# Tortuga-1 Exploration Well

Environment Plan Summary
August 2006

## Introduction

Apache Energy Ltd plans to drill a vertical exploration well, Tortuga-1, in State waters off the Western Australian coast in Exploration Permit TP/9. Tortuga-1 is located approximately 30 km to the northwest of the Exmouth Peninsula and 4.3 km northwest of North Muiron Island. It is located within the Muiron Islands Marine Management Area in 60 m water depth (Figure 1). Location coordinates are latitude 21° 35' 19.45" S and longitude 114° 21' 56.95" E.

## Drilling Operations

Tortuga-1 will be drilled using the jack-up drill rig, Ensco 67. Only water-based muds (WBMs) will be used. Upon completion of drilling, the well will be plugged with cement and the surface casing will be cut below the seabed and removed. No debris will remain on the seabed. The drill rig will then be jacked down and towed away. Two vessels, the Voyager and Pacific Ariki will support drilling activities and tow the rig into and out of location.

All drilling activities will be undertaken in accordance with the Commonwealth *Petroleum (Submerged Lands) Act 1967* and the Petroleum (Submerged Lands) (Management of Environment) Regulations 1999.

## Physical Environment

The North West Shelf 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 May 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 and September each year.

Tortuga-1, at 56 m water depth, is located on the mid-continental shelf region, which is characterised by a thick sequence of carbonate rock that is overlain by thin layers of unconsolidated fine to medium grained, carbonate sediments. The seabed in the immediate vicinity of the well is composed of coarser sand and fine gravel sediments deposited on a gentle slope. No exposed limestone reefs or other seabed features were recorded.

## Biological Environment

Benthic infauna are likely to exist at the well site. 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.

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. Whale sharks will not be impacted by the drilling of Tortuga-1 in August/September. Four species of marine turtle nest on sandy beaches in the North wEst Shelf 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 mid-shelf water depths, so may occur around the Tortuga-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, and so are unlikely to be encountered during the drilling of Tortuga-1.

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 proposed timing of Tortuga-1 from mid August onwards overlaps with the end of the northbound migration of humpback whales and the beginning of the southward migration through the Exmouth region. The surface location of Tortuga-1 is likely to be on the periphery of the northbound migratory path.

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

**Environmental Hazards and Controls**

The potential environmental impacts resulting from offshore drilling on the North West Shelf are outlined in detail in Apache's Generic Drilling Program Environment Plan. Table 1 summarises the potential impacts applied to the Tortuga-1 drilling program.

**Environmental Management**

Extensive environmental management guidelines are prepared for each well that Apache drills. 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 Drilling EP, Apache consulted with numerous stakeholder representatives, including:

- DoIR
- Department of Environment (DoE)
- CALM (Marine branch)
- Fisheries WA
- Marine and Coastal Community Network
- Environment Protection Agency (EPA)
- Marine Parks Reserve Authority (MPRA)
- CALM (Environmental protection)
- WA Fishing industry Council

Letters of notification summarising details of the Tortuga-1 drilling programme were forwarded to the following organisations:

- Onslow Tourist Centre
- Shire of Ashburton
- North Coast Charters
- Scubaroo Dive
- Ashburton Fisheries
- Cape Conservation Group
- Exmouth Chamber of Commerce and Industry
- Exmouth Police Station
- Exmouth Visitor Centre
- RecfishWest
- MG Kailis Gulf Fisheries PL
- Shire of Exmouth
- Fisheries Department - Exmouth

## Further Details

For further information about the Tortuga-1 drilling program, please contact:

