005; Woodside, 2005). From September to mid-April the nearshore Ningaloo Current flows northwards, opposite to the Leeuwin Current, along the outside of the Ningaloo Reef and across the inner shelf (BHPB, 2005; Woodside, 2005). The Indonesian Throughflow is the other important current influencing the upper 200 m of the outer NWS (Woodside, 2005; CMAR 2007). This current brings warm and relatively fresh water to the region from the western Pacific via the Indonesian Archipelago.

4.2 Biological environment

The East Spar CSEMS operational area is situated within Commonwealth waters of the Northwest Shelf Province which lies within the North-west Marine Region (DSEWPaC, 2008). The Northwest Shelf Province Bioregion is located between North West Cape and Cape Bougainville and is located almost entirely on the continental shelf.

Benthic habitats are expected to comprise soft sediments and outcropping cemented sediments (hard substratum) and associated benthic fauna. Benthic primary producer habitat (e.g. areas of hard corals, seagrass, macroalgae or mangroves) may be present in the shallow margins (>100 m depth). At depths greater than 100 m benthic primary production, which relies on photosynthesis for energy production is limited due to insufficient light availability.

Benthic surveys at nearby Greater East Spar found a relatively flat seabed comprising of fine silt and muddy sediments, with a gentle sloping gradient from east to west. These sediments were un-vegetated and densely bioturbated (<75%). Soft sediment infauna comprised predominantly mobile burrowing species including molluscs, crustaceans (crabs, shrimps and smaller related species), polychaetes, sipunculid and platyhelminth worms. Epibenthic biota was sparse (<5%) and included invertebrates, such as anemones, sponges, asteroids (sea stars) and echinoids (sea urchins).

A search of the EPBC Act Protected Matters Database was conducted on 29 October 2013 using the coordinates of the operational area (**Figure 2-1**) with a 10 km buffer. Results of the search identified 11 'threatened' species of marine fauna.

Key ecological features (KEFs) which are components of the marine ecosystem that are considered to be important for biodiversity or ecosystem function and integrity of the Commonwealth Marine Area are also included in the EPBC Act Protected Matters Database results (DSEWPaC, 2013). Based on the search the following KEFs were identified within the operational area (**Figure 3-2**): Ancient Coastline at 125 m Contour and Continental Slope Demersal Fish Communities.

The East Spar CSEMS operational and modelled spill trajectory areas do not overlap with any state or federal protected areas. The closest protected area is Montebello Commonwealth Marine Reserve, located 13.4 km east.

4.3 Socio-economic environment

Socio-economic activities that may occur within the operational area and surrounds include commercial fishing, oil and gas exploration and production; and to a lesser extent, recreational fishing and tourism.

Offshore and coastal waters in the North-west Marine Region support a valuable and diverse commercial fishing industry. State fisheries within the operational area that may be active include the Pilbara Trap Managed Fishery, Pilbara Line Fishery and Pilbara Fish Trawl Managed Fishery (Zone 1).

There are four Commonwealth fisheries within and/or adjacent to the operational area: the North West Slope Trawl Fishery, the Western Tuna and Billfish Fishery (North of 34° South), Southern Bluefin Tuna Fishery and the Western Skipjack Tuna Fishery (**Figure 3-5**).

The North West Slope Trawl Fishery (NWSTF) is the only Commonwealth licensed fishery with historical effort operating in the vicinity of the operational area. The NWSTF is restricted to depths of greater than 200 m, and is therefore further offshore than the operational area (AEL, 2011b) (**Figure 3-5**).

Although the remaining Commonwealth fisheries are permitted to operate within the operational area, effective fishing effort is either non-existent or of a very limited nature (AFMA, 2011).

Recreational fishing and other tourism based activities are unlikely to occur in the operational area due to the distance to the nearest population centre at Dampier (approximately 160 km), the distance offshore (25.1 km from Barrow Island) and water depths (ranging from 50-150 m).

