



**Rider-1
Drilling Programme**

**Northern Territory
[Commonwealth Waters]**

Environment Plan Summary



October 2009

INTRODUCTION

Apache Energy Ltd (Apache) proposes to undertake the Rider-1 drilling programme located within the Territory of Ashmore and Cartier Islands in permit area AC/P37 in the Northern Browse Basin, off the coast of Western Australia (see **Figure 1**).

The drilling programme will involve the use of the *Stena Clyde* semi-submersible drilling rig (see **Plate 1**).

As the location of the Rider-1 well is 4 km north of the Arlo-1 well, the *Northern Territory Arlo-1 Drilling Environment Plan* (EA-71-RI-002), which was approved by the Department of Regional Development, Primary Industry, Fisheries and Resources (DRDPIFR), in accordance with the Petroleum (Submerged Lands) (Management of Environment) (PSLMoE) Regulations 1999 on 12 January 2009, will be used to drill the well since it covers the expected environmental risks and control measures to be undertaken during the drilling program. Apache submitted a bridging document to the Arlo-1 Environment Plan (EP) for the Rider-1 drilling program to DRDPIFR. The bridging document to the Arlo-1 EP was approved by the DRDPIFR on 26 October 2009.

This summary of the Rider-1 EP (bridging document) has been submitted to comply with Regulation 11(7)(8) of the Petroleum (Submerged Lands) (Management of Environment) [P(SL)(MoE)] Regulations 1999.



Plate 1:The Stena Clyde semi-submersible drill rig

PROJECT DESCRIPTION

Timing

The Rider-1 drilling programme is scheduled to commence from 10 November 2009. The proposed drilling program is expected to take approximately 35 days to complete, based on a dry hole scenario. The drilling programme is estimated to conclude by mid December 2009, however any delays to the start date of the programme or adverse prevailing sea and weather conditions during the programme could potentially extend the finish date.

Drilling operations will be conducted 24 hours a day, 7 days a week.

Location

The Rider-1 drilling programme is located within the Territory of Ashmore and Cartier Islands in permit area AC/P37 in the Northern Browse Basin, off the coast of Western Australia (see **Figure 1**).

Drilling programme

The Rider-1 drilling programme is a typical exploration drilling programme similar to most others conducted in Australian marine waters (in terms of technical methods and procedures). The purpose of the drilling program is to confirm the presence of hydrocarbons and the thickness and internal pressure of a reservoir.

The drilling procedure follows the principle of decreasing hole and casing diameters as the well deepens. A drilling fluid, or mud, is continuously circulated while drilling to balance hydrostatic pressure, cool the bit and to flush out cuttings. Water based muds (WBM) will be used to drill the well.

The drilling programme will involve the use of the *Stena Clyde* semi-submersible drilling rig (see **Plate 1**), an offshore drilling vessel which has its deck supported by columns fixed to pontoons which can be ballasted below wave action and provide a stable drilling base.

The rig will be towed into position by one or two support vessels. When in position, the rig will be held on location by an eight point anchor spread, moored in an even radial pattern extending about 1,300 m from the drill rig centre.

The support vessels will also supply the rig with fresh water, food, fuel, bulk drilling fluid materials and drilling hardware. These vessels will operate between the rig and the Port of Broome.

Before the drill rig moves on to another location, all the seabed obstructions will be removed using a remotely operated vehicle (ROV) to survey the seabed to ensure that no debris remains from the operations.

The location of the proposed well and the drilling details are summarised in **Table 1**.

Table 1: Proposed Rider-1 Well Details

| Well | Arlo-1 | |
|---|---|--|
| Surface hole location GDA '94, Zone 50 | Lat/Long 12° 56' 41.91" S 123° 46' 52.44" E | Decimal Degrees 12.944975 123.781233 |
| Type of well | Vertical Exploration | |
| Approximate water depth | 199 m | |
| Approximate length of drilling period | 35 days (dry hole) | |
| Proposed total depth of well | 3,645 m | |
| Drilling rig | <i>Stena Clyde</i> | |
| Drilling fluid | WBM | |
| Scheduled commencement date | 10 November 2009 | |
| Distance to nearest land or reef system | Approximately 38 km southeast from Cartier Island | |
| Oil Spill Modelling | Undertaken for Sept/Oct and Nov-Feb weather conditions at Arlo-1 | |

Vessels

The three support vessels for the drilling campaign are likely to be the *Far Grip*, *Far Sky* and the *Solitaire*.

