Hoss-1 Environment Plan Summary
Commonwealth Waters

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1. INTRODUCTION

Apache Energy Ltd (Apache) proposes to drill the exploration well Hoss-1 on behalf of the WA-208-P Joint Venture in Commonwealth waters. Apache has agreed to operate the drilling of Hoss-1 instead of the permit operator under a Drilling Management Agreement (DMA). This arrangement has been entered into because Apache is the party to the *Ensco 104* rig contract, and because of Apache's greater experience of drilling wells in this general area. The WA-208-P Joint Venture comprises:

Santos Offshore Pty Ltd (25.85%) Operator

Apache Northwest Pty Ltd (34.03%)

ENI Australia Pty Ltd (18.66%)

Santos Ltd (11.46%)

Beach Energy Ltd (10.00%)

The objective of drilling the Hoss-1 well is to intersect and appraise the Lower Angel Sandstone and establish if there are any recoverable hydrocarbon reserves present. There is only one hydrocarbon target for this well. Once drilled to target depth and all logging requirements have been met, the well will be permanently abandoned.

The Hoss-1 Environment Plan (EP) has been prepared in accordance with the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 (OPGGS (E) Regulations). The EP has been reviewed and accepted by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA).

This EP summary has been prepared as per the requirements of Regulation 11 (7) and (8) of the referenced OPGGS(E) Regulations.

2. LOCATION OF THE ACTIVITY

The Hoss-1 well location is in Commonwealth waters in Exploration Permit Area WA-208-P (**Figure 1**) in approximately 60 m of water depth. The surface hole location coordinates are given **Table 1** and is approximately 64 km from the nearest proposed Marine Park boundary (Dampier Archipelago) (**Table 2**).

Table 1: Surface location for Hoss-1

Parameter	Hoss-1
Surface location (GDA 94 Zone 50)	19˚ 49’ 40.00”N (Lat) 116˚ 34’ 49.00”E (Long) 456047 (Easting) and 7807522 (Northing)

Table 2: Distances from Surface hole location to key regional features

Regional Feature	Distance from Hoss-1 location
Dampier Archipelago	64 km
Closest boundary to Montebello Marine Park	116 km
Closest Montebello Island	122 km
Varanus Island	138 km
Barrow Island	150 km
Distance to Ningaloo World Heritage Area	319 km

