Dibbler-1 Exploration Well
Environment Plan: Public Summary
September 2008

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

Introduction

Apache Energy Limited (Apache) proposes to drill the Dibbler-1 exploration well in Commonwealth waters off the Western Australian coast in Exploration Permit WA-334-P using the *Ensco 106* semi-submersible drill rig. Dibbler-1 is located 78 km northwest of the nearest mainland, and 17 km southwest of the Montebello Islands (Figure 1). Drilling is scheduled to commence in mid to late September 2008.

Apache's generic Environment Plan (EP) for its drilling program on the North West Shelf (NWS) in State and Commonwealth waters will be used to manage the well (EA-00-RI-164). A bridging document to this EP for Dibbler-1 was approved by the DoIR, in accordance with the Petroleum (Submerged Lands) (Management of Environment) (PSLMoE) Regulations 1999.

Project Description

The proposed Dibbler-1 drill site is located at 20° 35' 32.540" S, 115° 21' 44.980" E (GDA 94, Zone 50) in a water depth of 28 m. The well will be drilled with water-based mud (WBM) and drill cuttings will be discharged to the seabed.

The drilling procedure for the Dibbler-1 well will be to drill a vertical 406 mm (16") hole riserless to approximately 1,474 m total vertical depth Australian Height Datum (TVD AHD) with sea water (SW)/ pre-hydrated gel (PHG) (water-based mud - WBM). Following this a 340 mm (13⅜") casing will be run and cemented and the blow-out preventer stack (BOP) will be installed and tested. A 216 mm (8½") hole will then be drilled to 3,559 m TVD AHD, using KCl polymer WBM. The well will then be logged by wireline and evaluated before the reservoir section is permanently plugged / abandoned.

A production test and vertical seismic profiling (VSP) may take place at the end of drilling if hydrocarbons are encountered.

If hydrocarbons are present, coring may also be required. In this case, following the abandonment of the original hole section, sidetrack operations will commence by setting a kick-off plug above the target reservoir (reservoir top at 2,790 mTVD AHD) and coring of 2 x 18 m intervals in the target reservoir before the well is abandoned. However, if required for the well test the sidetrack may be drilled to the base of the Dupuy reservoir at 3,559 m TVD AHD with a maximum inclination of 25 degrees. This will be confirmed following evaluation of the wireline logs.

At the completion of any production test and well abandonment, the rig will move to its next location for Apache.

