

This summary of the Enfield – Jack Bates Drilling Campaign 2007 Environment Plan has been submitted to comply with Regulation 11(7)(8) of the *Petroleum (Submerged Lands) (Management of Environment) Regulations 1999*. It may not be used for any other purpose without Woodside’s prior approval.

1. Project Description

Woodside Energy Ltd (Woodside) proposes to conduct drilling operations for the Enfield Development (Woodside 60% and Operator, Mitsui E&P Australia 40%) using the semi-submersible drill rig ‘Jack Bates’ operated by Transocean Inc. A total of 5 wells are planned to be drilled, including three production sidetrack wells, one production well and one water injection well. The campaign will commence with the drilling of the ENA03L1 sidetrack well in May 2007 and the full campaign is expected to take approximately 6 months.

The Enfield Development area is located approximately 37 km from North West Cape, 21 km from the boundary of the Ningaloo Marine Park and 37 km from the Muiron Island Marine Management Area. Water depths at the well locations range from 500 – 550 m.

2. Coordinates of Activity

Well	Type of Well	GDA 1994 MGA Zone 50	
		Easting	Northing
ENA03L1	Production Sidetrack	189 979 mE	7 621 530 mN
ENA06	Production	187 982 mE	7 621 507 mN
ENC04	Water Injection	186 540 mE	7 620 872 mN
ENA01L1	Production Sidetrack	188 016 mE	7 621 538 mN
ENA02L1	Production Sidetrack	188 003 mE	7 621 553 mN

3. Description of the Receiving Environment

Physical Environment

The North West Cape exists in an arid (mainly summer rain), subtropical environment with a tropical cyclone period from November to April. Winds in the area blow predominantly from the south-west and south-east quarters.

Tides are semi-diurnal (four current reversals a day). The Leeuwin Current, which originates in the region, runs southward along the edge of the continental shelf and is primarily a surface flow (up to 150 m deep) which is strongest during winter. The Ningaloo Current flows in the opposite direction to the Leeuwin Current, running northward along the outside of Ningaloo Reef and across the inner shelf from September to mid-April.

Regional sea surface temperatures in summer range from 26 – 31°C and in winter from 19 – 24°C.

Biological Environment

The most significant regional coastal habitat is Ningaloo Reef, which extends 260 km southward of North West Cape. The reef is considered to be in generally pristine condition and supports diverse biological communities including corals, other invertebrates and fish. Small mangrove communities are present on the west coast of the Exmouth Peninsula and are more extensively developed on the eastern shore of Exmouth Gulf. Various sandy beaches on the coastal areas and islands in this region support significant turtle nesting areas.

The seabed in the vicinity of the Enfield Development Area is dominated by soft sediments inhabited by a sparse seabed community, including larger species living on the seabed (mainly urchins, seastars and crustaceans) and smaller burrowing invertebrate species living within the seabed sediments.

Limited patches of outcropping rock can be found at a range of depths. These hard rocky surfaces support a locally diverse accumulation of species.

The habitats and species associated with the fringing Ningaloo Reef and shallow coastal waters are relatively accessible and better understood than the deeper water shelf environments off North West Cape. As part of Woodside's environmental assessment of the proposed Enfield Development, an extensive programme of investigation and studies has been conducted on deepwater marine environments. This has included:

- Seabed habitat surveys: a series of vessel and drilling rig-based video surveys and fauna sampling surveys of the seabed in water depths up to 900 m;
- Physical and biological oceanographic surveys: vessel-based recording of a range of physical parameters and zooplankton abundance and distribution in nearshore and offshore areas;
- Aerial surveys of larger marine animals: a two-year programme of regular flights over the region to record the presence of large marine fauna including whales, dolphins, whale sharks, manta rays and turtles;
- Vessel surveys of larger marine animals: a two year programme of vessel surveys funded by both Woodside and BHP Billiton, to record the presence of large marine fauna, focussing on Humpback whales; and
- Whale shark studies: satellite and acoustic tagging to determine short and long-term movements and nearshore feeding behaviour.

A variety of cetaceans (whale and dolphin species) have been recorded during surveys of offshore waters in the vicinity of the proposed Enfield Development including several large whales, notably Humpback, Blue, Sperm, Minke, Pilot and False Killer Whales.

Survey information indicates that Humpback Whales are the most abundant whale species recorded, these being present during the year between June and November. Individuals were recorded up to 80 km offshore with a peak in average numbers recorded during the year over a three-week transition period, commencing in late August, when the northern and southern migrations overlap.

Overall, the highest concentrations of pods were observed in water depths of around 200 m during the northern migration, 200–300 m during the transition period and in waters shallower than 200 m during the southern migration.