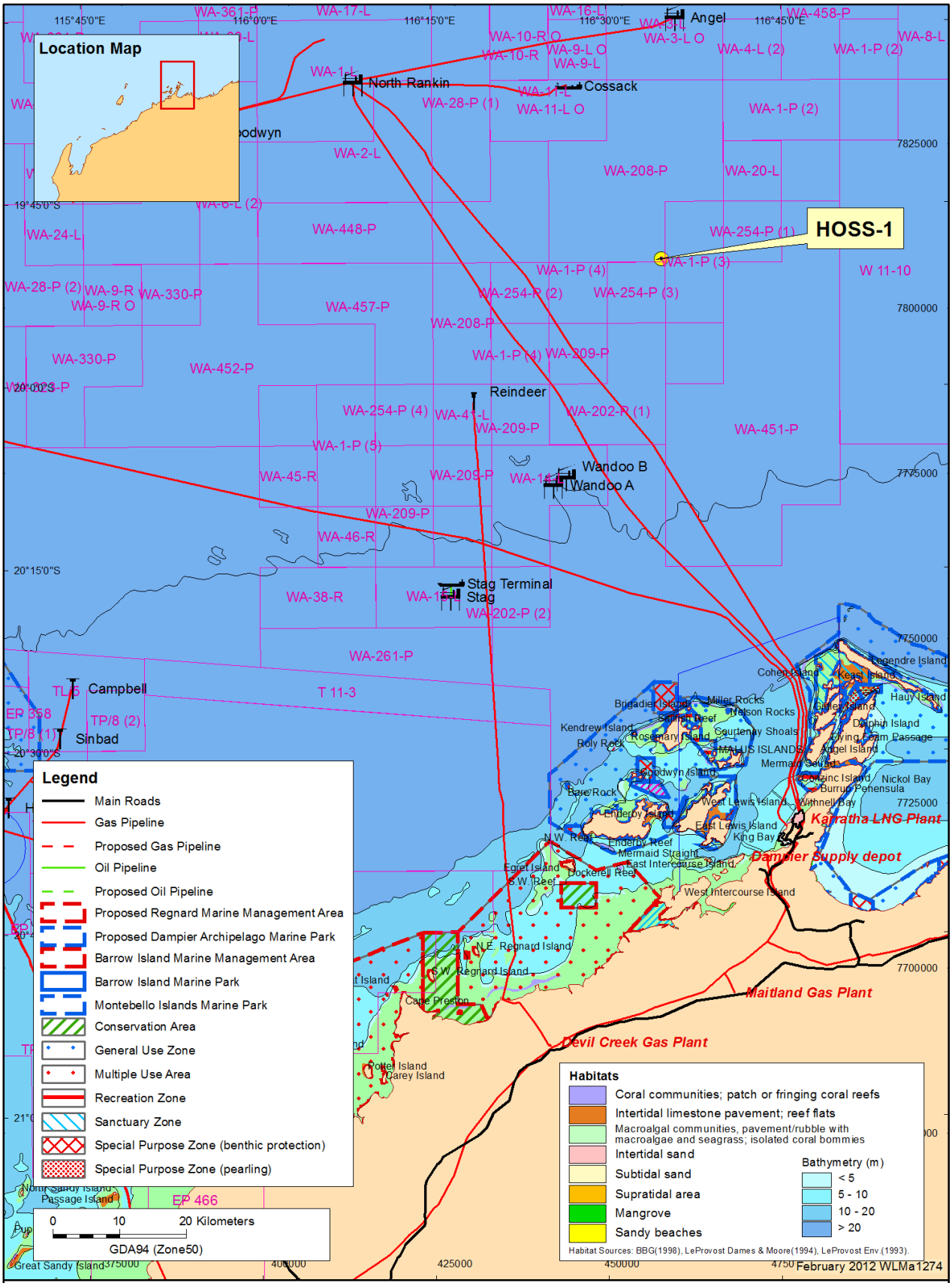

Figure 1: Location Map for Hoss-1

3. DESCRIPTION OF THE RECEIVING ENVIRONMENT

3.1 Physical Environment

The Hoss-1 exploration well is located within the North-West Marine Bioregion in the North-West Shelf (NWS) province in approximately 60 m water depth. Wind patterns in the area are monsoonal with a marked seasonal pattern and extreme wind conditions may be generated in the area by tropical cyclones during the summer months (November to April). The dominant offshore current in the Exmouth sub-basin is the Leeuwin Current which carries warm tropical water south along the Western Australia (WA) continental shelf. The Indonesian throughflow is also important in the area influencing the upper 200 m of the outer NWS. This current brings warm and relatively fresh water to the region from the western Pacific via the Indonesian archipelago (Woodside, 2005). When the drilling activity is proposed (winter months) the site of the Hoss-1 location experiences a predominance of westerly flowing currents and the wind direction is most commonly from the east and east-southeast. The seabed topography for the proposed Hoss-1 drilling location is essentially flat lying with no particular shoaling direction, and no bathymetric hazards. Seabed scars are present within the survey area, likely associated with previous drilling or fishing activity.

3.2 Biological Environment

The seafloor comprises low relief unconsolidated medium to coarse calcareous sands. A cluster of pinnacles is located approximately 400m northwest of the proposed location. The pinnacles are interpreted as isolated rock or coral outcrop, each pinnacle is less than 1m in length and width, and less than 0.5m high. Apache conducted sampling of the infauna surrounding the location of the Stag Central Production Facility and FSO (located approximately 50 km from Hoss-1) prior to development drilling as a baseline for comparison to the post-development and post-commissioning situation (Kinhill, 1997, 1998). This study confirmed that the benthic biota within the vicinity of Stag is comparable to that found over similar substratum and at similar depths over the wider region. The unconsolidated sediments support a diverse benthic infauna consisting of predominantly mobile burrowing species such as molluscs, crustaceans, polychaetes, sipunclid and platyhelminth worms, asteroids, echinoids and other small animals. Water depths at the site mean that benthic habitats including seagrass, algae and scleractinian corals are not present.

The EPBC Act Protected Matters Search Database lists eight species of marine fauna, found within one kilometre of the survey area, listed as threatened species (endangered or vulnerable) under the EPBC Act. In addition, these species are also listed as migratory along with 5 other marine species (DSEWPaC, 2012). The timing of the Hoss-1 drilling activity coincides with the humpback whale northern migration (June-August) but the well site lies within a broad migratory pathway and is not expected to deter them from their migratory path. The area has no other known feeding, resting, breeding and/or nesting areas or constricted migratory pathways.

The abundance of these species in the vicinity of the drilling activity is expected to be low and although the presence of the drill rig may result in localised behavioural avoidance, this is not considered significant and will not impact the population of these species.

