Greater East Spar Development Installation Environment Plan Summary

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1. INTRODUCTION

Apache Oil Australia PTY (AOA) proposes to develop the Greater East Spar (GES) development, located approximately 49 km from Barrow Island and 188 km from the town of Dampier Western Australia, using a subsea tie-back to link the Spar-2 Xmas tree (XT) into the existing Halyard subsea facility and the Varanus Island (VI) onshore processing facility.

1.1 Compliance

The *Greater East Spar Installation Environment Plan* (EA-66-RI-10001.1) was prepared in accordance with the OPGGS (E) Regulations pre 28 February 2014 requirements; and requirements of the amended OPGGS (E) Regulations (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 of August 2014.

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

1.2 Schedule

Due to scheduling constraints, the environment plan considers activities at any time of year. Activities will be conducted 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 30 days to complete. However with potential for weather and operational delays this could extend the project duration (installation activities) to a period of 60 days.

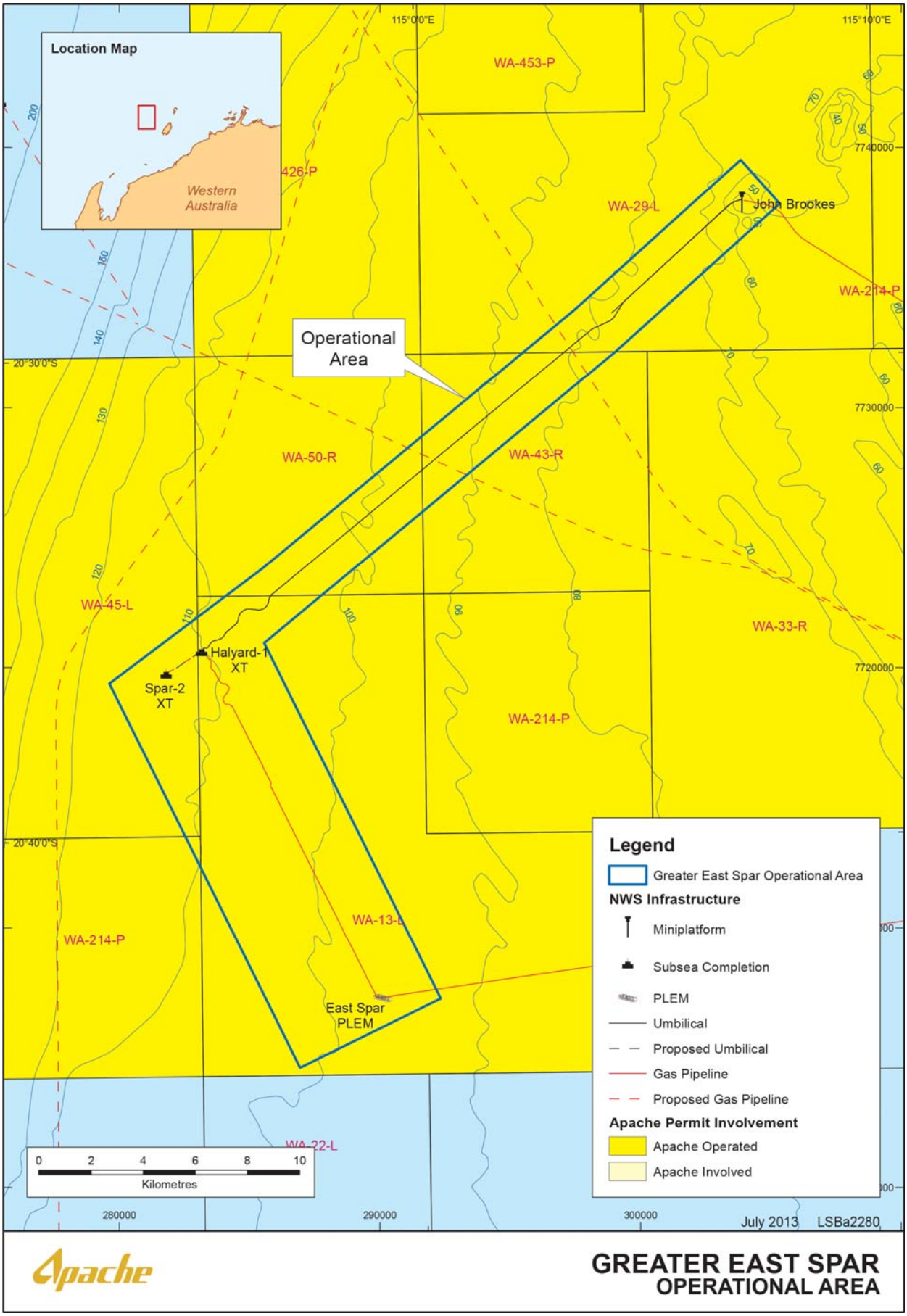

Figure 1-1: Location of the Greater East Spar installation operational area

2. ACTIVITY LOCATION

Subsea facilities will be installed in Petroleum Pipeline Licence WA-21-PL. The pipeline licence area is contained within a larger 'operational area' (**Figure 1-1**). The operational area defines the boundary within which activities described within the Environment Plan (EP) will occur.

The operational area boundary covers an area of 160.55 km^2 (approximately 49 km long and between 2–6 km wide) within water depths from 50 to 118 m.

Bounding coordinates for the operational area are presented in **Table 2-1.**

Table 2-1: Co-ordinates of the proposed Greater East Spar installation operational area

Latitude (Decimal Degrees)	Longitude (Decimal Degrees)
-20.4327	115.1199
-20.6116	114.8853
-20.7457	114.9534
-20.7222	115.0056
-20.5980	114.9425
-20.4478	115.1338

3. DESCRIPTION OF THE ACTIVITY

A new Pipeline End Manifold (PLEM) and Subsea Cooling Skid (SCS) will be installed adjacent to the existing Halyard-1 XT, and the 10" flexible flowline to the East Spar PLEM will be disconnected from the Halyard-1 XT and reconnected to the SCS.

A new length of flexible flowline and an electro-hydraulic unit (EHU) will be installed connecting the GES PLEM to the Spar 2 XT. The flowline will be installed pre-flooded with treated water. The umbilical lines to be installed are supplied full and pressurised to approximately 70 bar and has Umbilical Termination Heads (UTH) fitted on both ends.

The PLEM and SCS will be connected via a rigid tie-in spool. The Spar-2 XT will operate with direct flowline and umbilical connections to the PLEM.