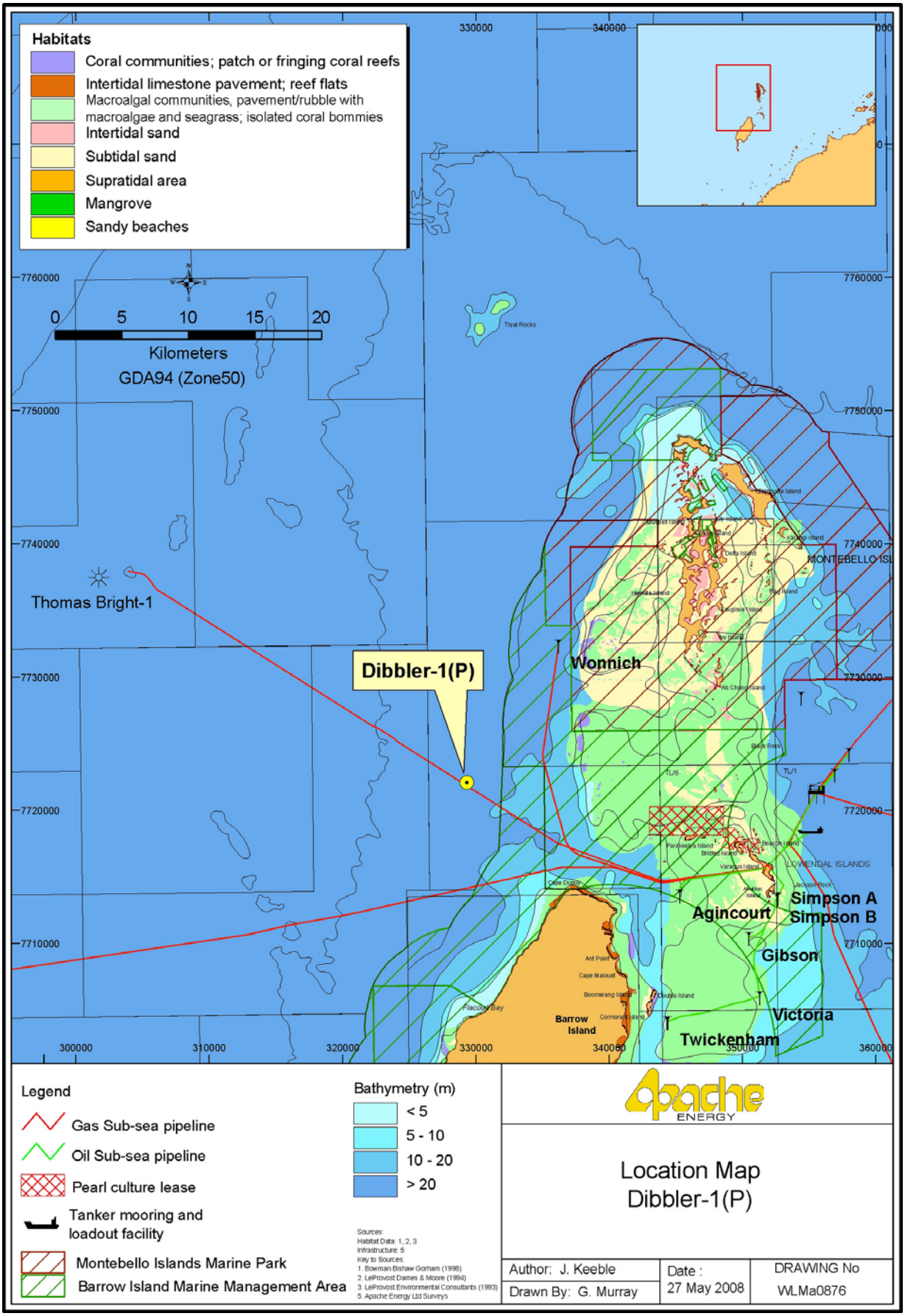


Figure 1 Location of the proposed Dibbler-1 drill site

Receiving Environment

Physical Environment

The NWS lies in the arid tropics region of Australia, which experiences high summer temperatures and periodic cyclones (with associated rainfall). Rainfall is generally low, with evaporation exceeding rainfall. Mean ocean temperatures range from a minimum of 11ºC in winter to a maximum of 37ºC in summer. Shelf waters are usually thermally stratified at a depth of about 20 m.

Wind patterns are monsoonal with a marked seasonal pattern. From October to March, the prevailing non-storm winds are from the south-west, west and north-west at an average speed of less than 10 knots. From June to August, winds are generally lighter and more variable in direction than in spring and summer.

Non-storm winds prevail from north-east through to south-east at average speeds of 5-6 knots. Transitional wind periods, during which either pattern may predominate, can be experienced in April, May and September each year.

Biological Environment

Diverse assemblages of benthic fauna are likely to exist at the site, especially if unconsolidated sediments are present. Mobile burrowing species that may be present include crustaceans (crabs and shrimps), worms, sea stars, sea urchins and other small animals. Spatial and seasonal distribution of such species depends on factors such as substrate composition, season, water depth and temperature.

The demersal habitat of the NWS hosts a diverse assemblage of fish, many of which are commercially exploited by trawl and trap fisheries, for example the genera *Lethrinus* (emperor) and *Lutjanus* (snapper). Pelagic fish in this area include tuna, mackerel, herring, pilchard and sardine. The inshore habitats in this region are not considered to be significant nursery grounds for commercially important deeper-water fish species.

Whale sharks (*Rhincodon typus)* are oceanic and cosmopolitan in their distribution; however, they aggregate in and near the waters of the Ningaloo Marine Park during autumn, around the Exmouth region. They are occasionally observed from Apache's offshore oil and gas facilities on the NWS such as the Stag platform.