Whale sharks are found to aggregate off Ningaloo Reef, generally between April and June each year. Encounters mainly take place within a few kilometres of the reef. A relatively small number of whale sharks (21 individuals) were recorded during two years of aerial surveys (2000/2001) with none being seen in the vicinity of the proposed Enfield Development. Recent whale shark tagging and tracking studies have provided more information on whale shark movements in waters beyond the vicinity of the reef. While further information is required to achieve comprehensive understanding of seasonal whale shark movements, evidence indicates that some whale sharks could pass near or through the Enfield Development Area when making their approach or departure from the reef.

Socio-Economic Environment

The nearest town to the proposed Enfield Development area is Exmouth, located 1200 km north of Perth.

Tourism is one of the major industries of the town and contributes significantly to the local economy in terms of both income and employment. Around 104,000 tourists (about 70% domestic and 30% international) stay overnight in Exmouth each year. Traditional tourist

activities have centred around recreational fishing and boating, but more recently nature-based tourism has become more popular, based around Ningaloo Reef, Cape Range National Park, and seasonal attractions such as the humpback whales, whale sharks and turtle nesting. The main marine nature-based tourist activities are snorkelling and scuba diving, whale shark encounters, whale watching and tours of turtle hatching beaches.

The main commercial activities associated with Exmouth include prawn fisheries, tourism and defence-related activities. Limited commercial fishing takes place in deepwater offshore regions, the most notable being a developing longline fishery.

The region is very prospective for oil and gas, with two oil and gas production facilities already located in the region. The nearest is the Woodside-operated *Nganhurra* Floating Production Storage and Offtake (FPSO) vessel, which is producing from the Enfield oil field, and is approximately 2 km from the proposed drilling location. The BHP Billiton Petroleum-operated Griffin oil and gas project, which is an FPSO development, is located approximately 70 km north-east of Exmouth.

While there are no defined shipping lanes in the North West Cape region, there are general shipping routes running in a north-south direction along the coast which become north to easterly to the north of Exmouth. Approximately 1,200 vessels per year pass through the area off North West Cape, with approximately 550 ships passing through the permit area.

4. Major Environmental Hazards

An environmental risk assessment undertaken identified environmental risks and potential environmental effects of drilling activities associated with rig deployment, well drilling and operation of standby vessels.

The main environmental aspects of the above activities are:

- Physical disturbance associated with positioning the Jack Bates and drilling operations;
- Acoustic impacts when undertaking vertical seismic profiling;
- Discharge of drilling fluid, drill cuttings and cementing fluids;
- Discharge of deck drainage;
- Discharge of sewage and putrescible domestic wastes;
- Emissions to atmosphere from operating equipment;
- Accidental hydrocarbon and/or hazardous material spills during routine drilling activities;
- Accidental hydrocarbon spills from failure of mechanical/physical barriers e.g. blowout preventers or casing strings;
- Accidental hydrocarbon and/or hazardous material spills during transfer from standby vessels; and
- Accidental hydrocarbon spills from damage to production infrastructure.

5. Summary of Management Approach

The following table identifies the key management objectives, standard and criteria to achieve these objectives.

Objectives	Standards	Criteria
No significant disturbance to seabed and benthic habitats	<ul style="list-style-type: none"> Woodside Environmental Standards Site specific mooring plan Jack Bates Specific Procedures Supply Vessel Marine Operations Procedures 	<ul style="list-style-type: none"> Anchor deployment and retrieval is undertaken according to anchoring procedures and anchoring plan. Recording and reporting of all items lost overboard.
No introduction of exotic marine species	<ul style="list-style-type: none"> Australian Quarantine and Inspection Service (AQIS) Australian Ballast Water Management Requirements <i>Quarantine Act 1980</i> 	<ul style="list-style-type: none"> Jack Bates and support vessels adhere to AQIS Australian Ballast Water Management Requirements and quarantine requirements.
No significant impact to marine fauna	<ul style="list-style-type: none"> Woodside Environmental Standards and Aspirations <i>Environment Protection and Biodiversity Conservation (EPBC) Amendment Regulations 2006</i> Department of the Environment and Water Resources (DEWR) Guidelines for Minimising Disturbances to Whales 	<ul style="list-style-type: none"> Cetacean interaction procedure will be adhered to. Required safe distance of 300 m from cetaceans maintained by standby vessels. Vertical Seismic Profiling (VSP) Survey Procedures followed.
No significant impact on marine environment from drilling fluids and cuttings	<ul style="list-style-type: none"> Woodside Environmental Standards and Aspirations Woodside's Well Engineering Drilling Fluid Selection Procedure (TP03) 	<ul style="list-style-type: none"> Use of approved, low toxicity Drill Mud. Fluid and cuttings control equipment inspected and operating correctly prior to commencement of operations.
No significant impact on marine environment routine waste discharge.	<ul style="list-style-type: none"> Woodside Environmental Standards and Aspirations International Convention for the Prevention of Pollution from Ships (MARPOL) 73/78 Annex IV 	<ul style="list-style-type: none"> Sewage treatment system (comminuter and grinder) is fully operational prior to commencement of drilling operations and includes maceration and disinfection. MARPOL/<i>Petroleum (Submerged Lands) Act, 1967 (P(SL)A)</i> waste management requirements followed. Deck drainage contaminated by hydrocarbons or chemicals is contained and disposed onshore.

