



Brunello Continuation Drilling (Revision 4 of Balnaves Deep 2/3)

Environment Plan Summary

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1. INTRODUCTION

Apache Energy Ltd (Apache) proposes to continue the development of the Brunello gas field within WA-49-L, in the Northern Carnarvon Basin of the North West Shelf (NWS) (Error! Reference source not found.). Previous drilling undertaken to date to develop the Brunello gas field has included the appraisal drilling of Balnaves Deep-2/3 and drilling intermediate sections of the Brunello production wells (BruA-2, BruA-3, BruA-4, Bru-A5). The Environment Plan, Revision 4 (EA-72-RI-002), covers the complete abandonment of the Balnaves Deep-2/3 well and the continuation of drilling of the intermediate sections of the Brunello wells to intersect the top of the reservoir, referred to throughout this document as Brunello continuation drilling.

The primary objective of the Brunello continuation drilling is to progress the development of the Brunello gas field and extract hydrocarbons from the Mungaroo Sandstone. Each previously suspended Brunello well will be re-entered and the intermediate hole section drilled from the previously installed surface casing shoe depth to planned depth for intersecting the Mungaroo reservoir. On reaching the planned depth, the intermediate casing string will be installed, cemented and the well suspended for future re-entry

Apache undertakes this activity as the operator of the WA-49-L permit, with its subsidiary Apache Julimar Pty Ltd holding a 65% share, and its joint venture partner Kufpec Australia (Julimar) Pty Ltd (35%) holding the remaining portion of the permit.

1.1 Schedule

Brunello continuation drilling of the intermediate sections will take approximately 60 days and is scheduled to commence as early as June 2013, depending on weather delays, rig availability and drilling schedules.

1.2 Compliance

The EP has been prepared to comply with the Commonwealth Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 (OPGGS (E)). The EP has been reviewed and accepted by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) on the 13th June 2013.

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

2. LOCATION OF THE ACTIVITY

The Brunello production wells are located approximately 49 km northwest of the Montebello Islands and 77 km northwest from Varanus Island in approximately 148 m of water depth (**Figure 2-1**).

The wells are located within a 100m radius of the drill centre/manifold at the location coordinates in **Table 2-1**.

Table 2-1: Surface locations for the drilling activity infrastructure

Parameter	Coordinates (Datum/Projection: GDA 94 Zone 50)			
	Latitude	Longitude	Easting	Northing
Brunello Drill Centre	-20° 01' 49.08"	115° 12' 06.87"	311 922.40	7 784 154.70

A 500 m petroleum safety zone around the Mobile Offshore Drilling Unit (MODU- *Atwood Falcon/Eagle*), when stationary onsite at the drill location, defines the exclusion zone and operational area for the drilling activity.