3.3 Socio-economic environment

The Hoss-1 well is within three Commonwealth fisheries which are permitted to operate within the proposed Hoss-1 drilling location. Effective fishing effort is either non-existent or of very limited nature (AFMA, 2010). The North West Slope Trawl Fishery is the only Commonwealth licensed fishery with historical effort operating in the vicinity of the Hoss-1 drilling location. In addition seven State managed

fisheries have boundaries that overlie or are in close proximity to the location. Majority of fisheries effort on the NWS is typically focussed on areas of water depths of 100m and less.

There are no known or recognised shipping routes through the proposed Hoss-1 drilling location. There is a shipping route heading northeast to the south of the proposed drilling location however, a relatively low number of vessels use this (AEL, 2010; Woodside 2006).

Given the location of the Hoss-1 well in deep offshore waters, it is not accessed for tourism activities (recreational fishing, diving, swimming and boating) as the large majority of these activities occur within 2 nm of the shoreline including the Ningaloo Reef and Cape Range National Park.

The proposed Hoss-1 well location and surrounding waters are also used for petroleum exploration and development. The nearest production activities are the Wandoo production platforms in Exploration permit area WA-14-L and a subsea pipeline running from the North Rankin platform to the mainland to the west of the proposed well.

There are no listed Commonwealth Heritage Places or National Heritage Places within, or in the immediate vicinity of the proposed Hoss-1 drilling location. Marine Parks and Reserves of Conservation Significance are within the region with the closest marine park (proposed Dampier Archipelago Marine Park) located 64 km to the south.

4. DESCRIPTION OF THE ACTION

The Hoss-1 exploration well will be drilled using the *Ensco 104* jack-up drilling rig, operated by Ensco Plc. and supported by three main vessels *Lady Astrid*, *Far Sky* and *Mermaid Endeavour*. Personnel will be transferred to and from the rig by helicopter from Barrow Island and Karratha. The operations will commence in July 2012 over a period of approximately 18 days with completion expected mid to late August.

Once the rig has moved onto location and spudded, the 406 mm (16") and 311mm (12 ¼") holes will be drilled and casing (13 ⅜") run and cemented to approximately 2,170 measured depth below rotary table (MDRT). The conductor, wellhead and blow-out preventer (BOP) will be installed and pressured tested after the 16" hole has been drilled riserless. A water based mud (WBM) system containing potassium chloride (KCl)/Klastop) and barite will be used to drill the well.

Although offset well analysis strongly suggests the well can be drilled from the 344 mm (13 ⅜") shoe to the target depth, a contingent 244 mm (9 ⅝") liner will be available in case of unexpected difficulty when drilling the well. If the liner is installed then a 216 mm (8 ½") hole will be drilled.

Once drilled to target depth and all logging requirements have been met, the well will be permanently abandoned. Cement plugs will be set in the bore to seal the well, the casing will be cut off below the surface of the seabed and removed and all seabed obstructions will be removed. A remotely operated vehicle (ROV) will then be used to survey the seabed to ensure that no debris remains from the drilling activities.

Apache have data and information on this area from ten offset wells. This is combined with the seismic information collected at Hoss-1 and the seabed survey to inform the well location and well design. In addition the offset well data indicates that normal pressures will be intersected in the Hoss-1 well location, and in conjunction with the seismic profiling, no shallow hazards are identified.

5. MAJOR ENVIRONMENTAL HAZARD AND CONTROLS

Apache undertook an environmental risk assessment for routine and non-routine events for Hoss-1 drilling centred around a hazard identification workshop attended by a subset of Apache's environmental scientists and drilling personnel, held on 12 April 2012. The outcomes of a broader scale hazard identification workshop on Apache's drilling activities across the NWS (Oracle, 2011), independently facilitated by risk consultants using the combined experience of Apache's Drilling, Environment and Logistics Departments, was used to inform the Hoss-1 workshop.

The purpose of the risk assessment is to understand and identify the potential environmental risks to ensure they are reduced to As Low As Reasonably Practicable (ALARP) utilising Apache's management and mitigation actions which have been developed from experience in the environmental management of offshore exploration 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 key environmental hazards and control measures to be applied to the Hoss-1 well activities are shown 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.