The existing 10" flexible flowline will be purged and flushed with nitrogen, followed by potable/treated seawater flushing. This will occur via downline from the installation vessel to the Halyard-1 XT. The system will be isolated at the East Spar PLEM and the flowline will then be recovered and relocated. In addition, two concrete mattresses currently installed across the flowline will be removed and laid down nearby. The flowline will be disconnected from the isolated Halyard XT and temporarily capped and recovered to deck. The cap will be removed on deck and cleaning, maintenance and potential modifications will be performed before redeploying and tying in. The concrete mattresses will then be re-installed.

An existing EHU that provides chemicals, hydraulic fluid and electrical power and communications to the Halyard-1 XT from the John Brooks Platform will be disconnected from the Halyard-1 XT and recovered to deck. One concrete mattress currently installed across the umbilical will be removed and laid down nearby. The EHU UTH cleaning and maintenance will be performed on deck before it is redeployed to tie-in the GES PLEM and the concrete mattress re-installed.

Running tools will be connected to the spools onboard the installation vessel before overboarding and installing between the installed structures (note: the spools are suspended between the structures, they are not installed on the seabed). Flying leads will be overboarded from the installation vessel on a deployment frame with the Electric Hydraulic Flying Lead (EHFL) installed between the PLEM and Halyard XT, and the Electric Flying Leads (EFL) installed from the PLEM to SCS.

The Subsea Control Module (SCM) at Spar-2 XT will be changed out prior to pre-commissioning. System leak testing will be completed and pressure testing and electrical testing of the control system will be conducted. Communication testing and function testing of the subsea hydraulically actuated valves will be conducted; valves will be tested using the subsea control system with an ROV observing the operations.

A pre-installation seabed survey will be completed to ensure the seabed is suitable for installation. Following completion of the infrastructure installation, a post-installation survey along the entire route and other subsea infrastructure will be conducted using an ROV.

A dynamically positioned (DP) class 2 or 3 installation vessel will be used to install the structures.

4. DESCRIPTION OF ENVIRONMENT

4.1 Physical environment

North West Shelf (NWS) waters are usually thermally stratified with a marked change in water density at approximately 20 m (SSE, 1993). Surface temperatures vary annually, being warmest in March (32^{o}C) and coolest in August (19^{o}C). Near bottom water temperature is approximately 23^{o}C, with no discernible seasonal variation.