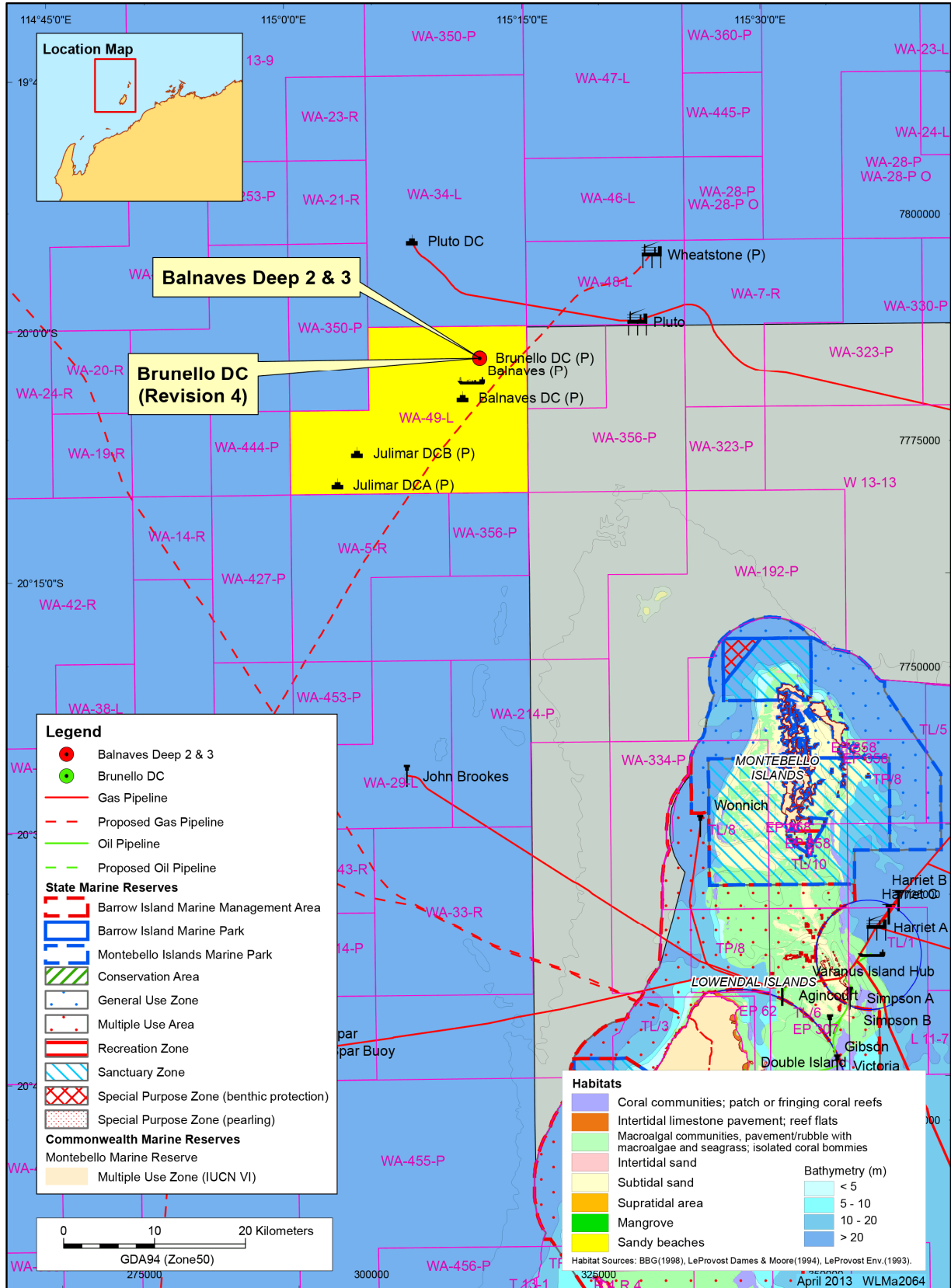


Figure 2-1: Location map for the Brunello Continuation Drilling Activity

3. DESCRIPTION OF THE RECEIVING ENVIRONMENT

3.1 Physical Environment

The drilling activity is located on the North West Shelf. The region is typical of the arid tropics; high summer temperatures, periodic cyclones and associated rainfall. Rainfall is generally low although intense rainfall may occur during passage of summer tropical cyclones. 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). Vertical gradients are correlated to sea surface temperatures, and are greatest during the warm-water season (SSE, 1991). Near bottom water temperature is approximately 23°C, with no discernible seasonal variation.

Wind shear on surface waters generates local-scale drift currents that can persist for extended periods (hours to days). Wind data from 2004-2009 sourced from the National Centre for Environmental Predictions at coordinates 20° S, 115° E (the nearest node to the activity location) provides a guide to the wind conditions expected during the project (APASA, 2011). During September–March, the prevailing non-storm winds are from the southwest ranging up to a maximum speed of ~30 knots. Winds from the southwest direction are generally strongest between September and January with wind speed frequently reaching 24 knots and weaker between February and March; with wind speed generally less than 16 knots (APASA, 2011). During April–August, winds are generally lighter and more variable in direction. Non-storm winds prevail from the east-south quadrant and can attain a maximum speed of up to 30 knots, but are generally less than 16 knots, particularly during April and May (APASA, 2011). Extreme wind conditions in the area may be generated by tropical cyclones, strong easterly pressure gradients, squalls, tornados and water spouts.

The wave climate is generally composed of locally generated wind waves (seas) and swells that are propagated from distant areas (WNI, 1995; 1996). In summer, seas typically approach from the west and southwest. Mean sea wave heights of less than 1 m with peak heights of less than 2 m are experienced in all months of the year (WNI, 1995). Tropical cyclones have generated significant swell heights of up to 5 m in this area, although the predicted frequency of swells exceeding 2 m is less than 5% (WNI, 1995).

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 Indonesian Throughflow is the other important current influencing the upper 200 m of the outer NWS (Woodside, 2005).

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, 2011).

3.2 Biological environment

Benthic habitats within the exclusion zone comprise soft sediments and associated benthic fauna. Soft sediments support a diverse benthic infauna consisting predominantly of mobile burrowing species which include molluscs, crustaceans (crabs, shrimps and smaller related species), polychaetes, sipunculid and platyhelminth worms, asteroids (sea stars), echinoids (sea urchins) and other small animals.

Within the wider zone of potential impact (ZPI), benthic habitats including coral reefs, macroalgae, seagrasses, hard substrate and supported assemblages are also found. These habitats are found near the shoreline around many of the smaller islands along the coast such as Barrow/Montebello Islands. Other habitats within the ZPI include mangroves, sandy beaches, intertidal and subtidal zones and rocky shorelines. In addition, marine protected areas occur within the ZPI.

The drilling activity is located in Commonwealth waters, offshore from the WA mainland. Significant features in the region include Varanus Island (77 km SE), Montebello Marine Park (boundary 41 km SE),

Barrow Island (75 km SE), Montebello and Lowendal Island group (49km SE), and the Ningaloo World Heritage Area (188 km SW).

An EPBC Act Protected Matters search (DSEWPaC, 2013) identified 14 Key Ecological Features (KEF) (parts of the marine ecosystem that are considered to be important for the biodiversity or ecosystem functioning and integrity of the Commonwealth Marine Area) within the ZPI. The EPBC search of the ZPI identified 120 listed marine species and 40 whales and other cetaceans. Of these listed species, 29 threatened species (endangered or vulnerable) of marine fauna were identified, 21 of which are also migratory species. A further 23 species were listed as migratory marine species. The species listed, or habitat important for these species, may occur within the predicted ZPI impact as a result of a loss of well control.