6. MANAGEMENT APPROACH

The Hoss-1 well activity will be managed in compliance with the *Hoss-1 Environment Plan Commonwealth Waters (EA-00-RI-203/1 Revision 3)* 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 the Hoss-1 well during both routine and non-routine activities, 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 for each environmental impact identified (and assessed in the Environmental Risk Assessment) specific performance objectives, standards and procedures and identifies the range of controls to be implemented (Section 9) to be implemented (consistent with the standards) to achieve the performance objectives and also identifies the specific measurement criteria and records to be kept to demonstrate the achievement of each performance objective.

The goal of the environmental implementation strategy detailed in the EP is 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 over the duration of the drilling activity. It includes the following;

1. Details on the systems, practices and procedures to be implemented
2. Key roles and responsibilities
3. Training and competencies for all personnel (Apache and contractors)
4. Monitoring, auditing, management of non-conformance and review
5. Incident Response including Oil Spill Contingency Plan
6. Record Keeping

The reporting requirements for routine activities and environmental incidents (recordable and reportable) and reporting on overall compliance of the activity with the EP (e.g. close out reports submitted to NOPSEMA within 3 months of drilling completion) are also detailed.

7. CONSULTATION

The proposed Hoss-1 drilling activity is located in waters approximately 60 m deep, approximately 60 km north of the nearest WA coastline at Dampier Archipelago. At this location, the proposed activity falls within the jurisdiction of the Commonwealth government.

Relevant interested parties for consultation of the proposed drilling activity were identified based on the extent of the modelled zone of potential impact (ZPI) and identified sensitive resources. Each identified stakeholder was emailed a summary of the proposed Hoss-1 activities and an overview of the ZPI in April 2012.

Key stakeholders contacted prior to commencement of drilling activities are detailed in **Table 3** below and the dates of first contact and whether any feedback has been received to date.

Table 3: Stakeholders consulted for the Hoss-1 drilling activity

Group	Stakeholder	Date first contacted	Feedback received
Government Regulatory Agencies			
Commonwealth	Australian Fisheries Management Authority (AFMA)	12/04/2012	No
	National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA)	12/04/2012	No
	Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC)	21/05/2012	Yes
State	Department of Fisheries (DoF)	26/05/2012	Yes
	Department of Infrastructure and Transport (DoT)	11/06/2012	Yes
	Department of Environment and Conservation (DEC)	01/4/2012	Yes
	Department of Mines and Petroleum (DMP)	21/05/2012	Yes
Commercial fisheries			
Commonwealth	Australian Fisheries Management Authority (AFMA) – Environmental Assessments Division	12/04/2012	Yes
	Commonwealth Fisheries Association (CFA)	12/04/2012	Yes
Private Fisheries Groups	A Raptis and Son	12/04/2012	Yes
	WA Seafood Exporters	12/05/2012	Yes
	Northern Fishing Companies Association (NFCA)	12/04/2012	Yes
	WestMore Seafoods	12/04/2012	Yes
State	West Australian Fisheries Industry Council	21/05/2012	No
Operators			
	Woodside	29/06/2012	Yes
	Chevron	25/07/2012	Yes
	Vermilion	28/06/2012	Yes

8. CONTACT DETAILS

Further information about the Hoss-1 exploration well activity can be obtained from:

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9. ENVIRONMENTAL ASPECTS, IMPACTS AND CONTROLS

The following tables provide a summary of potential environmental impacts that could be expected from the drilling of the Hoss-1 exploration well. It lists the activities which might give rise to the environmental impact and the controls and measures which eliminate or ensure the residual risk is reduced to ALARP.