During summer (October–March), the prevailing non-storm winds are from the southwest, west and northwest at an average speed of less than 10 knots, peak average speeds of 15–25 knots, and maximum speeds of 30 knots. Non-storm winds prevail from the north-east through to south-east at average speeds of 5–6 knots, peak average speeds of 10–15 knots, and maximum speeds of 20 knots. The wave climate is generally composed of locally generated wind waves (seas) and swells that are propagated from distant areas (WNI, 1995; 1996). In the open ocean, sustained winds result in wind-forced currents of approximately 3% of the wind speed (Holloway and Nye, 1985).

Tidal and wind-forcing are the dominant contributions to local sea surface currents. The tides of the NWS have a strong semi-diurnal signal with four tide changes per day (Holloway and Nye, 1985) and a spring tidal range of 1.9 m and a highest astronomical tide of 2.9 m (Chevron Australia, 2010). The dominant sea surface offshore current (typically seaward of the 200 m isobath) is the Leeuwin Current, 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. The current is described as a sea surface current, extending in depth to 150 m (BHPB, 2005; Woodside, 2005). Closer to the coast, the Ningaloo Current flows in a northerly direction, in the opposite direction to the Leeuwin Current, along the outside of the Ningaloo Reef and across the inner shelf from September to mid-April (BHPB, 2005; Woodside, 2005). The Indonesian Throughflow is the other important current influencing the upper 200 m of the outer NWS (Woodside, 2005). This current brings warm and relatively fresh water to the region from the western Pacific via the Indonesian Archipelago.

Offshore drift currents are represented as a series of interconnected eddies and connecting flows that can generate relatively fast (1–2 knots) and complex water movement. These offshore drift currents also tend to persist longer (days to weeks) than tidal current flows (hours between reversals) and thus will have greater influence upon the trajectory of slicks over time scales exceeding a few hours (APASA, 2013).

4.2 Biological environment

The operational area is situated within Commonwealth waters of the North-west Marine Region (DSEWPaC, 2008). Low density benthic communities of bryozoans, molluscs and echinoids are supported within the bioregion. Sponge communities are also sparsely distributed on the shelf and are found only in areas of hard substrate.

Key ecological features (KEFs) are components of the marine ecosystem that are considered to be important for biodiversity or ecosystem function (DSEWPaC, 2012). In a search of EPBC Act Protected Matters Database of the operational area, one KEF was identified: The Ancient Coastline at 125 m Contour. The Ancient Coastline at 125 m Contour is a submerged coastline which provides areas of hard substrate and may contribute to higher diversity and enhanced species richness relative to soft sediment habitat (DSEWPaC, 2012).

The expected benthic habitats within the area are soft sediments and outcropping cemented sediments (hard substratum). Benthic primary producer habitat (e.g. areas of hard corals, seagrass, macroalgae or mangroves) is unlikely to be present. The minimum depth of the water is approximately 50 m; at this depth benthic primary production, which relies on photosynthesis for energy production is limited due to insufficient light availability. Soft sediment benthic fauna comprises predominantly mobile burrowing species including molluscs, crustaceans (crabs, shrimps and smaller related species), polychaetes, sipunculid and platyhelminth worms, asteroids (sea stars), echinoids (sea urchins) and other small animals.

Cemented sediments provide hard substrate which can be used as attachment points for sessile filter feeding invertebrates such as soft corals, gorgonians and sponges. These areas are also likely to be used by mobile invertebrates such as molluscs, crustaceans (crabs, shrimps and smaller related species), polychaetes, sipunculid and platyhelminth worms, asteroids (sea stars) and echinoids (sea urchins).

A search of the EPBC Act Protected Matters Database was conducted using the coordinates of the operational area (**Figure 1-1**) with a 5 km buffer. Results of the search identified ten threatened species of marine fauna, of which nine were also listed as migratory species; a further seven species were listed as migratory marine species. The list included seven marine mammals, five turtles, one sea snake, one seabird and three fish.

Pelagic fish in the region may include tuna, mackerel, herring, pilchard and sardine, and game fish such as marlin and sailfish; southern bluefin tuna are thought to migrate through the region. The timing of spawning of fishes in the North-west Marine Region varies between fish species although peaks are usually observed over warmer months between spring and autumn (Department of Fisheries, pers comms.).