Several petroleum developments are active in the region. Facilities located nearby include East Spar (located within the operational area), Woollybutt FPSO (located on the southern boundary of the operational area), John Brookes Platform (4.2 km north), Balnaves FPSO Project (48 km north) and the Julimar Development (51 km north). Associated vessel traffic may pass through the operational area.

No shipping routes exist through the operational area; however AUSREP shipping data indicates that vessels use the general area. The nearest designated shipping routes are located approximately 50 km northwest (**Figure 3-6**).

No known Aboriginal heritage sites are located within the operational area or spill trajectory area. There is no evidence from seabed surveys that shipwreck sites exist within the operational area.

5. STAKEHOLDER CONSULTATION

As stated in Apache's Environmental Management Policy, our company is committed to maintaining open community and government consultation regarding its activities and environmental performance.

Apache's operating presence off the North West Shelf (e.g. gas processing facilities at Devil Creek and Varanus Island) ensures that communication is regular with relevant stakeholders, including those potentially affected by this activity.

The identified stakeholders are commercial fishers in the region, fishing bodies, federal departments and regulators. Relevant stakeholders identified for the survey activity based on the defined operational area are summarised in **Table 5-1**.

Table 5-1: Summary of stakeholders consulted

Group	Stakeholder
Commercial fisheries	• Austral Fisheries • Australian Fisheries Management Authority (AFMA) • Commonwealth Fisheries Association (CFA) • Department of Fisheries (State) (DoF) • MG Kailis • Pearl Producers Association • A Raptis and Sons • Western Australian Fishing Industry Council (WAFIC) • WestMore Seafoods & Shark Bay Seafoods • Individual fishing licence holders
Recreational fishers	• Marine Tourism WA • RecFish West • Quest Marine Services
Marine conservation	• Western Australian Department of Parks and Recreation (State) (DPaW)
Shipping safety and security	• Australian Maritime Safety Authority (AMSA) • Department of Defence
Hydrocarbon spill response	• Australian Marine Oil Spill Centre (AMOSC) • Western Australian Department of Transport (State) (DoT)
Adjacent regulators	• Western Australian Department of Mines and Petroleum (State) (DMP) • Commonwealth Department of the Environment (formerly DSEWPaC)
Karratha/Dampier SRG	• Shire of Roebourne • Dampier Port Authority

Consultation regarding the CSEMS at East Spar was initiated by means of a Consultation Pack distributed to all listed stakeholders on November 5, 2013.

Stakeholders have been kept up to date with Apache's activities in the East Spar area extensively, particular with an information package regarding the Greater East Spar Development, distributed on August 9, 2013. This package highlighted the activities that are undertaken as part of the Varanus Island oil and gas production and infrastructure facilities, including the Halyard Gas Field and East Spar. No concern was raised with this consultation and the most extensive communication was with the State Department of Parks and Wildlife (DPaw) and the State Department of Fisheries (DoF), whose advice was taken into account when producing the activities environment plan. It is Apache's view that consultation from

stakeholders such as DoF and DPaW on the Greater East Spar Development will be relevant for the East Spar CSEMS project due to survey location.

As part of ongoing consultation, Apache plans to continue regular consultation in accordance with regulatory guidelines (NOPSEMA) regarding Environmental Plans and OSCPs for phases of particular projects, as well as the regular briefings and meetings requested and/or regular progress reports included in Apache Energy's *Quarterly Project Update* document, supplied to all stakeholders. The Greater East Spar Development has been a fixture in the June and September updates. CSEMS at East Spar will be added to the December update.

6. ENVIRONMENTAL HAZARDS AND CONTROLS

An environmental risk assessment was undertaken at a workshop held on 31 October 2013. This workshop was attended by a subset of Apache's environmental scientists, engineers and contracted personnel. During the risk assessment workshop, environmental risks associated with the proposed activity were assessed by identifying the hazards, their causes and their potential impacts. An analysis of the inherent risk for each hazard was made, treatments to reduce the risks due to the hazards to ALARP were proposed and analysis of the residual risk considering the proposed treatments was undertaken.