Environmental risk Summary for Hoss-1 – routine activities

Activity and Cause of Impact	Potential Impacts	Risk treatment (Avoidance, Mitigation and Management Measures)
Introduction of invasive marine pest species to permit area through contaminated ballast water or from vessel hulls	Introduction and possible establishment and spread of marine pests.	• Vessels imported into Australian waters will meet Australian Quarantine and Inspection Service (AQIS) quarantine requirements. • All vessels will comply with AQIS *Aus. Ballast Water Management Requirements* and the *National Biofouling Management Guidance for the Petroleum Production and Exploration Industry*. • Will only use support vessels that, after IMPS risk assessment (in accordance with AQIS guidelines), are deemed to pose negligible risk. • Ensco 104 is being mobilised from Sinbad in State waters located on the northwest shelf of Australia (in Australian waters) approximately 230km, southwest of Hoss-1
Hydrocarbon spill resulting from vessel collision with rig or support vessels.	Damage to support vessels, rig and/or platform, leading to oil spill.	• Apache's *Drilling and Completions Standards Manual (AE-91-004)* will be adhered to • Implementation of the NOPSEMA approved *Hoss-1 Oil Spill Contingency Plan (EA-00-RI-203/2)* as the control in event of spill to minimise impact • Rig move procedures in place, *Apache-Ensco 104 Safety Case Revision (DR-00-RF-033, Rev 6)* • Tanks on the Ensco 104 do not abutt the side of the rig, and are located immediately under the engine room – cannot be damaged through side impact. • Adherence to Australian Maritime Safety Authority (AMSA)'s marine notices and marine orders (maritime safety measures) • 500m gazetted exclusion zone monitored by support vessels. • Notice to Mariners will be issued prior to rig moving to site. • Qualified tow master to move the rig and on board for all transits. • Certified towing equipment. • Radio and radar communications adopted on vessels. • Vessel illumination at night and during times of low visibility to assist navigation and make rig visible. • Support vessel crew experienced and competent (*International Convention of Standards of Training, Certification and Watch keeping for Seafarers*, *2010*) • Consultation with relevant fisheries on proposed activities and dates. • Rig is mobilising to site outside of the cyclone season (November to March), less likely to have poor weather conditions. • Ensco 104 has an Automatic Identification System (AIS) which allows tracking of the rig by surrounding vessels. • Support vessel radar watch during mobilisation of rig
Marine Fauna interaction resulting from collision with vessel	Marine fauna disturbance, injury or death	• Cetacean observations to be logged in Apache's Marine Fauna database and record sent to DSEWPaC. • Adherence to Australian National Guidelines for Whale and Dolphin Watching (DEWHA 2005).
Seabed disturbance from rig positioning	Localised disturbance to seabed, resulting in loss of or change in benthic habitat.	• Pre and post Remote Operated Vehicle (ROV) survey of seabed within 2 km radius of well • No anchoring planned by support vessels. • Utilising a jack-up rig with 3 legs and associated spud cans – minimises disturbance impact compared with rig that has to anchor • Hoss-1 site survey (seabed characterisation, substrate geotechnical information) undertaken prior to rig arriving on site. • Avoidance of sensitive areas identified by seabed survey. • Drill rig anchoring procedure in *Rig Tow Plan Ensco 104 (Hoss-1)* and Apache's *Drilling and Completions Standards Manual* (AE-91-004) will be adhered to
Damage to existing subsea infrastructure during mobilisation/demobilisation	Release of hydrocarbons to the marine environment	• Adherence to AMSA's marine notices and marine orders (maritime safety measures) • Radio and radar communications adopted on vessels. • *Apache-Ensco 104 Safety Case Revision (DR-00-RF-033, Rev 6)* • *Rig Tow Plan Ensco 104 (Hoss-1)* • Nearest identified subsea infrastructure >20km radius from drilling activities. • No anchoring planned by support vessels. • Hoss-1 Site survey (seabed characterisation, substrate geotechnical information) undertaken prior to rig arriving on site, and incorporated into the positioning analysis. • Implementation of Hoss-1 Oil Spill Contingency Plan (OSCP) (EA-00-RI-203/2) as the control in event of spill to minimise impact.
Continuous lighting in the same location for an extended period of time which is required for safety purposes on rig and vessels	Attraction of fauna such as migratory birds and turtles, leading to possible increased predation.	• Lighting levels are not significantly different from lighting levels on vessels, platforms etc. operating on the NWS. • Minimum safe lighting requirements for vessels and rigs to meet relevant Safety and Industry Regulations. • *Apache-Ensco 104 Safety Case Revision (DR-00-RF-033, Rev 6)* • No well clean-up or well test activities involving flaring will be carried out.

