Bianchi Seismic Survey

Environment Plan Summary

REV	DATE	DESCRIPTION	BY	CHK	EM/PM
0	30/10/14	Issued for Use	S2V	LM	LM
A	29/10/14	Issued for Review	S2V	LM	LM

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1. INTRODUCTION

Apache Northwest Pty Ltd ('Apache') is the titleholder for petroleum activities covered under this EP within the permit area WA-450-P, WA-290-P and WA-49-R. In Australia, Apache Northwest Pty Ltd is a subsidiary of Apache Energy Ltd (AEL), an Australian operating subsidiary of Apache Corporation. AEL has had a presence on Western Australia's North West Shelf (NWS) since 1993 when it took over operations of the Harriet field and the Varanus Island gas plant and oil storage facility from Hadson Energy. Since the early 2000's, AEL has been one of the major holders of petroleum exploration permits on the NWS, and is one of the most active offshore drillers in Australia.

Apache proposes to undertake the Bianchi 3D Marine Seismic Survey ('the survey') in Commonwealth waters of the Carnarvon Basin, Western Australia (WA)

In accordance with the *Offshore Petroleum & Greenhouse Gas Storage Act 2006* Part 2.8 (Petroleum Access Authorities), the instrument holder of the initiating titles will obtain Access Authorities from the National Offshore Petroleum Titles Administrator (NOPTA) for seismic activities that fall within, and adjacent to, the permits not within Apache titleholder permit areas.

1.1 Compliance

The overall purpose of this EP is not only to comply with statutory requirements of the Commonwealth Offshore Petroleum and Greenhouse Gas Storage (Environment) regulations 2009 (OPGGS (E) Regulations) but also to ensure that the seismic acquisition is planned and conducted in line with Apache environmental policies and standards, including the corporate Environmental Policy. The EP has been reviewed and accepted by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) on the 22nd of October 2014. This EP summary has been prepared in accordance with the requirements of regulation 11 (7) and (8) of the OPGGS (E) Regulations.

1.2 Schedule

The survey will occur in 2015. The exact timing of the survey is dependent upon vessel availability, weather conditions and receiving the necessary statutory approvals. To reduce potential impacts to humpback whales, and to keep the survey duration as short as possible, the proposed survey will likely occur between January and June, however the EP covers for the activity occurring at any time of year.