3.3 Socio-economic environment

Both the offshore and coastal waters in the NWC Region support a valuable and diverse commercial fishing industry, mainly dominated by the Pilbara fisheries. The North West Slope Trawl Fishery (NWSTF) is the only Commonwealth licensed fishery with historical effort operating within the vicinity of the operational boundary. However, AFMA logbook data for 2008-2010 indicates that no vessels reported operating within the operational boundary or ZPI (C. Munn, *pers. comm*, AFMA, 2011). Other Commonwealth fisheries, such as the Western Tuna and Billfish Fishery (WTBF), Southern Bluefin Tuna Fishery (SBFTF) and the Western Skipjack Tuna Fishery (WSTF) although licenced to fish within the operational boundary and ZPI, have had no recent fishing effort reported. The Western Deepwater Trawl (WDTF) has reported effort within the ZPI with 34.3 tonnes reported for the 2009/2010 season (AFMA, 2011)

In addition, 13 State managed fisheries have boundaries that overlie or are in close proximity to part or all of the operational boundary and the ZPI (Fletcher and Santoro, 2012): Onslow Prawn Managed Fishery (OPMF), Mackerel Fishery, Pilbara Demersal Scalefish Fishery (Trap and Trawl), Pearl Oyster Managed Fishery, North Coast Shark (closed), Shark Bay Prawn and Scallop Managed Fishery, Exmouth Gulf Prawn Managed Fishery, Gascoyne Demersal Scalefish Managed Fishery, West Coast Rock Lobster, Roe's Abalone, Beche-de-mer Fishery, Octopus, West Coast Deep Sea Crab (Interim) Managed Fishery, Marine Aquarium Fish Fishery, and Specimen Shell Managed Fishery.

The ZPI falls primarily within the North Coast Bioregion, but also extends into Gascoyne Bioregions (Fletcher and Santoro, 2012). Within the North Coast Bioregion, recreational fishing is experiencing significant growth, with a distinct seasonal peak in winter when the local population increases significantly from tourists visiting the Exmouth/Onslow area and Dampier Archipelago (Fletcher and Santoro, 2012). Offshore islands, coral reefs and continental shelf provide species of major recreational interest (DoF, 2011). However, recreational fishing within the exclusion zone is unlikely given the distance offshore.

There are no recognised shipping routes in or near the drilling location. The nearest designated shipping route is approximately 40 km northwest of the drilling activity location (AMSA, 2012).

The drilling location is approximately 20 km northeast of the Julimar gas field. Both of these fields will be developed by Apache to supply gas to Chevron's Wheatstone Project. The defined area for the activity is located approximately 1.5 km northwest of the proposed 44" (1.1 m) diameter gas pipeline from the Wheatstone offshore facilities to the proposed LNG plant at Ashburton on the mainland.

Tourism activities are concentrated in the vicinity of Exmouth, Dampier, Onslow, Carnarvon, Shark Bay (Monkey Mia) Point Samson and Port Hedland. In the waters immediately surrounding the operational boundary, tourism activities are limited due to its distance from the mainland and island shorelines.

There are no World Heritage, Commonwealth Heritage or National Heritage sites, or Wetlands of International Importance (Ramsar sites) in or adjacent to the operational boundary. The nearest sites are the World and National Heritage Sites Ningaloo Coast (188 km SW) and Shark Bay (550 km SW), Commonwealth heritage sites Ningaloo Marine Area (205 km SW) and Mermaid Reef (570 km NE). No registered Aboriginal heritage sites are located within or in close proximity to the drilling activity location.

One shipwreck listed on the RNE as historic places is located within the ZPI, the *Trial*.

4. DESCRIPTION OF THE ACTIVITY

The activity covered by this EP includes the abandonment of Balnaves Deep 2/3 and the continuation of Brunello BruA-2,4 and 5. The work will be undertaken with either the *Atwood Falcon* or *Atwood Eagle* semi-submersible Mobile Offshore Drilling Units (MODU). The two main vessels currently supporting the *Atwood Falcon* are the DOF Subsea *Skandi Atlantic* and *Pacific Hornbill*. If the *Atwood Eagle* is utilised and/or these vessels are unavailable or further support vessels are required which are new to the drilling campaign, they will be obligated to meet certain requirements prior to mobilising to the MODU location including if they are sourced from outside Australian waters.

Balnaves Deep 2/3

Balnaves Deep 2/3 has now been assessed as not suitable for future use and will be abandoned in accordance with the accepted WOMP (*Well Operation Management Plan (DR-91-ZG-138)*). Cement plugs will be set at various depths in the well bore to seal the well, the casing and wellhead will be cut off below the surface of the seabed and all seabed obstructions will be removed. A remotely operated vehicle will then be used to survey the seabed to ensure that no debris remains from the operations.