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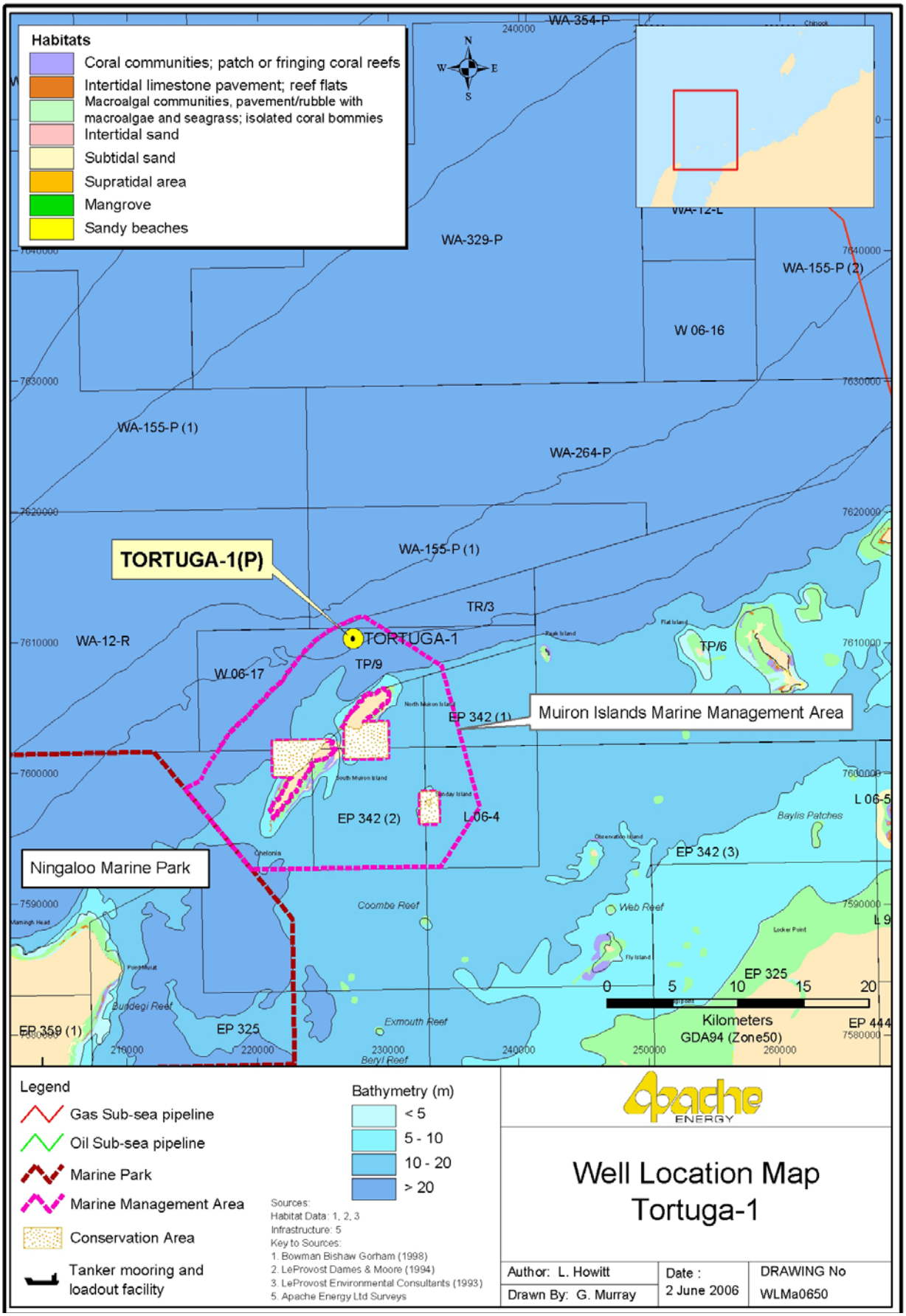


**Figure 1 Location of the Tortuga-1 drill site**

**Table 1. Summary of potential environmental impacts from offshore drilling of Tortuga-1**

| 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 – seabed depressions rapidly filled by sand and detritus and recolonised. Seabed at Tortuga-1 is unconsolidated sediments. |
| 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 – Tortuga-1 drilled prior to turtle hatchling season and only on location for 12 days. |
| 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 and other marine fauna 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. | Acceptable – Non-toxic water based muds used. Studies on North West Shelf indicate no long-term impacts on benthic fauna. |
| 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 – no ballast required for jack-up drill rig. |
| Impacts to humpback whales from vertical seismic profiling (VSP) noise | Vertical Seismic Profiling 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. | Negligible – VSP will occur for about 8 hrs. Tortuga-1 is located on the periphery of the northern migration route for humpbacks. DoIR's *Guidelines on Minimising Acoustic Disturbance to Marine Fauna* (1997) will be implemented. |
| 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 modelling from Tortuga-1, indicates spills of diesel and crude would be likely to reach land and the waters of the Ningaloo Marine Park, however, the likelihood of such a spill event occurring is highly unlikely. |