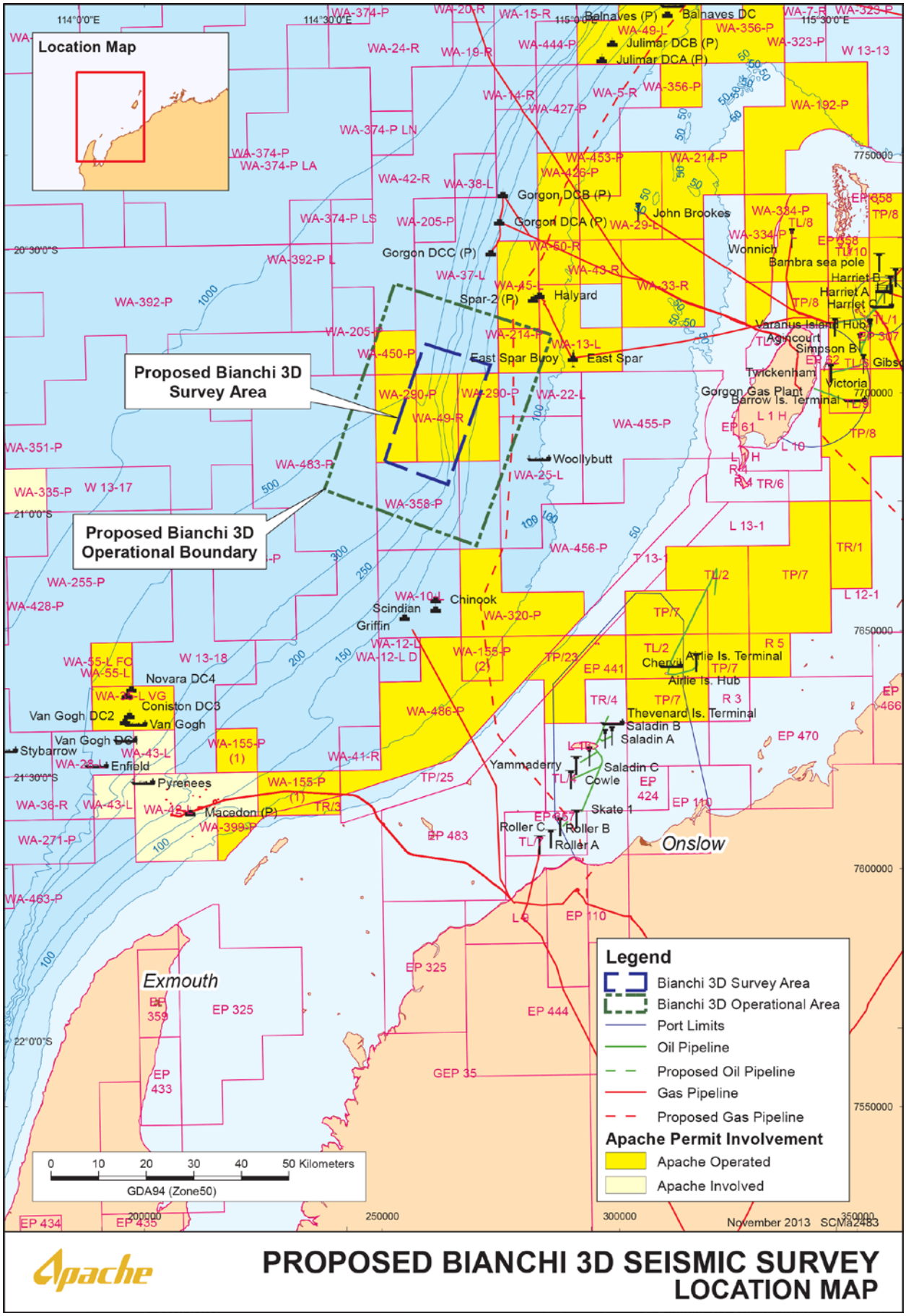

Figure 1-1: Location of the Bianchi operational and survey area

2. ACTIVITY LOCATION

The survey will consist of a 'survey area' and a larger 'operational area' (**Figure 1-1**). The survey area is defined by that area which contains full-fold seismic coverage for the purpose of imaging the subsurface. The operational area is used for conducting operations ancillary to achieving full-fold coverage within the survey area. Activities conducted in the operational area include: acoustic emissions at full power on sail line 'run-outs'; acoustic emissions below full power for the purpose of 'soft start' or 'fauna alert' procedures; miscellaneous maintenance operations; and, vessel turns at the end of each sail line, necessary for the vessel to change to a new sail line.

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

Table 2-1: Co-ordinates of the proposed Bianchi survey and operational area

LATITUDE			LONGITUDE		
Degrees	**Minutes**	**Seconds**	**Degrees**	**Minutes**	**Seconds**
Operational area					
20	43	48.4	114	55	17.71
21	1	1.93	114	48	20.83
20	54	28.76	114	30	1.24
20	37	16.12	114	36	59.74
Survey area					
20	41	26.92	114	41	8.76
20	44	0.23	114	49	6.66
20	57	31.79	114	43	44.07
20	54	46.81	114	36	4.92

3. DESCRIPTION OF THE ACTIVITY

Apache intends to conduct the proposed survey using state-of-the-art technology and techniques. The proposed survey will employ modern streamer technology (dual sensor, jell filled) and improved survey design parameters, aimed at improving the resolution of the sub-surface image. The survey is designed to aid in the appraisal and exploration of potential additional recoverable petroleum reserves within the title area and to aid the efficient recovery of such petroleum where commercially viable.

The proposed survey is a typical 3D survey similar to others conducted in Australian marine waters (in terms of technical methods and procedures). No unique or unusual equipment or operations are proposed. The surveys will be conducted using a purpose-built seismic survey vessel.

During the proposed activities, the survey vessel will traverse a series of pre-determined sail lines within the operational area at a speed of approximately 4-4.5 knots (8-9 km/hr). As the vessel travels along the sail lines a series of noise pulses (every 5 - 10 seconds) will be directed down through the water column and seabed. The released sound is attenuated and reflected at geological boundaries and the reflected signals are detected using sensitive microphones arranged along a number of hydrophone streamers towed behind the survey vessel. The reflected sound is then processed to provide information about the structure and composition of geological formations below the seabed.

The seismic array will comprise a maximum of 14 seismic streamers and the streamers will have an approximate length of 8,000 m. The seismic streamers are towed side by side and the spacing between each seismic streamer between 50 - 75 m. The seismic energy source tow depth will be 5 m and the streamer tow depth will be between approximately 7 to 20 m. The operating pressure for the seismic energy source will be approximately 2000 psi and will consist of two sub-arrays, each with a maximum volume of between approximately 3000 and 4000 cui. These sub-arrays will be fired alternately, with a shotpoint interval of 12.5 m horizontal distance.

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˚C) and coolest in August (19˚C). Near bottom water temperature is approximately 23˚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 area (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, 2012).