The activity timing may coincide with the start of humpback whale northbound migration, and as the route is based inshore of the 200 m depth contour, whales are likely to be encountered at the operational area (approximately 50 to 118 m). There are no resting areas that have been identified nearby, with the closest sensitive area likely to be Exmouth Gulf. There is the potential for pygmy blue whales to transit through the operational area on their northern migration. However, the width of the blue whale migration corridor in the region (> 200 km) suggests that it is highly unlikely that there will be significant interactions with pygmy blue whales during the installation activities. Given the distance to the Ningaloo Marine Park where whale sharks aggregate (approximately 200 km southwest), large numbers are not expected to be encountered within the operational area. Encounters with individuals are possible (although not expected) as they migrate through the operational area and modelled spill trajectory area to the Ningaloo aggregation areas.

The nearest turtle nesting sites are the Montebello Islands, Lowendal Islands and Barrow Island (greater than 34 km southeast). The southern giant petrel (*Macronectes giganteus*) may occasionally over-fly the operational area when in transit or during foraging, but are not expected to be encountered in significant numbers.

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 GES location: 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. Although these Commonwealth fisheries are permitted to operate within the proposed GES operational area, effective fishing effort is either non-existent or of a very limited nature (AFMA, 2011). The North West Slope Trawl Fishery is the only Commonwealth licensed fishery with historical effort operating in the vicinity of the GES operational area. The remaining Commonwealth fisheries, although permitted to fish within the GES operational area, have no current effort reported (AFMA, 2011).

At a distance of approximately 38 km from the Montebello Islands the GES operational area is unlikely to be visited by recreational fishers especially given the water depths (ranging from 50–115 m).

Various petroleum exploration and development activities have occurred within and surrounding the operational areas; there are no known non-Apache operated exploration and production activities in the GES operational area.

There are no recognised shipping routes in or near the operational area with the nearest designated shipping routes located at least 50 km northwest and 70 km northeast. While no shipping routes exist through the operational area, AUSREP shipping data indicates that vessels use the general area, most likely vessels in the oil and gas industry.

Given the considerable distance of the GES operational area from the nearest population centre at Dampier (approximately 188 km west) and the nearest shoreline at Montebello Islands (approximately 38 km away) there is unlikely to be any tourism-based activities in the deep waters of the operational area.

There are no World Heritage properties, National Heritage places, or wetlands of international importance, Aboriginal heritage sites 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 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	• Australian Fisheries Management Authority (AFMA) • Department of Fisheries (DoF) • Western Australian Fishing Industry Council (WAFIC) • Commonwealth Fisheries Association (CFA) • A Raptis and Sons. • WestMore Seafoods • Shark Bay Seafoods • Austral Fisheries • MG Kailis • Pearl Producers Association • Individual fishing licence holders
Recreational fisheries	• Recfishwest
Conservation	• Department of Parks and Wildlife
Tourism	• Marine Tourism WA
Shipping safety and security	• Australian Maritime Safety Authority (AMSA) • Department of Defence
Hydrocarbon spill response	• Department of Transport (DoT) • Australian Marine Oil Spill Centre (AMOSC)
Adjacent Regulator	• Department of Mines and Petroleum

Consultation regarding GES was initiated by means of a Consultation Pack distributed to all listed stakeholders on August 9, 2013. Apache considers this set of stakeholders to be familiar with the majority of current and planned Apache projects on the NWS through the 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.

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 environment plan.

The Apache Energy Quarterly Project Update has been developed in consultation with informed stakeholders and includes a summary of Apache's activities for the next six to nine months (in both Commonwealth and State waters). Stakeholders are urged to contact Apache Energy should they require more information or have concerns with any activities showcased.

6. ENVIRONMENTAL HAZARDS AND CONTROLS

Risk identification involves identifying the sources of risk, such as those hazards and events that could result in an environmental impact from the activity. The identification of hazards and events is based on a detailed understanding and experience of the activities to be carried out (Apache's engineers and project co-ordinators) and knowledge and experience of likely impacts from these activities on the environment (Apache's environmental scientists). The hazard identification workshop is the forum used to capture this expertise and was used to identify hazards and events associated with the planned and unplanned events of the activity. Following on from the workshop the risk assessment is further detailed through smaller working groups/ meetings as required, during the preparation of the environment plan and detailed engineering of the project design to mitigate the environmental risks identified to as low as reasonably practicable (ALARP).