Activity and Cause of Impact	Potential Impacts	Risk treatment (Avoidance, Mitigation and Management Measures)
		• Non-essential lighting will be switched off when possible without compromising safety
Underwater noise generated by VSP, drill rig, vessels and helicopters during routine operations	Potential negative physiological or behavioural effects to some threatened cetaceans, fish and other marine fauna.	• Helicopters will fly at a minimum altitude of 150 m (except for take offs, landings and adverse weather). • Cetacean observations to be logged in Apache's Marine Fauna database and record sent to DSEWPaC. • VSP operations will comply with DSEWPaC / EPBC Act Policy Statement 2.1 (2008) – Part A and will last for only several hours • Adherence to Australian National Guidelines for Whale and Dolphin Watching (DEWHA 2005) • All Ensco 104 personnel will complete the Apache/ Ensco 104 environmental induction (incorporating VSP operations and marine fauna interaction mitigation measures) • All noise generating equipment is serviced and maintained in accordance with Ensco Plc's planned maintenance system and support vessel owners planned maintenance systems
Discharge of drill cuttings and WBM drilling fluids through routine drilling activity	Temporary and localised water column turbidity and seabed deposition potentially causing benthic fauna smothering in some situations.	• The well is designed to minimise the generation of drill cuttings within the technical constraints of achieving the well's target depth safely. • Apache fluid selection process to determine most appropriate choice of drilling fluids(in this case WBM) • Risk based approach to select products that reduce the potential impacts to the marine environment (i.e. CHARM gold rated or non-CHARM rated E) and achieve the technical requirements. • Approved contractors will control the storage and handling of drilling fluid chemicals in conjunction with National Code for the control of Workplace Hazardous Substances • During the use of WBM, drilling fluid volumes are digitally recorded from the mud logging units. Drilling fluid volume balance calculations are made daily to determine where fluid losses are taking place in the system. • Drill cuttings from upper hole sections drilled with seawater and high viscosity gel sweeps will be disposed of directly to seabed, minimising water column turbidity. • Drill cuttings shaker system maintenance included in Ensco 104 Planned Maintenance System • Shaker screen selection is made by the Consultant Mud Engineer on location and reviewed by the Apache Fluid Coordinator daily. • Screens are inspected a minimum of once a day during drilling operations to check for wear and tear. • Mud logging units are scheduled on Geoservices (a Schlumberger company) planned maintenance system and are maintained in accordance with manufacturer's maintenance specifications. • Mud logging units are calibrated before each well is spud and at the start of each hole section. • Where practicable re-use of drilling fluids on subsequent wells
Disposal of non-hazardous wastes (brine, cooling water) during routine activities	Localised increase in surface water temperature. Thermal impacts to pelagic species (e.g. plankton). Localised increased water salinity levels.	• Potable water system will be maintained in line with the manufacturer's specifications • Biocide dosage is maintained at the minimum dosage required to maintain the system or anti-scale chemicals. • Waste water stream from RO plant is pumped down a chute, and has time to cool to ambient temperature before entering the marine environment
Release of combustion emissions to the atmosphere through operation of machinery and engines	Temporary and localised decrease in air quality. Global contribution to greenhouse effect.	• Equipment fuel consumption monitored by barge engineer. • All rig equipment maintained in accordance with the Planned Maintenance System. • MARPOL 73/78 – air pollution prevention certificate • No waste incineration. • Records of diesel usage maintained by Ensco 104 operators. • Use of marine diesel, which is low in sulphur content, minimising the generation of Sulphur Oxides • No well clean-up or well test activities will be carried out
Release of treated and macerated sewage and putrescible waste through routine rig and vessel discharges as a result of accommodating personnel	Temporary and localised decrease in water quality due to nutrient enrichment. Modification in feeding habits of pelagic fish species and seabirds. Increased suspended sediment load in water column.	• Rig and support vessels will use approved Sewage Treatment Plant (STP) and compliant organic waste macerator in accordance with MARPOL Annex IV. • STPs and macerator will be maintained in line with manufacturers' specifications. • All non-food galley wastes will be bagged and shipped to shore for recycling or disposal in accordance with Environmental Protection (Controlled Waste) Regulations 2004.