4.2 Biological environment

The operational area is situated within the Northwest Shelf Province bioregion which is located almost entirely on the continental shelf, except for a small area to the north of Cape Leveque that extends onto the continental slope. The shelf gradually slopes from the coast to the shelf break, but displays a number of seafloor features such as banks/shoals and holes/valleys. The dynamic oceanic environment influences sediment distribution throughout the bioregion. The seafloor of this bioregion is particularly strongly affected by cyclonic storms, long-period swells and large internal tides, which can resuspend sediments within the water column as well as move sediment across the shelf (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 area of hard substrate. However the region between Dampier and Port Hedland is a hotspot for sponge biodiversity. Other benthic and demersal species in the bioregion include sea cucumbers, urchins, prawns and squid. Benthic and pelagic fish communities are also highly diverse and strongly depth-related with a number of hotspots identified between Port Hedland and North West Cape. Numerous migratory species including humpback whales, whale sharks and dugongs travel through the bioregion. The bioregion also supports bottlenose and Indo-Pacific humpback dolphins, turtle nesting sites including green, hawksbill, flatback and loggerhead turtles, and several seabird breeding populations including wedge-tailed shearwaters, crested, bridled and sooty terns, brown boobies and lesser frigatebirds (DSEWPaC, 2008).

A search of the EPBC Act Protected Matters Database was conducted on 2nd of November 2013 using the coordinates of the operational area (**Figure 1-1**). **Table 4-1** below provides a full list of all threatened and/or migratory species identified which may occur within the proposed operational area.

Table 4-1: EPBC Act threatened and migratory marine fauna species potentially occurring in the operational area

COMMON NAME	SCIENTIFIC NAME	STATUS	TYPE OF PRESENCE
Birds			
Southern giant-petrel	*Macronectus giganteus*	Endangered, Migratory	Species or species habitat may occur
Lesser crested tern	*Sterna bengalensis*	Migratory	Breeding known to occur within area
Roseate tern	*Sterna dougallii*	Migratory	Foraging, feeding or related behaviour likely to occur within area
Marine mammals			
Blue whale	*Balaenoptera musculus*	Endangered, Migratory	Species or species habitat may occur
Southern right whale	*Eubalaena australis*	Endangered, Migratory	Species or species habitat may occur
Humpback whale	*Megaptera novaeangliae*	Vulnerable, Migratory	Species of species habitat known to
Antarctic minke whale	*Balaenoptera bonaerensis*	Migratory	Species or species habitat may occur
Bryde's whale	*Balaenoptera edeni*	Migratory	Species or species habitat may occur
Sperm whale	*Physeter macroocephalus*	Migratory	Species or species habitat may occur
Spotted bottlenose dolphin	*Tursiops aduncus*	Migratory	Species or species habitat may occur
Reptiles			
Short-nosed seasnake	*Aipysurus apraefrontalis*	Critically endangered	Species of species habitat may occur
Loggerhead turtle	*Caretta caretta*	Endangered, Migratory	Species or species habitat known to
Green turtle	*Chelnonia mydas*	Vulnerable, Migratory	Species or species habitat known to
Leatherback turtle	*Dermochelys coriacea*	Endangered, Migratory	Species or species habitat likely to occur
Hawksbill turtle	*Eretmochelys imbricata*	Vulnerable, Migratory	Species or species habitat known to
Flatback turtle	*Natator depressus*	Vulnerable, Migratory	Congregation or aggregation known to occur within area
Fish			
Whale shark	*Rhincodon typus*	Vulnerable, Migratory	Foraging, feeding or related behaviour known to occur within area
Shortfin mako	*Isurus oxyrinchus*	Migratory	Species or species habitat likely to occur
Longfin mako	*Isurus paucus*	Migratory	Species or species habitat likely to occur

Due to the high environmental value of the Pilbara coast, an extensive network of existing and proposed conservation reserves exists. A summary of the Commonwealth Marine Reserves, State Protected Areas, World Heritage Areas and KEFs overlapping with the operational area and the nearby region is given in **Table 4-2** below.

