



## John Brookes-6 Development Well Environment Plan: Public Summary January 2009

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*This summary of the John Brookes-6 EP has been submitted to comply with Regulation 11(7)(8) of the Petroleum (Submerged Lands) (Management of Environment) [P(SL)(MoE)] Regulations 1999.*

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### **Introduction**

Apache Energy Limited (Apache) proposes to drill a development well in permit area WA-29-L in Commonwealth waters. Drilling is proposed to commence in mid February 2009 (weather conditions permitting) using the *Ensco 106* jack-up drill rig. John Brookes-6 is located 40 km east of the Montebello Islands and 40 km south-east of Barrow Island (Figure 1).

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 John Brookes-6 was approved by the Department of Mines and Petroleum (DMP), in accordance with the Petroleum (Submerged Lands) (Management of Environment) (PSLMoE) Regulations 1999.

### **Project Description**

The proposed John Brookes-6 drill site is located at 20° 26' 50.440" S, 115° 7' 12.643" E (GDA 94, Zone 50) in a water depth of 52 m.

The drilling procedure for the John Brookes-6 development well will be drill a 914 mm (36") hole using seawater and pre-hydrated gel (SW/PHG) to 118 m and run a 762 mm (30") conductor. A 660 mm (26") hole will then be drilled to 220 m with SW/PHG and 508 mm (20") conductor run. Following this, a 406 mm (16") hole will be drilled to 1410 m Measured Depth (MD) with WBM, 340 mm (13-3/8") casing run and blowout prevention system (BOP) installed and tested.

A 311 mm (12 1/4") hole will then be drilled with SBM to 4,455 m and a 244 mm (9-5/8") casing run. A 216 mm (8-1/2") hole will then be drilled to 5005 m MD using SBM and a 178 mm (7") liner run. Completion will then be run, the well suspended and then handed over to production (a Christmas tree will not be installed as part of this drilling program).

This drilling program will not involve any production/well testing nor vertical seismic profiling (VSP). The method of positioning on location will be anchoring. The rig will be moved off location at the completion of the program.