Apache requires two barriers between the environment and hydrocarbon flow to be maintained during drilling and completion activities, and suspension and abandonment periods. The two barrier philosophy is described in the *Apache Drilling and Completions Barrier Standard (Document No: AE-91-ID-004, Section 11)*.

Brunello continuation drilling

Brunello continuation drilling will be drilled in accordance with the NOPSEMA accepted WOMP (*Julimar Brunello Gas Field Development Phase 1 Drilling and Suspension, DR-91-ZG-139 Rev 1.1*).

The intermediate hole sections will be drilled to their planned depths from the semi-submersible MODU anchored at the Brunello drill centre location (i.e. over the proposed manifold location) allowing drilling operations for the wellbores to be re-entered, drilled and suspended in a single phase utilizing batched operations. The subsea wellhead layout has been designed to allow the MODU to be repositioned over all well slots without pulling anchors

5. ENVIRONMENTAL HAZARDS AND CONTROLS

The environmental risk assessment for operational activities and unplanned events associated with the drilling activity centred on a hazard identification workshop. The workshop, held on the 17th July 2012 was attended by a subset of Apache's environmental scientists and drilling personnel. 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 Brunello continuation drilling workshop.

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

The environmental risk assessment identified nine routine environmental risks and seven non-routine (unplanned events) environmental risks. These environmental risks and control measures to be applied to the drilling activity are provided in **Section 9**. 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.

6. MANAGEMENT APPROACH

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

The objective of the EP is to ensure that potential adverse environmental impacts associated with routine operational events and unplanned events associated with the drilling activity, 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 drilling activity are summarised in **Section 9**. The EP also identifies the specific measurement criteria and records to be kept to demonstrate the achievement of each performance objective.

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

1. Details on the systems, practices and procedures to be implemented;
2. Key roles and responsibilities;
3. Training and competencies;
4. Monitoring, auditing, management of non-conformance and review;
5. Incident response including an OSCP (*Brunello Drilling OSCP* (EA-72-RI-004/2))
6. Record Keeping; and
7. Consultation.

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

7. 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 (e.g., gas processing facilities at Devil Creek and Varanus Island) 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. As the modelled Zone of Potential Impact boundary for the drilling activity crosses into State waters, additional stakeholders were identified as requiring a copy of the oil spill contingency plan. These stakeholders include DEC and DoT. Apache engages regularly with DEC and DoT regarding the appropriateness of the proposed oil spill response strategies, as described in the OSCP, in parallel with NOPSEMA’s assessment of the Environment Plans.

Relevant stakeholders identified for the drilling activity based on the defined operational area are summarised in **Table 7-1**.

Table 7-1: Summary of stakeholders relevant to the drilling activity

Group	Stakeholder
Commercial fisheries	<ul style="list-style-type: none"> • 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. • WA Seafood • Pearl Producers Association • Individual fishing licence holders
Recreational fisheries	<ul style="list-style-type: none"> • WAFIC • Recfishwest
Marine conservation	<ul style="list-style-type: none"> • Commonwealth Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC). • Department of Environment and Conservation (DEC).
Marine activities, spill response and safety	<ul style="list-style-type: none"> • Australian Maritime Safety Authority (AMSA). • Department of Mines and Petroleum (DMP); • Department of Defence • Department of Transport (DoT).

Apache has commenced with issuing quarterly updates to relevant stakeholders. These updates consist of details for the ongoing, plus proposed upcoming activities on the NWS for the next 3-6 months. This update provides the stakeholders with information inclusive of proposed activity, activity location and the activity duration, and gives the stakeholders an opportunity to request additional information on the specific activities that may be of interest to them. The quarterly update issued in March 2013, included this drilling activity.

During the consultation process, where stakeholders have raised queries, Apache has conducted additional meetings and provided additional information in response to the stakeholder queries.

8. CONTACT DETAILS

Further information about the Brunello Continuation drilling activities can be obtained from:

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9. MANAGEMENT CONTROLS FOR THE DRILLING ACTIVITY

The following tables (**Table 9-1** and **Table 9-2**) summarise the control measures corresponding to the potential environmental hazards identified for the drilling activity which eliminate or reduce the environmental risks to ALARP.