Throughout the preparation of the EP, further evaluation of risks were undertaken as appropriate, as the activity scope was defined. Apache's Environmental Scientists and other participants from Survey, Logistics and Safety were also involved where necessary.

The purpose of the risk assessment was to understand and identify the potential environmental hazards, their causes and the potential impacts associated with the survey activity to ensure they are reduced to As Low As Reasonably Practicable (ALARP). Apache's management and mitigation actions corresponding to the risks and impacts have been developed from experience in the environmental management of offshore petroleum activities in Australia, and are based on Australian petroleum industry best practice environmental management guidelines, as defined by the APPEA Code of Environmental Practice (2008).

The environmental risk assessment identified nine routine environmental hazards and four non-routine (unplanned events) environmental risks. These environmental hazards, risks and control measures to be applied to the survey activity are provided in **Section 8**. The control measures 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

The CSEM survey will be managed in compliance with all measures and controls detailed within the EP accepted by NOPSEMA under the OPGGS(E) Regulations, other environmental legislation and Apache's Management System (e.g. Apache Environmental Management Policy).

The objective of the EP is to ensure that potential adverse environmental impacts associated with routine operational events and unplanned events associated with the CSEM survey, are identified and assessed and to stipulate mitigation measures to avoid and/or reduce any adverse impacts to the marine environment to ALARP.

The EP details 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 controls for the CSEM survey activities are summarised in **Section 8**. The EP also identifies the specific measurement criteria and records to be kept to demonstrate the achievement of each performance objective.

As described in the EP, the implementation strategy includes the following:

1. Details on the systems, practices and procedures to be implemented;
2. Key roles and responsibilities;
3. Training and competencies;
4. Monitoring, auditing, management of non-conformance and review;
5. Incident response including an OSCP;
6. Record keeping; and
7. Consultation.

The reporting requirements for routine events and environmental incidents (recordable and reportable) and reporting on overall compliance of the activity with the EP are also detailed.

8. ENVIRONMENTAL IMPACTS AND CONTROLS

The following tables (refer to **Table 9-1** and **Table 9-2** below) provide a summary of potential environmental impacts that could be expected from the East Spar CSEM survey for planned activities and unplanned events. The tables list the activities which might give rise to environmental impacts and the subsequent controls and measures which eliminate or ensure the environmental risk is reduced to ALARP.

Table 9-1: Environmental risk summary for planned activities

PLANNED ACTIVITIES			
Hazard	**Cause**	**Potential Impacts**	**Risk Treatment** **Avoidance, Mitigation & Management Controls**
Introduction of invasive marine pest species	Biological fouling on vessel hull or equipment, and through ballast water exchange	Introduction of disease to the marine environment, disrupt ecosystems, reduce species diversity and abundance, outcompete native species for food or space, damage fisheries and cause industrial problems including fouling	• Vessel anti-foulant system is maintained. • Vessel has AQIS clearance to be in Australian waters. • A biofouling vessel risk assessment (VRASS) is completed and risk ranked 'low' prior to mobilisation to Australia. • Vessel shall exchange 'high-risk' ballast water, as defined in Australian Ballast Water Management Requirements (AQIS, 2011), outside Australian territorial seas and in waters at least 200 m deep • Onboard ballast water exchange logs detail uptake and discharge volumes and position and water depth of exchange.
Interaction with marine fauna and other marine users through vessel movement	Vessel movement	Behavioural or physical impacts to the following sensitive marine species: •Fish (pelagic); •Marine mammals; and •Marine reptiles. Disruption to commercial ships and fishers	• In accordance with Part 8 of the EPBC Regulations 2000, the vessel must: Travel at a constant speed of less than 6 knots and minimize noise within 300 m (caution zone) of a cetacean or whale shark known to be in the area; The vessel must not: Approach closer than 100 m of a cetacean or whale shark known to be in the area; and Change the course or speed of the vessel suddenly if a dolphin approaches the vessel or comes within 100 m • Binoculars and Marine Fauna Sighting Datasheet available on the vessel. • Apache Marine Fauna Sighting Datasheets completed and submitted to DoE. • Any vessel collision with an EPBC Act-listed marine fauna reported to DoE. • Australian Hydrographic Office (AHO) notified of activity within an appropriate timeframe. This triggers AHO to issue a Notice to Mariners prior to commencement of the activity. • Australian Maritime Safety Authority (AMSA) Rescue Coordination Centre (RCC) notified of activity which triggered RCC to issue an AusCoast Warning prior to the activity.
Seabed disturbance	Installation of subsea survey	Disturbance to:	• Target locations of receivers will be no closer than 180 m from any seabed infrastructure.