Activity and Cause of Impact	Potential Impacts	Risk treatment (Avoidance, Mitigation and Management Measures)
Discharge of contaminated water to the ocean consists of wash down water, occasional rainwater which may contain oil, grease, chemicals or detergent. E.g. through poor housekeeping practice, washdown or rainwater, or corrosion of bunds (Areas include deck drainage, machinery space spillage and drainage, enclosed storage area drainage, drill floor, moon pool and pipe deck drainage and drainage from support vessels).	Temporary and localised reduction of water quality. Physiological damage to marine fauna ingesting contaminated water.	• Ensco's procedures for the collection and treatment of drainage ensure that no contaminated waste streams are routinely discharged from the drainage system to the marine environment. • Drainage and discharge in accordance with MARPOL Annex I • The oily water system is routinely monitored and regularly maintained • Bulk hydrocarbon and chemicals will be stored in designated storage areas, which are bunded. • Deck drains which contain rainwater only are directed overboard. • Biodegradable washdown detergents used. • Material Safety Data Sheets (MSDS) are available for all chemicals used on the Ensco 104 (which includes spill response requirements). • Fully stocked and maintained oil spill kits, located in accessible location, on board to clean deck spills. • Drainage from bunded areas will be collected through a closed drain system and processed to ensure discharge water has less than 15 ppm OIW. Over-spec fluids will be re-directed through the separator again or held for future offloading and onshore disposal. • Spill exercises are to be conducted quarterly and recorded on daily report. • Minor oil/lubricant spills will be mopped up immediately with absorbent materials that will then be disposed of onshore as hazardous waste, and not washed overboard. • Main deck drain scuppers closed in the event of a spill on deck. • Recovered oil stored onboard rig for appropriate onshore disposal. • Used lubricants will be stored in bunded areas aboard the rig and subsequently transported onshore for recycling or disposal at approved locations. • In non-drill floor areas, drainage to MARPOL Annex I requirements. • Daily inspections will ensure that deck areas are clean of spillages and accumulations of oil/grease and chemicals, and that all spills and leaks are recorded / reported.
Interference with commercial shipping or fishing vessels due to e.g. breakdown in navigation equipment, poor weather, poor communications or human error	Vessel collision. Fuel spill (see hydrocarbon spill above). Fishing gear snags.	• Notice to Mariners (rig move notice) will be issued. • A 500m radius safety exclusion zone around the rig will be gazetted when on location. • Standard maritime safety measures to be applied. • Written and radio warnings to other vessels (via AMSA notification). • Support vessel crew experienced and competent • Bridge watch and radio standby on all vessels. • Pre-drilling stakeholder consultation. • Support vessels to patrol safety exclusion zone and act as chase vessels

Table 4: Environmental risk Summary for Hoss-1 – non-routine activities

Hazard	Potential Impacts	Existing Controls
Spill of hydro-carbons to the sea (excluding vessel-to-rig refuelling) e.g. through equipment malfunction, corrosion, inadequate bunding, spillage during transfer.	Short-term impact to water quality. Impact on pelagic fauna.	• Equipment maintained in accordance with Planned Maintenance System. • Ensco Safety Case HSE System (EN104-HSE-001) - section 2.7 and Apache-Ensco104 Safety Case Revision (DR-00-RF-033, Rev 6) – Section 4. Ensco 104 SOPEP • Drainage maintained according to MARPOL 73/78 Annex I • Ensco 104 and support vessels hold an International Oil Pollution Prevention Certificate • Use marine diesel rather than HFO • Drip trays used under portable equipment and when refuelling portable equipment. • Rig decks bunded. Scupper plugs available to prevent liquid discharges from decks. • Chemicals and hydrocarbons stored within continuously bunded areas. • Spill kits placed strategically around Ensco 104 and support vessel work areas. • Weekly inspection of spill kits is undertaken and recorded to ensure they are intact, clearly labelled and contain adequate quantities of absorbent materials. • Oily water discharged in accordance with MARPOL requirements • Spills cleaned up immediately and clean up material contained, and not washed overboard. • Spill exercises conducted quarterly and recorded on daily report. • All Ensco 104 personnel to complete the Ensco 104 environmental induction that includes response to spills.
Dropped objects (e.g., Blowout preventer (BOP), anchor, drill pipe, bulkis, tools). E.g. due to equipment failure, human error, adverse weather	Oil leak from subsea equipment. Seabed disturbance.	• Ensco Safety Case HSE System (EN104-HSE-001) includes Lifting Equipment Management System (LEMS). • ROV survey at completion of drilling campaign to retrieve any dropped objects. • Planned maintenance undertaken on lifting equipment. • Apache's Drilling and Completions Standards Manual (AE-91-004) • Permit to work (PTW) system for lifts between the support vessel and the rig. • Offloading procedures. • Use of competent, trained rig and support vessel crew. • Certification of lifting equipment.
Overboard loss/ accidental disposal of non-hazardous wastes e.g. If waste is not properly contained, waste management procedures not in place and/or not communicated	Marine pollution. Injury or death of marine fauna through ingestion or entanglement	• Procurement and contract process will ensure only essential items brought on board the rig in line with well design requirements. • Wastes to be collected in covered bins (and compacted where possible) for appropriate onshore disposal. • All scrap metal to be collected in bins for appropriate onshore disposal • Apache and Ensco 104 waste management procedure • The volume of concrete mixed will be accurately calculated to ensure only that which is necessary for drilling requirements is mixed