Table 9-1: Management controls for planned events during drilling activity

Hazard	Management Controls
Seabed disturbance	<ul style="list-style-type: none"> • Support vessels do not anchor within the exclusion zone. • Site surveys indicated that there are no raised seabed features or geological formations of concern for the safe movement of the MODU including features associated with KEFs. • The MODU is moved to and positioned on location in accordance with Atwood’s Marine Operations Manual (FAL-OPS-MAN-1201) and mooring analysis specific to the wells. These procedures are reviewed and approved by Apache prior to their use. • While at the drill centre location where the three hole sections will be drilled, the MODU will kedge (skidding – by increasing/decreasing tension of the anchor chain/wires) between well locations negating the need to move anchors for each of these wells. Prior to kedging the MODU between wells Atwood’s Safe work Procedure for Hopping between wells is to be adhered to with all moves recorded on the MODU vessel log. A JSA and PTW will be completed for the activity as per the SWP • To minimise potential disturbance to the seabed the following measures will be in place: <ul style="list-style-type: none"> ○ Loss of position while cross-tensioned anchors are in place is constantly monitored using the onboard seabed acoustic monitoring system; ○ The MODU monitors and records anchor tensions every three hours in the Deck Log; and ○ If constant slippage is experienced anchor holding power can be increased by changing the angles of the flukes or by piggy backs. • The MODU HSE Case includes Lifting Operations and Materials Handling procedures • Lifting equipment has current and valid certifications • During mobilisation/demobilisation and kedging all equipment and gear on MODU and support vessels are securely sea fastened. • Detailed records of equipment lost overboard will be recorded • Mitigation measures for equipment handling and lifting procedures are included in Job Safety Assessments to minimise dropped objects entering the marine environment • An ROV survey of the seabed will be completed at the end of the drilling activity to check for and retrieve dropped objects • Planned maintenance undertaken on material handling and lifting equipment undertaken in accordance with the MODU PMS • Crew members involved with lifting and offloading equipment from the MODU will be trained in Atwood Lifting Tackle Procedures and DROPS awareness and be aware of lifting and offloading requirements. • Transfer of chemicals and hydrocarbons will only be carried out under suitable conditions at the discretion of both the MODU’s OIM and the vessel master and will be monitored at all times by competent MODU and vessel crew

Hazard	Management Controls
Artificial light	<ul style="list-style-type: none"> • MODU and support vessel deck lights will be switched off and spot lights directed inboard to reduce light spill onto marine waters unless inconsistent with navigation and vessel safety standards. • Night-time activities will be avoided, if practicable, to reduce direct lighting onto marine waters.
Noise emissions	<ul style="list-style-type: none"> • MODU and support vessel machinery will be regularly maintained to reduce noise emissions to marine waters. • The interaction of all support vessels with cetaceans and whale sharks will be consistent with Part 8 of the EPBC Regulations. • Fauna observation kits will be available on MODU and all vessels. All cetacean and whale shark sightings will be recorded on the Apache Marine Fauna Sighting Datasheet with data submitted to DSEWPaC. • All crew will attend an environmental induction containing basic information on procedures to manage interactions between vessels and marine fauna. • Helicopters will maintain industry accepted horizontal, altitude and hovering exclusion zones. The helicopter exclusion zones will be consistent with the Australian National Guideline for Whale and Dolphin Watching (2005)
Discharge of SBM drill cuttings and fluids	<ul style="list-style-type: none"> • Apache drilling fluid selection process ensures biodegradable water based fluids selected wherever possible, however, SBMs are used when technically and geologically justified, or when it reduces activity duration • Through a risk based approach, select chemicals which have the least environmental impact in terms of ecotoxicity, biodegradation and bioaccumulation. • SBM stored in bunded areas where collected liquids are vacuumed and re-used where possible or directed for treatment and disposal. • Locking of overboard dump valves on mud pits to prevent accidental discharge. • Permit to Work required to unlock dump valves. • Plugging of deck drains while using SBM to prevent direct losses from drill floor and MODU floor flood test undertaken with water prior to commencement of drilling programme. • Optimisation of well design to minimise number of strings of casing. • SBM cuttings will be treated through a dryer and centrifuge system to ensure oil on cuttings is <10%. • When SBM and base oil tanks are required for other purposes, (e.g. for mixing WBM) the SBM and/or base oil will be back loaded to supply vessels and the tanks and mixing and transfer lines will be cleaned. • No whole SBM is disposed of overboard. • Shaker screens are selected by mud engineer and inspected minimum once daily once BOP and riser are in place. • Mud logging units and cuttings dryer, shaker and centrifuge systems maintained in accordance with PMS. • Mud logging unit calibration is checked bi-weekly and recalibration only required if the calibration is out following this check • Cuttings dryer and centrifuge system are inspected as a minimum at the end of each section, when operational • Use of drilling fluids recorded in daily mud reports. • Regular inspection of cuttings management equipment. • A PVT (pit volume totaliser) measures the volumes of SBM within the system components, individual components also fitted with volume measuring devices, these volumes are recorded in the Daily mud report. • End of well report confirms estimated volumes of drilling fluid used. • Once a week the daily mud report will include a record of when the calibration of mud loggers was last checked • Crew involved with base oil transfer follow MODU mud transfer procedures.