Table 4-2: Summary of Commonwealth Marine Reserves, State Protected Areas, World Heritage Areas and KEFs of the operational area and the nearby region

FEATURE	OPERATIONAL AREA	NEARBY REGIONAL
Commonwealth Marine Reserves	None	• Montebello Commonwealth Marine Reserve
World Heritage Property	None	• Ningaloo Coast World Heritage Property

FEATURE	OPERATIONAL AREA	NEARBY REGIONAL
State Protected Areas	None	• Muiron Island Marine Management Area • Montebello/Barrow Islands Marine Conservation Reserves • Barrow Island Marine Park • Barrow Island Marine Management Area • Bessieres Island NR • Serrurier Island NR • Thevenard Island NR • Airlie Island NR
Key Ecological Features (KEFs)	• Ancient Coastline at 125 m Contour • Continental Slope Demersal Fish Communities	• Ancient Coastline at 125 m Contour • Canyons linking the Cuvier Abyssal Plain and the Cape Range Peninsula • Continental Slope Demersal Fish Communities

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, dominated by Pilbara fisheries. The major fisheries in the Pilbara region target tropical finfish, large pelagic fish, crustaceans (prawns and scampi) and pearl oysters. Ten State commercial fisheries have boundaries that overlie or are in close proximity to the operational area. These are:

North Coast Bioregion

- Onslow Prawn Managed Fishery;
- Mackerel Fishery (Area 2 – Pilbara);
- North Coast Crab Fishery: Pilbara Developing Crab Fishery;
- North Coast Shark (closed indefinitely);
- Pearl Oyster Managed Fishery (Zone 1);
- Pilbara Demersal Scalefish Fisheries comprising:
    - Pilbara Fish Trawl (Interim) Managed Fishery;
    - Pilbara Line Fishery.
    - Pilbara Trap Managed Fishery;

Whole of State Fisheries

- Beche-de-mer Fishery;
- Marine Aquarium Fish Fishery;
- Octopus Fishery; and
- Specimen Shell Managed Fishery.

Commonwealth fisheries, such as the Western Tuna and Billfish Fishery (WTBF), Southern Bluefin Tuna Fishery (SBFTF) and Western Skipjack Tuna Fishery (WSTF), although licenced to fish within the operational area have had no recent fishing effort reported (AFMA, 2011). The North West Slope Trawl Fishery (NWSTF) is the only Commonwealth fishery with historical effort within the operational area, targeting scampi and prawns.

At a distance of approximately 66 km from Barrow Island and the Montebello Islands, the operational area is unlikely to be visited by recreational fishers especially given the water depths (ranging from 80-800 m).

Various petroleum exploration and development activities have occurred within and surrounding the operational area.

The East Spar (Apache) and Woollybutt (ENI) developments are those situated closest to the operational area at approximately 7 km. The Woollybutt FPSO is no longer on location; however, some subsea infrastructure remains at this location. The Gorgon (Chevron) development is approximately 16 km to the north of the operational area.

There are no recognised shipping routes in or near the operational area with the nearest designated shipping routes located 30 km north. The busiest traffic area surrounds Dampier port, which is 200 km away from the operational area. While no shipping routes exist through the operational area, AUSREP shipping data indicates that vessels use the general area.

Given the considerable distance of the operational area from the nearest population centre at Onslow (approximately 75 km away) and the nearest shoreline at Barrow Island (approximately 66 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 within the operational area.

No known Aboriginal heritage sites are located within the operational 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	• 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
Marine activities, spill response and safety	• Australian Marine Oil Spill Centre (AMOSC) • Australian Maritime Safety Authority (AMSA) • Department of Mines and Petroleum (State) • Department of Defence (State) • Department of Environment (formerly DSEWPaC) • Department of Transport (State)
Exmouth Stakeholder Reference Group	• North West Cape Aboriginal Cooperation • Department of Transport Exmouth • Department of Parks and Wildlife Exmouth • Exmouth Chamber of Commerce • Exmouth District High School • Exmouth Game Fishing Club • Federal Member • Cape Conservation Group • Ningaloo Station • Shire of Exmouth Council • TOLL Exmouth
Nearby operators	• ENI (Woollybutt)

On October 24, 2013, Apache Energy disseminated to all stakeholders advanced notification of seismic activities proposed to commence between January and June 2014. Apache consults with this stakeholder group regularly in the course of its NWS operations, and will notify or consult with stakeholders should there be any further changes, either through the regular consultation process, or through a specific

notification, whichever is deemed more appropriate. Apache is confident that the group is adequately informed, and is able to feed back or request further information if required.

No major concerns were raised by stakeholders between distribution of the Bianchi seismic consultation package and the submission of this EP. The most extensive consultation included discussions with Recfishwest regarding Apache's advice on clearance around seismic vessels, as well as detailed advice provided by DPaW and DoF which was incorporated into the development of this EP. Responding to ongoing consultation with WAFIC and DoF, Apache has extended its consultation program to include provision of Quarterly Updates to all individual commercial fishing licensees operating off the North West Shelf – now some 600 individual contacts.