PLANNED ACTIVITIES			
Hazard	**Cause**	**Potential Impacts**	**Risk Treatment** **Avoidance, Mitigation & Management Controls**
	equipment	•Benthic habitats; •Ancient Coastline at 125 m; and •Commercial fisheries.	• All receivers installed in accordance with the Installation Procedure endorsed by the Apache Geophysical Manager or their delegate.
Electromagnetic fields and marine fauna interaction	EM survey operations	Disturbance to marine fauna behaviour and physiology	• Noise emissions minimised by maintaining vessel machinery/equipment in accordance with vessel planned maintenance system. • In accordance with Part 8 of the EPBC Act, helicopters not landing, taking off or involved in an emergency must not: Fly lower than 500 m within a 500-m radius (i.e. 'no fly zone') of a cetacean. Hover over the 'no fly zone'.
Artificial light	EM survey operations	Disturbance to marine fauna behaviour	• Deck lighting configuration reviewed prior to mobilisation and practicable opportunities to reduce direct light spill to marine waters implemented.
Noise emissions	The survey vessel will emit noise from propeller cavitation, thrusters, hydrodynamic flow around the hull, and operation of machinery and equipment (e.g. generators).	Underwater noise may impact on marine fauna in the following ways: •Disturbance, leading to behavioural changes; •Masking or interference with other biologically important sounds; •Physical injury to hearing or other organs; and •Indirectly by inducing behavioural and	• Noise emissions minimised by maintaining vessel machinery/ equipment in accordance with planned maintenance system.

PLANNED ACTIVITIES			
Hazard	**Cause**	**Potential Impacts**	**Risk Treatment** **Avoidance, Mitigation & Management Controls**
		physiological changes in predator or prey species.	
Oily water discharges	Discharge of water that is generated in proximity to shipboard equipment (such as in the engine room) and may contain residual hydrocarbons.	Releasing oily water to the marine environment could reduce water quality and affect marine flora and fauna through exposure to a level that is toxic	• Oily water discharged to marine waters through filtering equipment in accordance with Regulation 15 of MARPOL Annex I: • Oily water discharged to sea after passing through filtering equipment has an oil content not exceeding 15 parts per million (ppm). • On detection of OIW content greater than 15 ppm, the discharge stream shall automatically shut-in or be directed in-board for further treatment or storage. • Oily water discharged while proceeding en route. • Vessel fitted with oil filtering equipment in accordance with Regulation 14 of MARPOL Annex I. • Oil filtering equipment maintained and calibrated with an alarm system in accordance with specification to ensure oil content is not exceeding 15 parts per million (ppm). • All discharge of oil is recorded in the vessel's oil record book.
Liquid discharges	The survey vessel will produce food waste, sewage (black water), brine (from water treatment plant), deck drainage (containing cleaning agents) and cooling water discharge	Impacts to water quality and marine fauna. Water quality changes may include increased nutrients, temperature, salinity, suspended sediments, organic loads and microorganism growth; reduced oxygen levels; and discolouration.	• Treated sewage discharge procedures compliant with Regulation 11 of MARPOL Annex IV. • Untreated sewage is discharged at a distance of more than 12 nautical miles from the nearest land in accordance with Regulation 11 of MARPOL Annex IV. • Sewage treatment system compliant with Regulation 9 of MARPOL Annex IV. • Sewage treatment system maintained in accordance with planned maintenance system. • Food waste collected, stored, processed and disposed of in accordance with a Garbage Management Plan as required under Regulation 9 of MARPOL Annex V. • In accordance with Regulation 3 of MARPOL Annex V food waste: Discharged at least 12 nautical miles from nearest land. Discharged at least 3 nautical miles from the nearest land if macerated to 25 mm or less. • Macerator capable of reducing food to 25 mm and is maintained in accordance with planned maintenance system. • Cleaning agents or additives that will be released to the sea via deck drains are not 'harmful substances' as defined by MARPOL Annex III. • Water treatment system maintained in accordance with planned maintenance system.