RECEIVING ENVIRONMENT

A general overview of the receiving environment in terms of its physical and biological aspects is provided in the following sections.

Physical Environment

The drilling site is located within the Ocean Shoals bioregion which experiences a tropical monsoonal climate. The area experiences two distinct seasons, the northwest and southeast monsoon seasons that occur from November to March (i.e. summer) and from April to September (i.e. winter), respectively.

The AC/P37 Permit Area is located on the edge of the Sahul Shelf, a broad, shallow platform off the north-west coast of Australia in the Timor Sea. The water depth at the Rider-1 drilling site is approximately 199 m.

Regional currents in the Timor Sea region are influenced by the Pacific-Indian Ocean Throughflow that transfers warm, low salinity waters from the western Pacific into the Indian Ocean.

The Rider-1 drilling site is located in the deeper commonwealth offshore waters where seabed features are sparse. Characterisation of the seabed in this part of the AC/P37 permit area has been determined from a survey of a portion of the permit area in 1999. Mega-ripples were identified which suggest low rates of sediment supply for the area. The survey indicated that the seabed was essentially featureless, hence environmental sensitivity is expected to be low, especially given the significant water depths and lack of light penetration to the seafloor.

Biological Environment

Benthic habitats

Benthic invertebrates likely to occur in the drilling area may be inferred from previous studies on both the Sahul Shelf and the North West Shelf at similar depths. Benthic invertebrates of the Sahul Shelf are dominated by polychaetes and crustaceans. Echinoderms, molluscs, nemerteans and sponges account for the remaining members of these communities.

Marine fauna

A review of the *Environment Protection and Biodiversity Conservation Act 1999* database held by the Department of Environment, Water, Heritage and Arts (DEWHA) indicates that a number of listed species occur or may occur within 50 km of the Rider-1 drilling site.

A brief overview of the listed species and other biota that may occur in the area of the Rider-1 drilling site are given under faunal groupings in the following sections: cetaceans, dugong, reptiles, sharks and fish, and seabirds.

Cetaceans

Twenty-two cetacean species have been identified as potentially occurring or their habitat occurring around the drilling area.

The humpback whale (*Megaptera novaeangliae*) is the most commonly sighted whale in north Western Australian waters. This species has been observed seasonally to complete their northern migration in the Camden Sound area of the west Kimberley, approximately 530 km from the drilling area.

There are no known breeding, calving or feeding grounds or migratory routes for any listed threatened or migratory whale or dolphin species within, or in the vicinity of the drilling area.

Dugong

Dugong (*Dugong dugong*) occur across the tropical coastal waters of Australia from Shark Bay to Queensland and are protected under national legislation and international agreements. Dugongs are herbivorous and are generally associated with seagrass beds, upon which they feed. They are commonly found in shallow (less than 5 m deep) sheltered areas, often near island or large bays.

Ashmore Reef NNR supports a small population of dugongs. Their range possibly extends to Cartier Island and other submerged shoals in the region.

The timing of the proposed drilling campaign in early-mid November does coincide with the breeding season for dugongs. However, dugongs are not expected to be encountered in the drilling area due to the water depth at the location and the lack of feeding habitat and resting areas.

Reptiles

Four turtle species may occur around the drilling area. Three of these, the green turtle (*Chelonia mydas*), hawksbill (*Eretmochelys imbricata*) and leatherback (*Dermochelys coriacea*), have circum global distributions and they are widespread in the Indo-Pacific region.

The timing of the proposed drilling campaign in early November does coincide with the breeding season of turtles but due to the offshore location of the proposed well

distant from any sensitive breeding/nesting sites it is not expected that these fauna will be affected by the drilling of the Rider-1 well.