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). The quarterly updates (which include this survey) are intended to trigger feedback, comments and requests for additional information or consultation opportunities for the future activities, and provide updates of the activities that are underway, or have previously been consulted on. Stakeholders are urged to contact Apache 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 operational activities and non-routine activities. 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 risk assessment identified eight 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 below. 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.

The following tables (refer to **Table 6-1** and **Table 6-2** below) provide a summary of potential environmental hazards that could be expected from the survey for operational activities and non-routine activities. The tables list the controls and measures which eliminate or ensure the environmental risk is reduced to ALARP.

Table 6-1: Environmental risk summary for operational activities

Hazard	Risk Treatment Avoidance, Mitigation & Management Controls
Invasive Marine Species Introduction	• Vessel anti-foulant systems are maintained • Vessel has AQIS clearance to be in Australian waters • A biofouling vessel risk assessment (VRASS) is completed prior to mobilisation to Australia as defined within the National Biofouling Management Guidance for the Petroleum Production and Exploration Industry (Commonwealth of Australia, 2008) and mitigating actions undertaken to ensure a "low" risk ranking • Vessels shall exchange 'high-risk' ballast water, as defined in Australian Ballast Water Management Requirements (AQIS, 2011), > 12 nm from Territorial Sea Baseline • Onboard ballast water exchange logs detail uptake and discharge volumes and position and water depth of exchange
Vessel Movements	• Crew will operate vessels in accordance with Part 8 of the EPBC Regulations 2000, and Apache Whale Interaction and Sighting Procedure (EA-91-11-003), the vessels must not: o Travel at greater than 6 knots within 300 m (caution zone) of a cetacean or whale shark known to be in the area o Approach closer than 100 m of a cetacean or whale shark known to be in the area o If a dolphin approaches the vessel or comes within 100 m the vessel master must not change the course or speed of the vessel suddenly • Binoculars and Marine Fauna Sighting Datasheet available on all vessels. • Apache Marine Fauna Sighting Datasheets completed and submitted to DoE. • All crew must attend an environmental induction containing basic information on procedures to manage interactions between vessels and marine fauna • Access authority for non-Apache permits prior to commencement of activity once survey program finalised • Notifications trigged by Apache and issued by AHO and AMSA, will provide advanced warning of the activity marine users • Implementation of the simultaneous operations (SIMOPS) plan to manage interactions between two or more vessels • Support vessel(s) will scout within the MSS operational areas to ensure that possible spatial conflicts between seismic source and other vessels are avoided • Bridge-watch on all support vessels 24 hours per day • Navigation equipment and vessel procedures compliant with all marine navigation and vessel safety requirements under the International Convention of the Safety of Life at Sea (SOLAS) 1974 and Navigation Act 2012 (or equivalent) • Vessels equipped with an automatic identification system (AIS) and an ARPA system which can identify, track and project the closest approach for any vessel (time and location) within the operational area and radar range (<70 km away). • Support vessel(s) will remain in communication with survey vessel at all times and with other 3rd party vessels in the vicinity where

Hazard	Risk Treatment Avoidance, Mitigation & Management Controls
	necessary to prevent interference • Deck lighting managed in accordance with Environmental Requirements for offshore marine vessels (AE-91-IQ-202) which requires: o No floodlights permitted unless essential as directed by vessel master o Restrictions on lighting within 10 km of islands/ mainland in August to April (not applicable given distance to shore) To minimise potential impacts on marine fauna • Deck lighting managed in accordance with (AE-91-IQ-202) or Vessel Master safety direction
Artificial Lighting Impacts	• Deck lighting managed in accordance with Environmental Requirements for offshore marine vessels (AE-91-IQ-202) which requires: o No floodlights permitted unless essential as directed by vessel master o Restrictions on lighting within 10 km of islands/ mainland in August to April (not applicable given distance to shore) To minimise potential impacts on marine fauna. • Deck lighting managed in accordance with (AE-91-IQ-202) or Vessel Master safety direction. • Night-time in-sea equipment inspections avoided if practicable to reduce direct lighting onto marine waters.
Acoustic Disturbance from Seismic Source Arrays	• Implementation of Part A EPBC Act Policy Statement 2.1 for whales throughout survey duration, and for whale sharks during 1 April to 31 December including: • Continuous watch • Precaution zones: o observation zone (3 km); o low power zone (2 km); and o shutdown zone (500 m); • Use of soft starts on every occasion • Recommencement procedures • Low visibility / night time restrictions • Two dedicated MFO must be onboard the seismic survey vessel during seismic operations with at least one MFO observing for Humpback Whales and Blue Whales during daylight hours • If the survey is required to shutdown/power-down 3 or more times per day for 3 consecutive days as a result of sighting Humpback Whales and Blue Whales, then the seismic operations must not be undertaken thereafter at night-time or during low visibility conditions. • Seismic operations cannot resume at night-time or during low visibility conditions until there has been a 24 hour period, which included seismic operations during good visibility conditions, during which no shutdowns/power-downs have occurred for Humpback Whales and Blue Whales sightings • Continual observations for whale sharks will be undertaken on the survey vessel during data acquisition;