Hazard	Potential Impacts	Existing Controls
Over-board loss of hazardous waste.	Death or injury of marine fauna through ingestion. Short-term reduction in water quality.	• MARPOL 73/78 Annex V • Ensco Safety Case HSE System (EN104-HSE-001) - section 4.6.1 • Environment Protection (Controlled Waste) Regulations 2004. • Waste segregation, onshore disposal of hazardous waste • MSDS and handling procedures for hazardous goods will be available in locations nearby to where the wastes are stored. • Onshore disposal of controlled waste will follow DEC requirements for transportation and disposal. • OCNS will be used in chemical selection to select products that have the least environmental impact. (Chemicals that are either ranked Gold and Silver using the OCNS CHARM model or non-CHARMable E and D). • Bunding around stored bulk wet chemicals or hazardous waste storage areas are continuous around the entire area. • Spill kits placed strategically around Ensco 104 and support vessel work areas. • All hazardous wastes are documented, tracked and segregated from non-hazardous wastes (via waste tracking records). • Minor spills will be mopped up immediately with absorbent materials that will then be disposed of onshore as hazardous waste and not washed overboard. • If spillage occurs in bunded area it will be removed, and treated as hazardous or oil waste. • Ensco 104 Oil Record Book is up to date and records waste oil disposal. • Weekly inspection of spill kits is undertaken and recorded to ensure they are intact, clearly labelled and contain adequate quantities of absorbent materials. • Spill exercises are to be conducted quarterly and recorded on daily report.
Spill of diesel oil to sea during refuelling through e.g. Equipment failure, support vessel runs over refuelling hose	Widespread surface water diesel slick, with death or physiological impacts on sensitive species such as planktonic crustaceans. Decrease in surface water quality.	• Fully manned operation • Diesel storage tanks and fuel transfer hoses will be maintained on the rig and vessels in line with the planned maintenance systems. • Use of marine diesel rather than heavy fuel oil (HFO). • Ensco Safety Case HSE System (EN104-HSE-001) - section 2.7 and Apache-Ensco104 Safety Case Revision (DR-00-RF-033, Rev 6) – Section 4 • MARPOL 73/78 Annex I • Adherence to Apache refuelling procedure • Vessels equipped with sophisticated navigation aids and competent marine crew. • An Oil Spill Contingency Plan (OSCP) will be in place and implemented immediately upon a diesel spill if necessary. • Shipboard Oil Pollution Emergency Plan (SOPEP) available and personnel trained in use. SOPEP will be exercised prior to commencement of drilling activity. • Weekly inspection of spill kits is undertaken and recorded to ensure they are intact, clearly labelled and contain adequate quantities of absorbent materials • Spill exercises are to be conducted quarterly and recorded on daily report. • Drains closed in fuel transfer area to contain spills.

Hazard	Potential Impacts	Existing Controls
Well blowout (e.g. Blow out Preventer (BOP) failure, casing failure, riser failure, human error).	Release of hydrocarbon into the pelagic environment, with death or physiological impacts to sensitive species. Shoreline exposure to oil.	• Ensco Well Operations Management Plan (WOMP) and abridged drilling programme (DR-00-LD-149) approved by NOPSEMA and readily available to all personnel • Apache-Ensco104 Safety Case Revision (DR-00-RF-033, Rev 6) – Section 2.3 • Ensco 104 OIM, Tool pusher, drillers and assistant drillers hold valid well control certificates (IWCF certificates) and are competent in well control manual requirements • BOP will be inspected, installed and pressure tested prior to drilling hydrocarbon zones. • BOP test is conducted every 14 days and recorded in daily drilling report • Casing and riser pressure tested with BOP. • AEL spill response procedures and OSCP. • Well control drill to be conducted and reported in daily report prior to drilling through first hydrocarbon zones. • Appropriate drilling fluid weight will be used specific to known reservoir pressure, and continually monitored. • Increased drilling fluid logging in formations behaving in unexpected manner. • Maintenance records show BOP has regular maintenance scheduled on the planned maintenance system and is maintained in accordance with manufacturers maintenance specifications. • Mud logging equipment to be in place and tested weekly. • Perform stress analysis to select appropriate casing material for the proposed well bore. • The OSCP is a key mitigation control that would be implemented in event of a spill to help minimise the subsequent impact of a spill
Oil spill response due to a spill to the marine environment	Increased emissions Reduction in water quality Continued release of hydrocarbon into the pelagic environment, with death or physiological impacts to sensitive species.	• Oil spill response has been developed using a hierarchy of source control strategies: 1. First Response Toolkit 2. Capping Stack 3. Relief Well • Net Environmental Benefit Analysis (NEBA) incorporated in the planning stages and part of the response strategy process. Monitoring of the spill and response strategy. • Undertake lessons learnt on oil spill exercises and response activities.

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