The environmental risk assessment for the surveys was conducted on 25th July 2013. The risk assessment identified nine potential environmental hazards associated with routine operational activities, and a further six non-routine hazards. 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 GES activity will be managed in compliance with all measures and controls detailed within the EP accepted by NOPSEMA under the OPGGS (E) Regulations, other relevant 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 surveys, 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 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, competencies and on-going awareness;
4. Monitoring, auditing, management of non-conformance and review;
5. Records Management;
6. Incident response including an Oil Spill Contingency Plan (OSCP); and
7. Reporting.

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.

7.1 Oil Spill Response

The OSCP details Apache's response preparedness and strategies, monitoring and evaluation strategies, termination criteria and performance objectives, standards and measurement criteria for each of the critical controls described in the OSCP. The response strategies for the spill scenarios identified for the GES activity include:

1. Source control plans(s);
2. Monitor and Evaluate Plan (including aerial and vessel surveillance, tracking buoys, spill fate modelling);
3. Mechanical dispersion;
4. Protect and Deflect (limited response)
5. Shoreline Clean-up (limited response)
6. Oiled wildlife response (OWR) activities; and
7. Scientific (Type II) monitoring (dependent on spill).

8. ENVIRONMENTAL IMPACTS AND CONTROLS

The following tables (refer to **Table 8-1** and **Table 8-2** below) provide a summary of potential environmental hazards that could be expected from the installation activity for planned activities and unplanned events. The tables list the controls and measures which eliminate or ensure the environmental risk is reduced to ALARP.

Table 8-1: Environmental risk summary for planned activities

Hazard	Risk Treatment Avoidance, Mitigation & Management Controls
Vessel movements and marine operations	• Interactions with marine fauna are managed in accordance with Part 8 (Interacting with cetaceans and whale watching) of the EPBC Regulations 2000 (specifically Part 8.05 Other craft – Adult cetaceans and 8.06 Other craft – calves) • Binoculars and Marine Fauna Sighting Datasheet available on all vessels • Apache Marine Fauna Sighting Datasheets completed and submitted to DoE • Any vessel collision with an EPBC Act-listed marine fauna reported to DoE and recorded in daily environmental report • Australian Hydrographic Office (AHO) notified of operational area, activities and durations, which triggers AHO to issue a Notice to Mariners • Australian Maritime Safety Authority (AMSA) Rescue Coordination Centre (RCC) notified of operational area, activities and durations, which triggers RCC to issue an AusCoast Warning
Introduction of Invasive Marine Species	• Vessel anti-foulant measures are maintained • Vessel has AQIS clearance to be in Australian waters • A biofouling vessel risk assessment (VRASS) is completed prior to mobilisation to Australia • Prior to entering Australian waters vessel is ranked “low” via VRASS process • Ballast water managed in accordance with Australian Ballast Water Management Requirements (AQIS, 2011)
Seabed disturbance	• Seabed survey of areas planned for structure installation completed prior to GES installation activities • No project vessel anchoring within operational area • Pre-planned location and defined corridors for subsea infrastructures • All subsea infrastructure installed in accordance with the Installation procedure endorsed by the Apache Project Manager • Use of Ultra Short Base Line (USBL) acoustic positioning devices and Long baseline (LBL) transponder array to accurately position structures • Marine Warranty Survey (MWS) approval of critical lifting operations • Lifting equipment certified • Survey work undertaken post-installation to ensure the construction/installation work has been completed according to the same specification set during the planning phases (and shown on the site plan) • Commercial Marine users: As-built drawings of the activity prepared within 10 weeks of completion of installation and supplied to AHO for marine chart update • Competent crew to conduct rigging and lifting operations
Artificial light	• Deck lighting configuration reviewed prior to mobilisation and practicable opportunities to reduce direct light spill to marine waters implemented