Hazard	Risk Treatment Avoidance, Mitigation & Management Controls
	• MFO to observe for whale sharks during 1 August to 31 October, MFO's will observe for whale sharks at all times; • During the pre-start observation period for cetaceans, observations for whale sharks will be undertaken during the final 10 minutes within shutdown zone; • Start-up will be delayed or stop work procedure will be implemented if a whale shark is observed in the shutdown zone; • Following a whale shark initiated start-up delay or stop work procedure, operations will only commence after the whale shark is observed to either move outside the shutdown zone or if 10 minutes has passed since the last sighting; and • During 1 August to 31 October, if whale sharks are observed within 500 m of seismic source, observation, low power and shut down zones must be implemented in accordance with Part A of EPBC Policy Statement 2.1 • Relevant personnel (including MFOs) trained in application of EPBC Policy Statement 2.1 Part A: Standard Management Measures • Use of smallest possible seismic source to meet geophysical objections of the survey • Crew will operate vessels in accordance with Part 8 of the EPBC Regulations 2000, and Apache Whale Interaction and Sighting Procedure (EA-91-11-003), the vessels must not: o Travel at greater than 6 knots within 300 m (caution zone) of a cetacean or whale shark known to be in the area. o Approach closer than 100 m of a cetacean or whale shark known to be in the area o If a dolphin approaches the vessel or comes within 100 m the vessel master must not change the course or speed of the vessel suddenly • Binoculars and Marine Fauna Sighting Datasheet available on all vessels • Apache Marine Fauna Sighting Datasheets completed and submitted to DoE • All crew must attend an environmental induction containing basic information on procedures to manage interactions between survey vessel and marine fauna
Acoustic Disturbance from Vessel / Helicopter Operation	• Noise emissions minimised by maintaining vessel machinery/equipment in accordance with vessel planned maintenance system. • In accordance with Part 8 of the EPBC Regulations 2000, and Apache Whale Interaction and Sighting Procedure (EA-91-11-003), the vessels must not: o Travel at greater than 6 knots within 300 m (caution zone) of a cetacean or whale shark known to be in the area. o Approach closer than 100 m of a cetacean or whale shark known to be in the area. o If a dolphin approaches the vessel or comes within 100 m the vessel master must not change the course or speed of the vessel suddenly. • Binoculars and Marine Fauna Sighting Datasheet available on all vessels. • Apache Marine Fauna Sighting Datasheets completed and submitted to DoE. • All crew must attend an environmental induction containing basic information on procedures to manage interactions between survey vessels and marine fauna.

Hazard	Risk Treatment Avoidance, Mitigation & Management Controls
	• Unless an action is reasonably necessary to prevent a risk to human health or to deal with an emergency, helicopters will operate in accordance with Part 8 of EPBC Regulations (Aircraft). In particular: o must not operate at a height lower than 1,650 feet (500 m) or within a horizontal radius of 500 metres of a cetacean; o must not allow the aircraft to approach a cetacean from head on; and o must not land the aircraft on water so that the aircraft comes within a 500 m radius of the cetacean (if the aircraft can land on water).
Oily Water Discharges	• Oily water discharged to marine waters through filtering equipment in accordance with Regulation 15 of MARPOL Annex I: o Oily water discharged to sea after passing through filtering equipment has an oil content not exceeding 15 parts per million (ppm) o 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 o 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 planned maintenance system to ensure oil content is not exceeding 15 parts per million (ppm) • All transfer and movement of oil is recorded in the vessel's oil record book
Liquid Discharges	• Treated sewage discharge procedures compliant with Regulation 11 of MARPOL Annex IV • Untreated sewage is discharged at a distance of > 12 nm from Territorial Sea Baseline 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 • Maximum carrying capacity of the sewage system is not exceeded • As per MARPOL Annex IV / AMSA Marine Order 96 any vessel licensed to carry more than 15 persons will have an International Sewage Pollution Prevention certificate • Food waste collected, stored, macerated 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: o Discharged > 12 nm from Territorial Sea Baseline Discharged at least 3 nautical miles from the nearest territorial baseline if macerated to 25 m or less • Macerator capable of reducing food to 25 mm or less that is installed and is maintained in accordance with planned maintenance system • 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 planned maintenance system