Hazard	Management Controls
Discharge of cement	<ul style="list-style-type: none"> • Through a risk based approach, select chemicals which have the least environmental impact in terms of ecotoxicity, biodegradation and bioaccumulation. • Bulk cement will not be discharged overboard except in emergency. • Bulk transfer procedure, storage and handling facilities on the rig • Only the required volume of cement will be brought on board the MODU (plus allowable contingency) in accordance with the cement program • Cement additives stored in bunded areas, if spillage occurs, collected liquids are vacuumed and reused where possible, or directed for treatment and appropriate disposal. • Cement discharged at seabed during cementing of conductor. All other returns discharged at sea surface. No discharge of cement without treatment when using SBM. • Residual cement will be discharged to sea following treatment to ensure oil on cuttings is <10% • When using SBM, liquid or semi liquid cement that returns to surface or is flushed during tank/pipe cleaning will be diverted overboard and OOC measurements will be taken and included in the interval totals • Hard cement which returns to surface and is removed at the shale shakers will be diverted overboard, the OOC will be measured and included in the interval totals when using SBM. • Mix and use cement as required to reduce wastage. Cement volume requirements are calculated using the volume of cement necessary plus industry accepted excess volumes to meet the downhole requirements and minimise surface discharges. Calliper logs will be used for this calculation when available • Shaker system maintained in accordance with PMS. • Routine inspection of cuttings management 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 • Oil on cuttings of cement recorded while using SBM. Oil on cuttings <10% for the interval average. • Apache <i>Synthetic Discharge Report</i> is completed daily. • Actual cement product and additive usage recorded on Apache Cement “Open wells” report within 48 hours of cement job.
Planned discharges	<ul style="list-style-type: none"> • Untreated sewage stored and disposed in accordance with MARPOL Annex IV; Treated sewage discharged in accordance with MARPOL Annex IV. Sewage system compliant with MARPOL Annex IV. • Sewage system maintained in accordance with manufacturer’s specifications • Vessel masters ensure maximum carrying capacity not exceeded. • Food waste collected, stored, processed and disposed in accordance with MODU/support vessel Garbage or Waste Management Plan. Placards will be displayed to provide guidance on garbage disposal requirements • Offshore food waste disposal in accordance with MARPOL Annex V. • Food macerators capable of macerating food to 25 mm or less and maintained to manufacturer specifications. • Food waste not discharged or incinerated stored and disposed at approved onshore facility. • The MODU will hold oily bilge water onboard and dispose of the oily water on return to port. Onshore oily water disposal will be at a

Hazard	Management Controls
	<p>reception facility or to a carrier licensed to receive the waste oil and details recorded in Oil Record Book</p> <ul style="list-style-type: none"> • Support vessels will not discharge oily water within the operational area
Air emissions	<ul style="list-style-type: none"> • No incineration will occur onboard the MODU and support vessels will not use incinerators within the 500 m operational boundary. • Fuel oil will meet regulated sulphur content levels in order to control SOx and particular matter emissions. • Vessel engines will be operated in a manner to achieve regulated NOx emission levels. • Vessels will hold a valid and current International Air Pollution Prevention Certificate (IAPPC). • Ozone-depleting substances (ODS) will not be deliberately released in the course of maintaining, servicing, repairing or disposing of systems or equipment. All ODS recorded in ODS Record Book.
Interference with other users of the sea	<ul style="list-style-type: none"> • AHO, AMSA and commercial fishing stakeholders notified prior to moving to the drilling location. • Drilling activity follows all marine navigation and vessel safety requirements under the International Convention of the Safety of Life at Sea (SOLAS) 1974 and Navigation Act 1912. MODU and support vessels equipment and procedures comply with AMSA Marine Orders Part 30: Prevention of Collisions and Marine Orders Part 21: Safety of Navigation and Emergency Procedures. • MODU and support vessels equipped with an automatic radar plotting aid (ARPA) system capable of identifying, tracking and projecting the closest approach for any vessel (time and location) within the operational area and radar range (up to approximately 70 km). • Visual observations will be conducted by trained watch keepers on all vessels 24 hours per day. • Support vessels employed to aid the detection of other vessels and provide additional communication with other vessels where necessary. • The support vessels will assist in maintaining the requested clearance of 500m around the MODU.

Table 9-2: Management controls for unplanned events during drilling activity.