Objectives	Standards	Criteria
No significant impact on marine environment from routine discharges	<ul style="list-style-type: none"> • Woodside Environmental Standards and Aspirations • MARPOL 73/78 Annex IV 	<ul style="list-style-type: none"> • Sewage and putrescible waste systems are fully operational prior to commencement of drilling operations and includes maceration to less than 25 mm diameter. • Check for marine mammals within the vicinity of the Jack Bates undertaken before discharge of residual water based mud or cement. • Deck drainage contaminated by hydrocarbons or chemicals is contained and disposed onshore unless monitored and oil in water content below 15 mg/L.
No significant environmental impact from solid and hazardous wastes	<ul style="list-style-type: none"> • Woodside Environmental Standards and Aspirations • Waste Management Plan for Mobile Offshore Drilling Unit (MODU) Operations - Dampier • MARPOL 73/78 Annex IV 	<ul style="list-style-type: none"> • Waste Management Plan is in place and adhered to. • Hazardous wastes documented and tracked according to requirements. • Material Safety Data Sheet (MSDS) sheets readily available. • Waste log maintained and quantities of wastes transported ashore recorded. • Recording and reporting of all items lost overboard.
No hydrocarbon or chemical spills to the marine environment.	<ul style="list-style-type: none"> • Woodside Environmental Standards and Aspirations • Jack Bates Shipboard Oil Pollution Emergency Plan (SOPEP) • Jack Bates Emergency Response Plan • Carnarvon Basin (WA) Oil and other Noxious and Hazardous Substances Spill Contingency Plan (ERP-3250) • Interface Document for Concurrent Activities in Enfield Field (Jack Bates MODU) 	<ul style="list-style-type: none"> • Blow-Out Preventer (BOP) in place. • Approved Oil Spill Contingency Plan (OSCP) in place. • Jack Bates crew induction covers spill response procedures and spill response exercise conducted. • Re-fuelling procedures are in place and followed for Jack Bates and standby vessels. • Job Hazard Analysis (JHA) for bulk transfer of diesel and drilling fluids reviewed before each transfer. • Dry break couplings used on transfer hoses. • At sea refuelling supervised by Vessel Master or nominated Officer. • Records kept of inspections and preventative maintenance. • All valves, couplings and the transfer hose checked for integrity prior to use. • No anchors to be located over live production lines. • Adherence to agreed concurrent activities document. • Approval is sought and provided prior to all dispersant applications.

Objectives	Standards	Criteria
Minimise interference with recreational vessels, commercial fishing, and shipping.	<ul style="list-style-type: none"> • Woodside Environmental Standards and Aspirations • Jack Bates Emergency Response Plan • Australian Maritime Safety Authority (AMSA) requirements. 	<ul style="list-style-type: none"> • Functional rig navigational lighting in place and in use. • Consultation with identified stakeholders undertaken. • Marine notices broadcast according to Standard Maritime Safety Procedures (AMSA), via the Rescue Co-ordination Centre (RCC).

6. Consultation

Woodside established a community consultation programme in 1997 to inform and update stakeholders about exploration and development activities off North West Cape. This programme was formalised in 2001 with the establishment by Woodside of community reference groups in Perth and Exmouth to support the development of the then Vincent-Enfield development.

Woodside decided in 2004 to pursue a stand-alone Enfield development and has since used the reference groups, supported by one-to-one briefings and associated communication activities, to undertake consultation regarding activities within the Enfield area.

Specific consultation activities for the Enfield Drilling Environment Plan and associated activities include providing information to stakeholders regarding the drilling programme and making the Environment Plan available to those stakeholders who request a copy. Ongoing communication will be undertaken throughout the drilling program, including advertising in local media, newsletters, briefings and provision of a toll free telephone number (1800 654 249) to ensure stakeholders are appraised of activities and potential impacts.

Contact Details

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