Four species of marine turtle nest on sandy shore sites of the Dampier Archipelago, Montebello Islands, Lowendal Islands, Barrow Island, and other coastal islands in the Exmouth region. These are the green turtle (*Chelonia mydas),* flatback turtle *(Natator depressus),* hawksbill turtle (*Eretmochelys imbricata*), and the loggerhead turtle (*Caretta caretta*). All four species are on the National List of Threatened Species. The leatherback turtle (*Dermochelys coriacia*) may also visit the open waters of the shelf. The loggerhead, flatback and leatherback turtles are known to feed on mid-water plankton and benthic animals, and can forage in continental shelf waters, so may occur around the Dibbler-1 location.

The nationally threatened dugong (*Dugong dugong*) occurs across the tropical coastal waters of Australia from Shark Bay to Queensland. They are herbivorous and are generally associated with seagrass beds, upon which they feed. Dugongs are commonly found in shallow sheltered areas (less than 5 m deep), often near islands or large bays. They are highly unlikely to be present around the proposed drilling location.

Dolphins are relatively common in the region. Species known to occur in the region are the bottlenose dolphin (*Tursiops truncatus*), common dolphin (*Delphinus delphis*), Indo-pacific humpback dolphins (*Sousa chinensis*) and the striped dolphin (*Stenella coeruleoalba*). A number of whale species, including the short-finned pilot whale (*Globicephala macrorhynchus*), false killer whale (*Pseudorca crassidens*), tropical byrdes whale (*Balaenoptera edeni*), southern minke whale (*Balaenoptera acutorostrata*) and humpback whale (*Megaptera novaeangliae*), also occur in the region, the most commonly sighted of these being the humpback whale. This species migrates between the Antarctic waters and the Kimberly region of Western Australia. The peak of their northerly migration between the Exmouth Gulf and the Dampier Archipelago occurs around late July to early August, while the southerly return migration peaks around late August – early September. The location and proposed timing of drilling for Dibbler-1 is not expected to overlap with either the northern or southern migration route of humpback whales (Megaptera novaeangliae) in the Exmouth to Dampier Archipelago region. However, DoIR's *Guidelines on Minimising Acoustic Disturbance to Marine Fauna* (1997) will be followed when undertaking VSP. All cetacean sighting records will be reported to Commonwealth Department of the Environment, Water, Heritage and the Arts (DEWHA) at the end of the drilling program. Using the DoIR guidelines, the following measures will be undertaken on the rig at the commencement of the VSP:

- Not commencing VSP unless whales are a minimum distance of 3 km from the rig;
- Soft-start over a 20 minute period;
- Rig crew being alert for whales during VSP, with a dedicated whale-watcher on post if a whale is sighted with 3-5 km of the rig; and
- Shut down of VSP if whales are observed within 1 km of the rig.

Eighteen species of seabird have been recorded over the NWS waters. These include petrels, shearwaters, tropicbirds, frigatebirds, boobies and terns, and silver gulls. Of these, eight species occur year round and the remaining 10 are seasonal visitors.

Socio-Economic Environment

Dampier and Karratha are the main service and population centres for this region. Local people seeking aquatic recreation such as boating, diving and fishing use the coast and islands of the Pilbara. The open waters of the Commonwealth permit areas do not support significant recreational or tourism activity.