PLANNED ACTIVITIES			
Hazard	**Cause**	**Potential Impacts**	**Risk Treatment** **Avoidance, Mitigation & Management Controls**
			• Anti-scale products are not 'harmful substances' as defined by MARPOL Annex III. • Machinery maintained in accordance with planned maintenance system.
Atmospheric emissions	Gaseous greenhouse gas (GHG) emissions and non-GHG emissions may be emitted from vessel engines, generators, mobile and fixed plant (e.g. crane) and onboard waste incinerators	Emissions of GHG can lead to a reduction in local air quality and add to the national GHG loading, which could contribute to climate change. Non-GHG may be toxic, odoriferous or aesthetically unpleasing.	• Vessel machinery maintained in accordance with the vessel's planned maintenance system. • Vessel engines meet NOx emission levels as required by Regulation 13 of MARPOL Annex VI. • Sulphur content of diesel/fuel oil complies with Regulation 14 of MARPOL Annex VI. • Incinerator certified and operated according to Regulation 16 of MARPOL Annex IV. • ODS to be licensed under the Ozone Protection and Synthetic GHG Regulations 1995. • ODS managed in accordance with Regulation 13 of MARPOL Annex VI • ODS only handled by a qualified or experienced tradesperson.

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

UNPLANNED EVENTS			
Hazard	**Cause**	**Potential Impacts**	**Risk Treatment** **Avoidance, Mitigation & Management Controls**
Hydrocarbon spill from vessel collision	Vessel collision causing sufficient damage such that a fuel tank is ruptured	Chemical (e.g. toxic) and physical (e.g. coating of emergent habitats, oiling of wildlife at sea surface and ingestion) impacts to marine species and a decline in water quality.	• All vessels undergo an International Marine Contractors Association (IMCA), Common Marine Inspection Audit (CMID) inspections to confirm that they meet international HSE and maintenance standards. • Vessels equipped with an automatic radar plotting aid (ARPA) system. • Visual vessel bridge-watch 24 hours per day by crew qualified by an accredited trainer. • Dynamic Positioning (DP) trials completed on a regular basis show acceptable accuracy. • No more than 329 m^3 in any tank on entering operational area • Vessel fuel type reviewed once confirmed. Risk assessment completed if MGO (or similar Group II hydrocarbon) or lighter oil not utilised • Australian Hydrographic Office (AHO) notified of activity within acceptable timeframe. Notification triggers