Hazard	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	• Vessel machinery maintained in accordance with the vessels planned maintenance system • Vessel engines meet NOx emission levels as required by Regulation 13 of MARPOL Annex VI • Sulphur content of MGO/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 • ODS managed in accordance with Regulation 13 of MARPOL Annex VI • ODS only handled by a qualified or experienced tradesperson

Table 6-2: Environmental risk assessment summary for non-routine events

Hazard	Risk Treatment Avoidance, Mitigation & Management Controls
Hydrocarbon Spill from Vessel Collision	• Navigation equipment and vessel procedures compliant to AMSA: o Marine Orders Part 27 – Radio Equipment o Marine Orders Part 21: Safety of Navigation and Emergency Procedures o Marine Orders Parts 3 and 6 – Seagoing Qualifications and Marine Radio Qualifications • AMSA Marine Order Part 30 – prevention of collisions. Navigational lighting requirements will be adhered to • All vessels undergo an International Marine Contractors Association (IMCA), Common Marine Inspection Audit (CMID) or OCIMF 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 crew qualified by an accredited trainer • Implementation of the simultaneous operations (SIMOPS) plan to manage interactions between two or more vessels • Notification provided to key stakeholders including relevant Australian Government agencies • Use of MGO over more persistent hydrocarbons e.g. HFO • AEL will identify weather sensitive activities and discuss with contractor limits which ensure weather windows are identified prior to commencing activities • Tier 2/3: Oil spill response executed in accordance with the oil spill contingency plan (OSCP) • Tier 1: Oil spill response executed in accordance with the vessel's Shipboard Oil Pollution Emergency Plan (SOPEP) as required under MARPOL • Spill response exercise conducted in accordance with the SOPEP requirements and conducted prior to the commencement of the activity • All crew must attend an environmental induction containing basic information on spill response measures • 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.
Hydrocarbon spill during at sea refuelling	• Fuel transfer will take place as per Apache endorsed refuelling procedures and will include the following as a minimum: o Refuelling to occur only during daylight hours o Use of certified hoses for fuel transfer o Visual inspection of dry break couplings and hoses o Dry break coupling fitted on fuel supply vessel o All refuelling hoses are fitted with breakaway couplings and are buoyant or fitted with floats o Adequate bunding beneath the refuelling hose connections on the survey / support vessels o Fully manned and continuously monitored operation

Hazard	Risk Treatment Avoidance, Mitigation & Management Controls
	• MGO compliant with MARPOL Annex VI Regulation 14.2 (i.e. sulphur content of less than 3.50% m/m) is the only fuel recorded on vessel fuel bunkering register • MGO only used • 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 • Vessels fitted with oil filtering equipment in accordance with Regulation 14 of MARPOL 73/78 Annex I • Tier 2/3: Oil spill response executed in accordance with the oil spill contingency plan (OSCP) • Tier 1: Oil spill response executed in accordance with the vessel's Shipboard Oil Pollution Emergency Plan (SOPEP) as required under MARPOL • Fuel storage tanks and fuel transfer hose maintenance undertaken in accordance with the vessels planned maintenance system • Spill response exercise conducted in accordance with the SOPEP requirements and conducted prior to the commencement of the activity • All crew must attend an environmental induction containing basic information on spill response measures • All crew involved in refuelling will adhere to Apache endorsed vessel fuel bunkering procedure with a PTW completed • In line with MARPOL 73/78 Annex 1, vessels over 400 gross tonnage will have a current SOPEP/ and IOPP in place • Refuelling will be undertaken >12 nm from the nearest territorial baseline
Environmentally Hazardous Chemical and Hydrocarbon Spills from Marine Operations	• 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 chemicals or hydrocarbons will be stored in a continuously bunded area • 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 • Spill clean-up equipment located where environmental hazardous chemicals and hydrocarbons are stored and frequently handled • Scupper plugs deck drainage control measures available where chemicals and hydrocarbons are stored and frequently handled • Only non-hazardous, biodegradable detergents used for deck washing • Environmental hazardous chemical and hydrocarbon leaks and spills on the vessel immediately cleaned up (including in deck bunds), and contaminated material contained securely onboard and treated as hazardous waste • Shipboard oil spill response executed in accordance with the vessel's current (<12 months) Shipboard Oil Pollution Emergency Plan (SOPEP) as required under MARPOL 73/78 • Oil spill response executed in accordance with the oil spill contingency plan (OSCP) • All crew must attend an environmental induction containing basic information on chemical and hydrocarbon management, as well as spill prevention