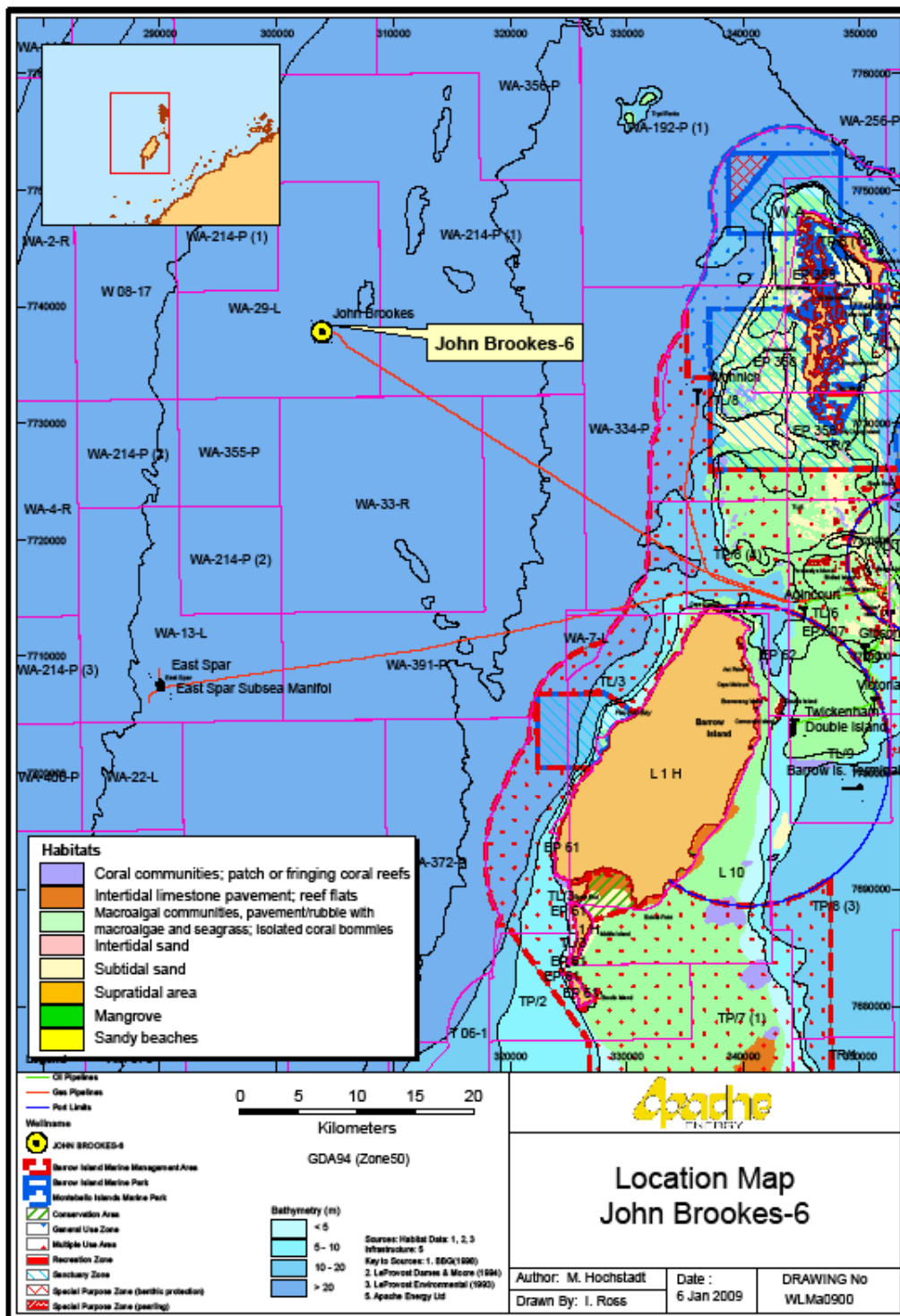


Figure 1 Location of the John Brookes-6 drill site

## 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 11°C in winter to a maximum of 37°C 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 coriacea*) 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 John Brookes-6 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 not likely to be present around the proposed John Brookes-6 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 John Brookes-6 well is located within the northern migration corridor, but drilling will occur outside the peak migration periods.

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 well to the east of the drill site.



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 nesting												
Green turtle nesting												
Loggerhead turtle nesting												
Coral spawning												
Whale migration						north			south			
Whalesharks												
Algae	growing				Shedding fronds				growing			
Seabird nesting												
Prawn trawling												
Tourism												
John Brookes-6												

**Key**

 Peak activity, presence reliable and predictable

	Low level of abundance/activity/presence
	Activity not occurring within the area

### **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 John Brookes-6 drilling program.

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

<b>Potential hazard (risk)</b>	<b>Potential environmental effect (consequence)</b>	<b>Risk ranking</b>
Drill rig and vessel anchoring	Localised disturbance to seabed, such as shallow furrows, dependent on seabed type. Effects are temporary.	Negligible – jack-up 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.  John Brookes-6 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.  Drilling at John Brookes-6 does not overlap with peak humpback whale migration.  No VSP as part of this program.
Discharge of drill cuttings, drilling fluid and pipe dope	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 – WBM used for upper sections of well, SBM used for mid to bottom sections of the well.  Studies on NWS reveal few long-term impacts on benthic fauna from WBMs.  SBM cuttings will be processed through the centrifuge/dryer prior to discharge to the seabed (SBM treated cuttings discharged to the seabed to be < 10% oil on cuttings).  Use pipe dope that has lowest concentration of heavy metals and hydrocarbons but still meets safety and performance criteria.
Sewage, putrescible and	Potential localised reduction in water quality - nutrient enrichment.	Negligible – sewage treatment used on rig.

solid domestic wastes	Modification of feeding habits of local fauna.	
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
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 indicates spills would be unlikely to reach land.

## 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:

- (former) Department of Industry and Resources
- Department of Environment (DoE) (now Dept of Environment & Conservation)
- CALM (Marine branch) (now DEC)
- Fisheries WA
- Marine and Coastal Community Network
- Environment Protection Agency (EPA)
- Marine Parks Reserve Authority (MPRA)
- DEC (Environmental protection)

- WA Fishing industry Council

### **Further Details**

For further information about the John Brookes-6 drilling program, please contact:

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