UNPLANNED EVENTS			
Hazard	**Cause**	**Potential Impacts**	**Risk Treatment** **Avoidance, Mitigation & Management Controls**
			AHO to issue a Notice to Mariners. • Australian Maritime Safety Authority (AMSA) Rescue Coordination Centre (RCC) notified of activity within acceptable timeframe. Notification triggers RCC to issue an AusCoast Warning. • Oil spill response executed in accordance with Apache East Spar CSEM Oil Spill Contingency Plan (OSCP) (EA-66-RI-10004/2). • Oil spill response executed in accordance with the vessel's current (<12 months) Shipboard Oil Pollution Emergency Plan (SOPEP) or Shipboard Marine Pollution Emergency Plan (SMPEP) as required under MARPOL. • Spill response exercise conducted in accordance with the SOPEP or SMPEP requirements and conducted prior to the commencement of the activity. • Crew undertaking vessel watch qualified in accordance with International Convention of Standards of Training, Certification and Watch-keeping for Seafarers (STCW95), AMSA Marine Orders Part 3: Seagoing Qualifications or certified training equivalent.
Environmentally hazardous chemical and hydrocarbon spills from marine operations	Equipment failure, corrosion and inadequate storage/ bunding, dropped object incidents and human error. There is potential for spills to enter the marine environment via vessel drains or over the side of the vessel.	Contamination of marine organisms in surface waters in the vicinity of the operational area. Short-term impacts to water quality.	• Chemicals and hydrocarbons packaged, marked, labelled and stowed in accordance with MARPOL Annex III regulations. • Vessel shall maintain a manifest setting forth the environmentally hazardous chemicals and hydrocarbons on board and the location thereof. • Material Safety Data Sheet (MSDS) available for environmentally hazardous chemicals and hydrocarbons onboard. • Environmentally hazardous chemicals and hydrocarbon storage areas inspected weekly. • Any equipment or machinery with the potential to leak oil will be enclosed in continuous bunding • All chemicals and hydrocarbons shall be stored securely within continuously bunded areas onboard the vessel. • Vessel machinery maintained in accordance with the vessel's planned maintenance system. • Clean-up equipment located where environmental hazardous chemicals and hydrocarbons are stored and frequently handled. • Scupper plugs or equivalent deck drainage control measures available where chemicals and hydrocarbons are stored and frequently handled. • Cleaning agents or additives that will be released to the sea via deck drains are not 'harmful substances' as defined by MARPOL Annex III. • Environmental hazardous chemical and hydrocarbon leaks and spills on the vessel immediately cleaned up (including in deck bunds), and contaminated material contained securely onboard. • Oil spill response executed in accordance with the vessel's current (<12 months) Shipboard Oil Pollution

UNPLANNED EVENTS			
Hazard	**Cause**	**Potential Impacts**	**Risk Treatment** **Avoidance, Mitigation & Management Controls**
			Emergency Plan (SOPEP) or Shipboard Marine Pollution Emergency Plan (SMPEP) as required under MARPOL 73/78. • Spill response exercise conducted in accordance with the SOPEP or SMPEP requirements and conducted prior to the commencement of the activity
Non-hazardous and hazardous solid waste	Non-hazardous solid wastes include plastics, paper, scrap material and packaging; while hazardous solid wastes include contaminated wastes (e.g. oily rags, oil filters, paint cans), batteries, fluorescent tubes, medical wastes and aerosol cans. These items may enter the marine environment from overfull bins, un covered bins, or items that have not been disposed of correctly.	Potential impacts to a range of sensitive environmental receptors through exposure and a reduction in water quality	• Non-hazardous and hazardous wastes collected, labelled, segregated, stored, processed and disposed of in accordance with the vessel's Garbage Management Plan as required under Regulation 9 of MARPOL Annex V. • Hazardous wastes (e.g. used oils, lithium batteries, chemical and metallic wastes) documented, tracked, segregated, labelled and stored onboard with secondary.
Hydrocarbon and chemical spill response	Preferred response strategy is: •Source control plans(s); •Monitor and Evaluate Plan (including aerial	Exacerbate or cause further environmental harm	• A NEBA is used to inform response strategies that have the greatest net benefit to the overall environment and reduce impacts associated with the response strategies to ALARP.

UNPLANNED EVENTS			
Hazard	**Cause**	**Potential Impacts**	**Risk Treatment** **Avoidance, Mitigation & Management Controls**
	and vessel surveillance, tracking buoys, spill fate modelling); •Mechanical dispersion; •Oiled wildlife response (OWR) activities; and •Scientific (Type II) monitoring.		

9. CONTACT DETAILS

Further information about the East Spar CSEM Survey activity can be obtained from:

Minh Hopkinson

Environment Manager

Apache Energy Limited

100 St Georges Terrace, Perth, Western Australia, 6000

Phone: 08 6218 7036

Email: minh.hopkinson@apachecorp.com

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