Hazard	Risk Treatment Avoidance, Mitigation & Management Controls
	and response measures • Spill response exercise conducted in accordance with the SOPEP requirements and conducted prior to the commencement of the activity
Non-hazardous and Hazardous Solid Waste	• Non-hazardous and hazardous wastes collected, labelled, segregated, stored, processed and disposed of in accordance with the survey / support 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 • Incinerator operated in accordance with Regulation 16 of MARPOL Annex VI • All crew must attend an environmental induction containing basic information on waste management • 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, labeled and stored onboard within secondary containment (e.g. bin located in a bund)
Seismic Streamer Release	• Seismic streamers undergo regular inspection and planned maintenance system checks on streamer towing systems for wear and damaged components. These components are replaced on an 'as required' basis • A secondary retaining/attachment device is utilized • Solid-filled seismic streamer contains buoyancy devices and is fitted with maker buoys • Procedures for streamer deployment and retrieval are reviewed and approved by Apache prior to their use • Notification provided to key stakeholders including relevant Australian Government agencies
Hydrocarbon and Chemical Spill Response	• 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.

7. MANAGEMENT APPROACH

The Bianchi seismic 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 non-routine events associated with the 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 survey activities are summarised in **Section 6**. 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.

During the period that activities described in this EP are undertaken, Apache will ensure environmental performance is managed through an inspection and monitoring regime undertaken by Apache representatives or vessel master based on the vessels. This will include daily, weekly and monthly monitoring and is recorded via a number of checklist and inspection documents that are sent to the Apache HSE Manager or delegate. Feedback from the ongoing monitoring also informs the environment plans developed for oil and gas activities, through the risk assessment stage, and the internal review of these documents prior to submission, providing opportunity for continuous improvement.

Non-conformances (non-conformances relate to not complying with the intent of environmental performance objectives and/or performance standards) from audits are formally documented in an audit report and distributed to the Apache Project Manager, Apache HSE Manager, Client Site (Apache) Representative and Offshore Contractor Representative. An end-of-activity environmental performance report will be produced which will include a 'lessons learnt' section to help facilitate continuous improvement for future projects.

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. HYDROCARBON SPILL RESPONSE ARRANGEMENTS

Credible hydrocarbon spill scenarios are identified in the EP including:

Tier 1: small spill from vessel (<1m^3)

Tier 2: spill from vessel such as during refuelling

Tier 3: vessel collision resulting in a ruptured fuel tank

In the event of a spill, initial actions will be undertaken by the Vessel Master in line with the vessel Shipboard Oil Pollution Emergency Plan (SOPEP). Should the spill require further action, such responsibilities will be taken over by the Combat Agency. For Commonwealth waters, subsequent actions determined by the Combat Agency (Australian Maritime Safety Authority – AMSA) under the National Plan to Combat Pollution of the Sea by Oil (NATPLAN), with regard to the potential impacts posed by the spill. If surface slicks appear likely to enter WA State waters, then subsequent actions will be determined in consultation with the WA Department of Transport (DoT) under the State Emergency Management Plan for Marine Oil Pollution (WestPlan – MOP).

Apache would provide support to the Combat Agency or hazard management agency (HMA) from the resources and capabilities. In the event of an incident, the Apache Incident Management team (IMT) would be mobilised. The Apache IMT would establish communications with the Combat Agency. Mobilisation of Apache resources would be made by Apache on request from the AMSA Incident Controller (IC) or, in the event that State waters were under threat, the HMA IC.

Response strategies that may be considered include monitor and evaluate, mechanical dispersion, oiled wildlife response, nearshore deflection and protection and shoreline clean up. Decision on whether to implement (and subsequently terminate) any response strategy is managed by the appropriate Combat Agency.

8.1.1 Summary

The oil spill response arrangements for the proposed activity, taking into account the nature and scale of the activity and the potential spill risks involved, comprises the vessel SOPEP, supported as required by applicable established, statutory OSCPs:

- Vessel SOPEP - Deals with spills which are either contained on the vessel or which can be dealt with from / by the vessel.
- National Plan (NATPLAN): AMSA will be the designated combat agency for oil spills from vessels within the Commonwealth jurisdiction. Upon notification of an incident, AMSA will assume control of the incident as the Combat Agency
- AMSA will be notified immediately of all vessel based incidents through the Rescue Coordination Centre (RCC) Australia
- WestPlan-MOP and MOSCP: WA DoT will be notified of incidents immediately through the Oil Spill Response Coordination (OSRC) unit 24 hour reporting number
- Additional support will be made available by Apache to the relevant Combat Agency or HMA as required

9. CONTACT DETAILS

Further information about the Bianchi Seismic Survey activity can be obtained from:

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