Hazard	Management Controls
Solid waste discharges	<ul style="list-style-type: none"> • Non-biodegradable and hazardous wastes are collected, stored, processed and disposed of in accordance with the vessel’s Garbage Management Plan as required under Regulation 9 of MARPOL 73/78 Annex V • Accidental release of waste to the marine environment is reported, investigated, and corrective actions are implemented. • All crew will be required to attend an environmental induction containing basic information on waste management. • Hazardous wastes (e.g. used oils, lithium batteries, chemical and metallic wastes) will be segregated, labelled and stored on-board with secondary containment (e.g. bin located in a bund). • No incineration will take place onboard the MODU or on support vessels within the 500 m exclusion zone. • Solid non-biodegradable and hazardous wastes that cannot be incinerated will be disposed of onshore at a reception facility or to a carrier licensed to receive the waste if required by jurisdictional legislation.
Marine fauna collisions	<ul style="list-style-type: none"> • Fauna observation kits will be available on MODU and support vessels. • All cetacean and whale shark sightings will be recorded on the Apache Marine Fauna Sighting Datasheet with data submitted to DSEWPaC • All crew will attend an environmental induction containing basic information on procedures to manage interactions between MODU, support vessels and marine fauna. • Interaction of support vessels with cetaceans and whale sharks will be consistent with Part 8 of the EPBC regulations, including: <ul style="list-style-type: none"> ○ A vessel will not travel at greater than 6 knots within 300 m (caution zone) of a cetacean (or whale shark) known to be in the area. ○ A vessel will not approach closer than 100 m of a cetacean (or whale shark) known to be in the area. ○ 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.
Spillage of hydrocarbons environmentally hazardous chemicals and liquid waste to the sea	<ul style="list-style-type: none"> • All crew will be required to attend an environmental induction containing basic information on chemical and hydrocarbon management, and spill prevention and response measures. • An oil spill exercise will be conducted prior to the commencement of the drilling activity and at a minimum of every three months thereafter. • Training records show that MODU personnel who are involved in lifting and offloading are trained in Atwood <i>Lifting Tackle Procedure</i>. • Chemicals and hydrocarbons will be packaged, marked, labelled and stowed in accordance with MARPOL 73/98 Annex III regulations. Specifically, all chemicals (environmentally hazardous) and hydrocarbons will be stored in appropriately bunded areas • All hazardous wastes are stored onboard the rig in closed, secure and bunded storage facilities prior to transport back to shore for disposal/recycling/treatment in accordance with local regulations • A Material Safety Data Sheet (MSDS) will be available for all onboard chemicals and hydrocarbons. • Chemical and hydrocarbon storage areas will be frequently inspected (at least weekly). • Spill clean-up equipment will be located where chemicals and hydrocarbons are stored and frequently handled (i.e. ‘high risk’ areas). • Chemical and hydrocarbon spills will be immediately cleaned up and contaminated material will be contained onboard for onshore disposal

Hazard	Management Controls
	<ul style="list-style-type: none"> • All shipboard chemical and hydrocarbon spills will be managed in accordance with the Shipboard Oil Pollution Emergency Plan (SOPEP)/ Shipboard Marine Pollution Emergency Plan (SMPEP) and the <i>Brunello Drilling OSCP (EA-72-RI-004/2)</i> (the OSCP). • Scupper plugs or equivalent will be available on MODU and support vessel decks where chemicals and hydrocarbons are stored and frequently handled (i.e. 'high risk' areas). • Non-hazardous, biodegradable detergents will be used for deck washing • Any equipment or machinery with the potential to leak oil will be enclosed in continuous bunding • All vessel machinery and equipment containing hydrocarbons will be included on the vessel's PMS and maintained in accordance with manufacturer's specifications. • All hoses used for pumping and transfers are maintained and checked as per MODU's planned maintenance schedule (PMS) • Any oil or fuel transferred to an onshore, reception facility, another vessel or to a carrier is transferred in compliance with MODU procedures and bunkering procedures and the receiver of the oily waste must be licensed to receive it. • Left-over bulk drilling solids (e.g., barite, bentonite, cement) will be stored onboard and legally disposed of. • Uncontrolled discharge of dry cement dust will be prevented by blocking vents when bunkering is occurring and having a crew member posted at the vent during filling to oversee the operation • MODU will hold oily bilge water on-board and dispose of the oily water on return to port. Onshore oily water disposal will be at a reception facility or to a carrier licensed to receive the waste oil. • The vessel operator will record the quantity, time and onshore location of the oily water disposal in the vessel Oil Record Book. • Support vessels will not discharge oily water within the 500 m operational boundary
Hydrocarbon spill during at sea refuelling	<ul style="list-style-type: none"> • Fully manned operations. Fuel bunkering will cease by turning off pump if refuelling pipe ruptures. • Dry-break refuelling hose couplings and hose floats installed on refuelling hose assembly. • Marine diesel is the only fuel type used by support vessels. • Adequate bunding beneath refuelling hose connections on supply vessels and MODU. • Drains closed in fuel transfer areas to contain spills. • MODU and support vessels have valid and current International Oil Pollution Prevention Certificates • All shipboard chemical spills are managed in accordance with the SOPEP/SMPEP. • Spill response in accordance with <i>Brunello Drilling OSCP (EA-72-RI-004/2)</i> (the OSCP). • Diesel storage tanks and fuel transfer hoses maintained in line with vessel PMS. • Refuelling hoses on MODU replaced every six months. • MODU personnel involved with refuelling follow appropriate documentation and checklists which includes fuel transfer with a PTW reflecting the activity. • MODU safety case and safety case revision in place. • Vessels over 400 gross tonnes have current SOPEP/SMPEP in line with MARPOL Annex 1. • Vessels hold a valid International Oil Pollution Prevention certificate (IOPP)
Hydrocarbon spill from ruptured vessel fuel tank.	<ul style="list-style-type: none"> • AHO is notified of drilling activity prior to mobilisation to the location to enable a Notice to Mariners to be issued. • AMSA RCC is notified of drilling activity prior to mobilisation to the location to enable an AusCoast warning to be issued. • Consultation with other users, e.g. fishing industry prior to mobilisation to the location. • Vessel operations will be undertaken in accordance with all marine navigation and vessel safety requirements under the International