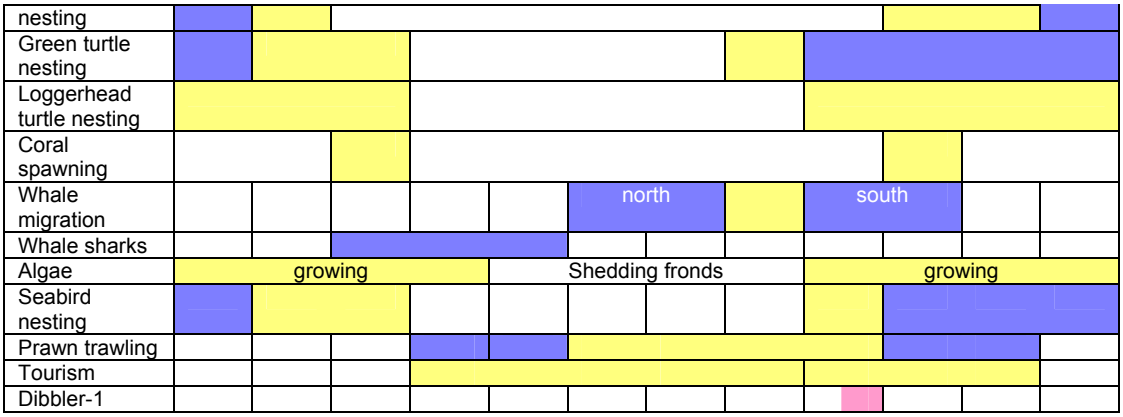
Commercial fisheries are active along the Pilbara coast; however fishing effort in the open Commonwealth waters is low, with operators favouring the inshore areas.

The Montebello/Barrow Islands Marine Conservation Reserves are located to the southeast of the drill site (see Figure 1).

Table 1 summarises the biological and socio-economic features of the NWS.

Table 1. NWS biological and human activity seasons

SPECIES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Dugong breeding	breeding								breeding			
Hawksbill turtle nesting												
Flatback turtle												



Major Environmental Hazards and Controls

The potential environmental impacts resulting from offshore drilling on the NWS are outlined in detail in the Generic Drilling Program EP. Table 2 summarises the potential impacts of the Dibbler-1 drilling program.

Table 2. Summary of potential environmental impacts from offshore drilling on the NWS

Potential hazard (risk)	Potential environmental effect (consequence)	Risk ranking
Drill rig and vessel anchoring	Localised disturbance to seabed, such as shallow furrows, dependent on seabed type. Effects are temporary.	Negligible – semi-submersible rig with anchoring to seabed.
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. Lee-4 is distant from nesting beaches.
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.
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.	Negligible – WBMs used. Studies on NWS reveal few long-term impacts on benthic fauna from WBMs.

Potential hazard (risk)	Potential environmental effect (consequence)	Risk ranking
Sewage, putrescible and solid domestic wastes	Potential localised reduction in water quality - nutrient enrichment. Modification of feeding habits of local fauna.	Negligible – sewage treatment available on rig.
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.
Cooling water and atmospheric emissions	Potential localised reduction in water quality. Emissions of greenhouse gases. Potential localised reduction in air quality.	Negligible – discharged above water line to allow cooling and oxygenation.
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
Impacts to humpback whales from vertical seismic profiling (VSP) noise	VSP is a more benign activity than 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.	Acceptable - VSP carried out in accordance with DoIR guidelines for minimising acoustic disturbance to fauna.
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.

Environmental Management

Extensive environmental management guidelines are prepared for each Apache-drilled well. Apache management documents used to guide the implementation of well-specific environmental management procedures are listed below:

- Environmental Management Policy (April 2006).
- Contaminated Waste Management Procedure (VI-SA-ON-EN-000).
- Incident Reporting Procedure (AE-91-IF-002).
- Lighting Management Plan (EA-60-RI-153).
- OSCP Volume 1 – Operations (NWS) (AE-OO-EF-008).
- OSCP Volume 2 – Resource Atlas (NWS) (AE-OO-EF-008/2).
- Quarantine Procedure (AE-91-IQ-189).
- Refuelling Management Plan (DR-91-IG-001).
- Refuelling Operational Procedure Guide.
- Vermin Management Plan (EA-60-RI-131).
- Waste Management Plan (EA-60-RI-167).

Consultation

In preparing the Generic NWS Drilling Program EP, Apache consulted with numerous stakeholder representatives, including:

- DoIR.
- Department of Environment (DoE) (now Dept of Environment & Conservation).
- CALM (Marine branch) (now DEC).
- Fisheries WA.
- Marine and Coastal Community Network (MCCN).
- Environment Protection Agency (EPA).
- Marine Parks Reserve Authority (MPRA).
- DEC (Environmental Protection).
- WA Fishing Industry Council (WAFIC).

Further Details

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