Hazard	Risk Treatment Avoidance, Mitigation & Management Controls
Noise emissions	• Noise emissions minimised by maintaining vessel engines as per vessel planned maintenance system • Interactions with marine fauna are managed in accordance with Part 8 (Interacting with cetaceans and whale watching) of the EPBC Regulations 2000 (specifically Part 8.05 Other craft – Adult cetaceans; 8.06 Other craft – calves ; and 8.07 – Aircraft • Binoculars and Marine Fauna Sighting Datasheet available on all vessels • Apache Marine Fauna Sighting Datasheets submitted to DoE • Daily environmental report details any incident that resulted in harm or mortality to marine fauna
Atmospheric emissions	• Vessel engines maintained as per planned maintenance system (PMS) • GES project vessels have current IAPP, as required by MARPOL • 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 73/75 Annex IV • ODS to be licensed under the Ozone Protection and Synthetic GHG Regulations • ODS managed in accordance with Regulation 13 of MARPOL Annex VI • ODS only handled by a qualified or experienced tradesperson
Liquid (non-hazardous) discharges	• Sewage (treated) discharge is compliant with Regulation 11 of MARPOL 73/78 Annex IV • Sewage treatment system compliant with Regulation 9 of MARPOL Annex IV • Sewage treatment system maintained in accordance with planned maintenance system (PMS) • Maximum carrying capacity of the sewage system is not exceeded • 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 • Macerator capable of reducing food to 25 mm or less that is installed and is maintained as required • Equipment is MARPOL compliant in accordance with Annex V • 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 manufacturer’s specifications • Anti-scale products are not ‘harmful substances’ as defined by MARPOL Annex III • Machinery maintained in accordance with manufacture’s specifications
Hydraulic fluids and treated seawater	• Vessel shall maintain a manifest listing the environmentally hazardous chemicals and hydrocarbons on board

Hazard	Risk Treatment Avoidance, Mitigation & Management Controls
	• Locations of products (i.e. storage locations) to be included in manifest • Material Safety Data Sheet (MSDS) available for environmentally hazardous chemicals and hydrocarbons • Contractor (Vessel) chemical handling and storage procedures endorsed by the Apache Project Manager • Dedicated chemical storage areas on the vessels • Machinery and equipment involved in the discharge and transfer of liquids are managed in accordance with the vessels planned maintenance system • ROV maintained in accordance with Planned Maintenance Schedule • ROV hydraulic hoses and fittings checked prior to deployment • Visual leak detection undertaken by ROV during flooding and testing • ROV monitoring during installation of subsea infrastructures • All Flooding and testing completed as per procedure. Procedure includes pre-job risk assessment • Procedure has been endorsed by the Apache Project Manager • Procedures for chemical handling and treated seawater endorsed by Apache Project Manager • All subsea infrastructure will undergo factory acceptance testing (FAT) to ensure strength (minimising the offshore testing required to only a system leak test) • Offshore leak testing will be conducted to ensure the integrity of joints between components • Apache's *Chemical Selection Procedure for Operational Activities in Commonwealth Waters* (EA-91-II-10001) will be followed to select chemical additives for treated seawater which are of the lowest toxicity whilst achieving technical requirements for known volumes used
Oily water discharges	• Oily water discharged to marine waters through filtering equipment in accordance with Regulation 15 of MARPOL Annex I • All transfer and movement of oil is recorded in the vessel's oil record book • Scupper plugs or equivalent deck drainage control measures available where chemicals and hydrocarbons are stored and frequently handled

Table 8-2: Environmental risk assessment summary for unplanned events

Hazard	Risk Treatment Avoidance, Mitigation & Management Controls

Hydrocarbon (MGO) spill from vessel collision	• Navigation equipment and vessel procedures compliant to AMSA:
	  • Marine Orders Part 27 – Radio Equipment.
	  • Marine Orders Part 21 - Safety of Navigation and Emergency Procedures.
	  • Marine Orders Parts 3 and 6 – Seagoing Qualifications and Marine Radio Qualifications.
	  • Marine Order Part 30 – prevention of collisions
	• All vessels undergo an International Marine Contractors Association (IMCA), Common Marine Inspection Audit (CMID) or Offshore Vessel Inspection Document (OVID) 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 qualified crew
	• Dynamic Positioning (DP) trials to ensure correct operation
	• Australian Hydrographic Office (AHO) notified of operational areas, activities and durations, which triggers AHO to issue a Notice to Mariners
	• Australian Maritime Safety Authority (AMSA) Rescue Coordination Centre (RCC) notified of operational areas, activities and durations, which triggers RCC to issue an AusCoast Warning
	• Vessel maintained in accordance with the vessel maintenance system
	• An exclusion zone will be requested through the aid of stakeholder consultation, with permission required to enter, GES operational area outside AMSA shipping channels
	• For an incident resulting in a release of hydrocarbon to the marine environment >80L (A reportable incident) – oil spill response will be activated
	• 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
	• Daily vessel meetings with crew for preparedness