Hazard	Management Controls
	<p>Convention of the SOLAS 1974 and Navigation Act 1912. Vessels equipment and procedures comply with AMSA Marine Orders Part 30: Prevention of Collisions and Marine Orders Part 21: Safety of Navigation and Emergency Procedures, Marine Orders Parts 3 and 6 – Seagoing Qualifications and Marine Radio Qualifications Marine Orders Part 27 – Radio Equipment.</p> <ul style="list-style-type: none"> • 24 hour visual observations maintained by all vessels by trained watch keepers. • A support vessel will be employed to maintain the exclusion zone, aid in the detection of other vessels and provide additional communication with other vessels where necessary. • Marine diesel oil compliant with MARPOL Annex IV Regulation 14.2 (sulphur content less than 3.5%<i>m/m</i>) is the only engine fuel recorded on the fuel bunkering register for MODU and support vessels. • Oil spill response executed in accordance with the OSCP and vessel SOPEP/SMPEP as required under MARPOL. • If spill event occurs as a result of ruptured fuel tank, implement a tier 2 response in accordance with the OSCP. • Conduct oil spill exercise prior to commencement of drilling activity and every three months thereafter. • Support vessel crew will be experienced and competent to standards required by the International Convention of Standards of Training, Certification and Watch-keeping for Seafarers (STCW95) and/ or AMSA marine orders, seagoing qualifications. • All crew must attend an environmental induction containing basic information on spill response measures.
Hydrocarbon spill due to loss of well control	<ul style="list-style-type: none"> • Casing sizes and lengths and the intervals where the hole is cement-sealed around the casing will be selected to maximise well control. Experience gained from the numerous wells previously drilled within the area will facilitate well design. Well design is conservative to ensure a margin of safety to control any higher than expected pressures • Safety risks associated with a blowout are considered within the MODU HSE Safety case which details safety risks associated with a well blowout, that are reduced to ALARP • Apache requires two barriers between the environment and hydrocarbon flow to be maintained during drilling and completion activities, and suspension and abandonment periods. The two barrier system to be applied when suspending the wells would also be the standard applied when abandoning wells • Other loss of well control prevention measures are defined in <i>Apache Drilling and Completions Standards Manual</i> • Blowout prevention and control of wells is managed through implementation of Apache’s <i>Well Management Drilling System (WMDS)</i> • Key elements of the well control standards are detailed within the <i>WOMP (Julimar Brunello Gas Field Development Phase 1 Drilling and Suspension, DR-91-ZG-139 Rev 1.1)</i>, which requires acceptance by NOPSEMA prior to commencement of well operations • The use of drilling mud to overbalance the mud column will be used to reduce the risk of gas release. If one or more warning signs of a kick are observed, steps are taken to check for flow from the well and the well is immediately shut-in. The well can then be easily brought under control by adjusting the density and weight of the drilling fluid • Crew will be trained in oil spill response procedures and will undertake an oil spill exercise every 3 months and prior to the activity commencing • Apache requires all well control equipment and installed casings and wellhead equipment to be tested to a pressure exceeding the Maximum Anticipated Surface Pressure (MASP) in accordance with the DSM, which states BOP pressure and function testing at set intervals • Mud logging equipment to be in place and tested weekly • BOP regularly testing in accordance with PMS and manufacturer’s maintenance specifications • In the event a loss of well control occurs, tier 3 spill response activities would be implemented in accordance with <i>Brunello Drilling OSCP</i>

Hazard	Management Controls
	(EA-00-RI-004/2)
Hydrocarbon Spill Response	<p>Management controls for activities and associated hazards relating to the following are described in Table 9-1 and Table 9-2 above:</p> <ul style="list-style-type: none"> • Additional seabed disturbance from rig anchoring, dropped objects and disposal of cuttings • Generation of additional artificial lights and noise associated with response vessels and aircraft. • Additional drilling discharges associated with drilling a relief well • Additional planned discharges from MODU and support vessels. • Release of air emissions from response vessels and aircraft. • Interference with other users of the sea during operation of response vessels. • A risk of unplanned solid waste discharges that may occur from response vessels. • A risk of marine fauna collisions. • A risk of unplanned chemical/hydrocarbon spills that may arise from response rig, vessels and aircraft. • Affected stakeholders. <p>In addition, oiled wildlife response activities may be required which would include the following management controls:</p> <ul style="list-style-type: none"> • Vessel-based hazing activities only to be initiated if marine fauna are considered at risk of coming into contact with the spill area. • Vessels to travel at slow speeds near fauna, and to approach fauna from the spill toward the animals at risk. • Noise deterrence to be initiated only if all animals in an aggregation are together. • Treatment of oiled birds will be undertaken by trained oiled wildlife response officers and at a dedicated treatment centre with adequate facilities and trained personnel to successfully rehabilitate birds • The Oiled Wildlife Response Plan (OWRP) is prepared by Apache using the expertise of wildlife service providers and by requesting advice/instruction from DEC as detailed in <i>Brunello Drilling OSCP (EA-72-RI-004/2)</i> • DEC will be requested to contact volunteers listed for handling wildlife in WA • Turtle hatchling fences will be erected to prevent progress of hatchlings down the beach profile to the water while not presenting a hazard for other beach fauna including burrowing crabs, birds and female turtles accessing nests.

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