Ashmore Reef, located 90 km northwest of the drilling area, is a known breeding site for the green turtle and hawksbill turtle. However, the drilling site is not within the known migration route for these species.

Other marine reptile species that may be present in the drilling area include seasnakes. The Ashmore Cartier Reserves provide critical habitat for an unusually high diversity and density of sea snakes making them internationally significant. At Ashmore Reef NNR there are estimated to be 40,000 sea snakes from at least 13 species, representing the greatest number of sea snake species recorded for any locality in the world.

Sharks and fish

Whale sharks (*Rhincodon typus*) are known to occur in both tropical and temperate waters and are normally oceanic and cosmopolitan in their distribution. Sightings of whale sharks have occurred near Ashmore Reef and they are known to aggregate in the vicinity of Ningaloo Reef during autumn, which is approximately 1,200 km from the drilling area.

Other marine species that may occur within the survey include various species of pipefish, and seahorses.

Seabirds

The streaked shearwater may occur in the drilling area. As this bird species is migratory and may overfly the drilling area, it is highly unlikely that they will be impacted by the drilling programme.

Conservation Areas

The only sensitive and important habitats in the immediate vicinity and northwest of the survey sites are the intertidal coral reefs and islands that occur at Ashmore Reef and Cartier Island.

More distant from the drilling location are Scott Reef Nature Reserve (NR; ~230 km to the southwest) and Browse Island NR (~130 km to the south).

There are no known shipwrecks within the drilling area. The nearest historic shipwreck listed on the National Shipwrecks Database is located in waters surrounding Cartier Reef.

There are a number of shoals located to the east of the drilling site (none of these shoals are within marine protected areas), including:

- Gouree Shoal; located approximately 60 km to the east of the Rider-1 site and rises from a depth of 180 m to 30 m lowest astronomical tide (LAT);
- Vulcan Shoal; located approximately 54 km to the east-northeast of the Rider-1 site and rises from a depth of 180 m to 30 m LAT;
- Heyward Shoal; located approximately 47 km to the north-northeast of the Rider-1 site and rises from a depth of 180 m to 60 m LAT; and,
- Heywood Shoal; located approximately 57 km to the south-southeast of the Rider-1 site and rises from a depth of 180 m to 20 m lowest astronomical tide (LAT).

These shoals are biologically productive areas supporting corals, sponges and a variety of reef fish, similar to the Big Bank Shoals studied by Heyward.

Socio-economic Environment

Permit Area AC/P37 is situated in a region recognised for offshore petroleum exploration and is surrounded by nearby developed and undeveloped oil and gas fields.

Four Commonwealth managed and two State managed commercial fisheries management areas overlap AC/P37 Permit Area; however, fishing effort is very low.

No defined commercial shipping lanes exist in the drilling area. The majority of the major commercial shipping route through the Timor Sea passes well to the north of the drilling area, though some vessels utilise routes adjacent to the drilling area.

ENVIRONMENTAL HAZARDS, MANAGEMENT APPROACH AND CONTROLS

The potential environmental impacts resulting from the Rider-1 drilling programme are summarised in Table 2.