Hydrocarbon (MGO) spill during at sea refuelling	• Contractor Vessel Fuel Bunkering Procedure (endorsed by Apache) or Apache *Vessel Refuelling Procedure* (AE-91-IQ-098) will be followed for fuel transfer • Adequate bunding in fuel transfer areas as per MARPOL Annex IV • Deck drains closed prior to fuel transfer • Drainage and bunding systems are subject to ongoing monitoring and maintenance to ensure integrity and capacity • Fuel storage tanks and certified fuel transfer hose maintenance undertaken in accordance with vessels planned maintenance system • In line with MARPOL 73/78 Annex 1, vessels over 400 gross tonnage will have a current SOPEP/SMPEP and IOPP

Hazard	Risk Treatment Avoidance, Mitigation & Management Controls
	• Spill response exercise conducted in accordance with the SOPEP or SMPEP requirements and conducted prior to the commencement of the activity • Oil spill response executed in accordance with Apache Greater East Spar Oil Spill Contingency Plan (OSCP); or the vessel's current (< 12 months) Shipboard Oil Pollution Emergency Plan (SOPEP) or Shipboard Marine Pollution Emergency Plan (SMPEP) as required under MARPOL
Hydrocarbon condensate release from damage to subsea infrastructure (dropped objects)	• Vessel maintained in accordance with the vessel planned maintenance system • Dynamic Positioning (DP) trials to ensure correct operation • ROV survey to establish the as-found and as-built condition of the subsea infrastructure • Installation procedures, endorsed by Apache Project Manager, will ensure the structural integrity of the structure being installed • Marine Warranty Surveyor (MWS) approval of lifting operations • As-built drawings of the activity prepared within 10 weeks of completion of installation and supplied to AHO for marine chart update • No project vessel anchoring within operational area • Spill response exercise conducted in accordance with the SOPEP or SMPEP requirements • Crew trained and competent in management of rigging and lifting procedures and equipment • 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 • Oil spill response executed in accordance with Apache *Greater East Spar Development Installation Oil Spill Contingency Plan* (OSCP); or the vessel's current (< 12 months) SOPEP or SMPEP as required under MARPOL
Environmentally hazardous chemicals and hydrocarbon shipboard and marine operations spills	• Chemicals and hydrocarbons packaged, marked, labeled, stowed and segregated from other streams of operational wastes in accordance with MARPOL Annex III regulations • Maintenance records on vessels indicate that all machinery and equipment containing hydrocarbons, and equipment involved in the discharge and transfer of liquids, have maintenance scheduled on their respective planned maintenance system • Header tank limit switches maintained and tested in accordance the vessels planned maintenance system • Spill clean-up equipment located where environmental hazardous chemicals and hydrocarbons are stored and frequently handled • Closed drain systems in areas designated for storage of products deemed hazardous (chemicals and hydrocarbons) • In line with MARPOL 73/78 Annex 1, vessels over 400 gross tonnage will have a current SOPEP/SMPEP and IOPP • Spill response exercise conducted in accordance with the SOPEP or SMPEP requirements and conducted prior to the commencement of the activity • Wastes collected, labelled, segregated, stored, processed and disposed of in accordance with the project vessel's Garbage Management Plan as required under Regulation 9 of MARPOL Annex V
Non-hazardous and hazardous solid waste	• Non-hazardous and hazardous wastes collected, labelled, segregated, stored, processed and disposed of in accordance with the project vessel's Garbage Management Plan as required under Regulation 9 of MARPOL Annex V • Incinerator meets the requirements of Regulation 16 of MARPOL Annex VI

Hazard	Risk Treatment Avoidance, Mitigation & Management Controls
	• Accidental release of waste to the marine environment is reported and investigated and corrective actions are implemented • Hazardous wastes (e.g. used oils, lithium batteries, chemical and metallic wastes) documented, tracked, segregated, labelled and stored onboard with secondary containment (e.g. bin located in a bund)
Hydrocarbon spill response	• OSCP that provides response strategies for the combat of floating oil, provision of intelligence on dispersion behaviour in the marine environment, and quantitative assessment of environmental impact and recovery due to contact by released hydrocarbon

9. CONTACT DETAILS

Further information about the Greater East Spar installation activity can be obtained from:

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