AC/P 37 PROPOSED ARLO-1 & RIDER-1 LOCATIONS

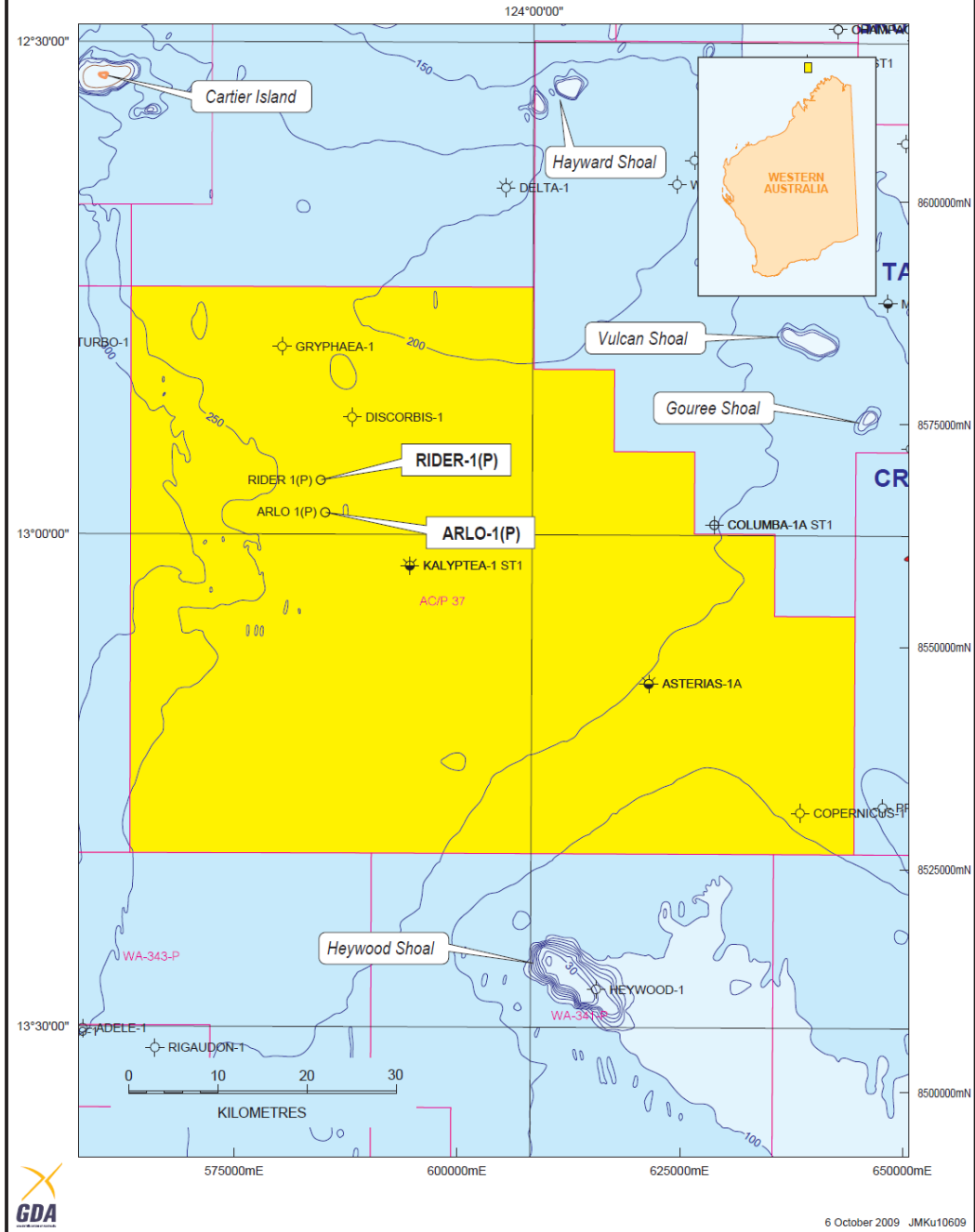


Figure 1: Map showing the location of the proposed Rider-1 well

Table 2. Summary of environmental hazards and management measures/controls for the Rider-1 drilling programme

| Potential hazard (risk) | Potential environmental effect (consequence) | Risk ranking | Management/Controls |
|---|--|--|--|
| Drill rig and vessel anchoring | Localised disturbance to seabed, such as shallow furrows, dependent on seabed type. Effects are temporary. | Negligible | Adherence to Apache's Rig Anchoring Procedures to minimise anchor and chain drag. Side scan sonar surveys and coring have been undertaken in the drilling area. |
| Impacts to marine species from noise generated by the drill rig and support vessels | Potential short-term physiological effects or disruption to behaviour patterns of cetaceans, birds, turtles, fish and other marine life. | Negligible - Observations have shown whales resting and swimming in close proximity to operating rigs. | Drilling will occur outside of humpback whale migration. Helicopters to fly at an altitude no lower than 1,000 m except for take offs, landings and during adverse weather conditions. Support vessel speed reductions and/or detour will be taken around any whale sightings. |
| Artificial lights from drill rig (must be kept on 24 hrs due to safety regulations) | Potential disorientation of fauna by lights at night, especially turtle hatchlings. | Negligible - wave direction and magnetic cues are primary influences on turtle hatchlings once they have left the beach. Rider-1 is distant from nesting beaches. | Lighting will be reduced (within acceptable safety levels) where necessary. |
| Atmospheric emissions | Emissions of greenhouse gases. Potential localised reduction in air quality. | Negligible | Rig engines and all equipment engines will be regularly maintained Marine diesel, low in sulphur, will be used. |

| Potential hazard (risk) | Potential environmental effect (consequence) | Risk ranking | Management/Controls |
|-------------------------------------|---|--|---|
| | | | The rig's main propulsion engine will not be running when on location. |
| Drill cuttings and fluid discharges | Drilling activities and disposal of drill cuttings and fluids will produce suspended sediments in the water column increasing turbidity, will bury and smother infauna and epifauna and may lead to toxicity and bioaccumulation to marine organisms. | Acceptable – Studies on NWS reveal few long-term impacts on benthic fauna from WBMs. | WBMs used. Drill fluids will be recycled within the drill system as practicable. Pipe dope that has the lowest concentration of heavy metals and hydrocarbons but still meets safety and performance criteria, will be used. |
| Sewage and putrescible wastes | Potential localised reduction in water quality - nutrient enrichment. Modification of feeding habits of local fauna. | Negligible | Waste management will comply with the P(LS)A Schedule and MARPOL regulations. Sewage and grey water will be treated prior to release. Sewage and food scrap disposal will conform to the requirement of MARPOL Annex IV; macerated to less than 25 mm diameter prior to disposal. Biodegradable soaps will be used on the rig. |
| Disposal of solid wastes | Marine pollution. | Negligible | No solid waste disposal overboard. Solid wastes (e.g., plastics, cardboard packaging, domestic, etc) will be compacted (where practicable) and sent onshore for appropriate disposal or recycling. |

| Potential hazard (risk) | Potential environmental effect (consequence) | Risk ranking | Management/Controls |
|---|---|--------------|---|
| | | | Used oils, paints, lubricants, etc will be stored separately for onshore disposal. |
| Introduction of foreign marine organisms from drill rig and support vessels | Competition with local marine life and absence of natural predators can alter ecological balance of flora and fauna communities, favouring the introduced species and resulting in loss of flora and fauna diversity and abundance. | Negligible | Adhere to AQIS Ballast Water Management requirements |
| Waste oil, chemicals and oil-contaminated drainage water | Potential localised reduction in water quality. | Negligible | Decks kept clean during operations, oily-water separator collects any spilled material. All liquid waste containers will be closed to prevent leakage. Spent oils and lubricants will be securely containerised and returned to shore upon completion of drilling. All hazardous wastes will be documented, tracked and segregated from other streams of operational wastes. |
| Cooling water | Potential localised reduction in water quality. | Negligible | Discharge above water line to allow cooling and oxygenation. |
| Vessel collision | | Negligible | A 500 m exclusion zone will be established around the rig. Standard maritime safety procedures shall be adopted. |
| Impacts to | VSP is a more benign activity than | Negligible | The drilling program is outside peak migration |

| Potential hazard (risk) | Potential environmental effect (consequence) | Risk ranking | Management/Controls |
|---|--|--------------|---|
| humpback whales from vertical seismic profiling (VSP) noise | conventional seismic surveys. Potential short-lived impacts include disruption to navigation and communication, with some research indicating no disruption from normal activities when seismic activity is occurring several kilometres away. | | periods for the humpback whale. Guidelines on minimising acoustic disturbance to Marine Fauna will be followed during VSP. |
| Oil or diesel spills | Severe damage of marine habitats (e.g., coral reefs, mangroves, beaches) and death or injury to marine life (e.g, birds, mammals). | Acceptable | Oil spill management procedures are in place. |

FURTHER DETAILS

For further information on the Rider-1 Drilling Programme please contact:

Myles Hyams, Apache Environmental Manager
PO Box 477, West Perth, WA 6872
Phone: 08-9422 7288