



**Title: Vincent Development Drilling Campaign
Environment Plan (Rev 2) Summary**

DOCUMENT INFORMATION			
DRIMS#: 4337305	Rev: 0		
DRIMS Classification (if applicable):			
	Date	Signature	
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Signed: Date: 5/8/08

REVISION HISTORY				
Revision	Description	Date	Prepared by	Approved by
0	For Issue	01/08/08	T. Bonnici	G. Jones

RELEASE STATEMENT
(Check one box only)

Unclassified
(Shared without Restrictions)

Restricted
(Freely Shared within Woodside and Associated Companies)

Confidential
(Shared With Selected Personnel)

Most Confidential
(Strict Need-to-Know Basis)

REVIEW STATUS
(Check one box only)

Review Period 1 Year

Review Period 3 Years

Review Not Required

PREPARED
(Check one box only)

By WEL

For WEL Under PO/Contract No: _____

Vincent Development Drilling Campaign Environment Plan (Rev 2) Summary

This summary of the Vincent Development Drilling Campaign Environment Plan (Rev 2) has been submitted to comply with Regulation 11(7)(8) of the *Petroleum (Submerged Lands) (Management of Environment) Regulations 1999*.

Introduction

Woodside Energy Ltd is developing the Vincent oil field in the deep waters off North West Cape, Western Australia.

Activities to support the drilling of the development wells were outlined in the Vincent Development Drilling Campaign Environment Plan (EP) and approved by the Western Australian Government in November 2006.

Since that time, a number of changes to the drilling programme and timing of planned activities have occurred. These changes, as well as additional information identified for inclusion, warranted a revision of the EP for approval and use.

The key revisions made to the original EP are outlined in a table of amendments included at the beginning of the Rev 2 version of EP. Key revisions include, but are not limited to, the following:

- Three of the originally planned dual lateral production wells may possibly be drilled as trilateral wells, a possible pilot well may be drilled extending from VNB-H2 production well and an additional water injector to be drilled;
- Proposed start date of drilling campaign changed to actual start date (April 2007) and expected duration extended;
- Revision of the Non-Water Based Mud SYN-TEQ formulation to be 100% Alpha-Teq base fluid as Iso-Teq is no longer in use;
- Inclusion of specific information pertaining to the use of RX-03;
- Inclusion of approved alternative chemicals to replace gluteraldehyde;
- Additional information outlining the requirements of the Historic Shipwrecks Act 1976; and
- Inclusion of additional MSDS' for products in use.

Project Description

At the closest direct distance, the Vincent Development Area is approximately 50 km north-west of the town of Exmouth, approximately 18.5 km north of the Ningaloo Marine Park (Commonwealth Waters) offshore boundary, and approximately 26 km north-west of the Muiron Islands Marine Management Area. Water depths across the Vincent Development Area range from about 230 – 460 m, while water depths over the Vincent field are approximately 350 – 400 m.

Coordinates of Activity

The surface location coordinates for the wells and manifolds are: *UTM (GDA94 50S)*.

Appraisal Well:

Easting	Northing	Latitude	Longitude
196 046 mE	7 628 146 mN	21° 25' 24.368" S	114° 4' 4.644" E

Production Wells:

Manifold	Easting	Northing	Latitude	Longitude
1	193 879 mE	7 626 308 mN	21° 26' 22.751" S	114° 02' 48.265" E
Well	Easting	Northing	Latitude	Longitude
VNA-H1	193 882 mE	7 626 290 mN	21° 26' 23.337" S	114° 02' 48.357" E
VNA-H2	193 861 mE	7 626 311 mN	21° 26' 22.642" S	114° 02' 47.642" E
VNA-H3	193 875 mE	7 626 325 mN	21° 26' 22.196" S	114° 02' 48.137" E
VNA-H4	193 896 mE	7 626 304 mN	21° 26' 22.891" S	114° 02' 48.852" E
Manifold	Easting	Northing	Latitude	Longitude
2	192 445 mE	7 626 927 mN	21° 26' 01.763" S	114° 01' 58.919" E
Well	Easting	Northing	Latitude	Longitude
VNB-H1	192 452 mE	7 626 911 mN	21° 26' 02.287" S	114° 01' 59.151" E
VNB-H2	192 427 mE	7 626 925 mN	21° 26' 01.817" S	114° 01' 58.293" E
VNB-H3	192 437 mE	7 626 942 mN	21° 26' 01.271" S	114° 01' 58.651" E
VNB-H4	192 462 mE	7 626 928 mN	21° 26' 01.741" S	114° 01' 59.509" E

Gas Injection Well:

Easting	Northing	Latitude	Longitude
194 660 mE	7 628 810 mN	21° 25' 1.955 S	114° 3' 16.994 E

Water Injection Wells:

Well	Easting	Northing	Latitude	Longitude
VNC-W1	193 502 mE	7 624 166 mN	21° 27' 32.098 S	114° 2' 33.781 E
VNC-W2	193 467.2 mE	7 624 129.8 mN	21° 27' 33.252 S	114° 2' 32.549 E
VNC-W3	193 501.7 mE	7 624 196.9 mN	21° 27' 31.090 S	114° 2' 33.790 E

Description of the Existing 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. Water temperatures decrease with depth, with temperatures near the seabed in the proposed Vincent Development Area (230 – 460 m water depth) ranging seasonally from 8 – 10°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 Vincent 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, although these occur mainly along scarp and canyon features to the south-west, and outside of the Vincent Development Area, in water depths greater than 500 m. These hard rocky surfaces support a locally diverse accumulation of species.

While some unusual species were recorded during sampling of the deeper water environments conducted as part of investigations, the same collection of species that typically inhabits the seafloor and burrows in seafloor sediments is generally found to be widespread and well represented along the continental shelf and upper slopes in this region.

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 Vincent 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 near shore 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 near shore feeding behaviour.

A variety of cetaceans (whale and dolphin species) have been recorded during surveys of offshore waters in the vicinity of the proposed Vincent 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 Vincent 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 Vincent Development Area when making their approach or departure from the reef.

Socio-Economic Environment

The nearest town to the proposed Vincent Development is Exmouth. Despite the relatively small population and isolation of the Exmouth area, a range of special events and recreational activities are held in the area throughout the year, including fishing competitions and the Whale Shark Festival.

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* FPSO, which is producing from the Enfield oil field and is approximately 9 km south-west of the Vincent FPSO location and the BHP Billiton Petroleum-operated Stybaroow Venture FPSO, another oil development, is more than 25 km west of the Vincent FPSO location.

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 Vincent Development Area each year.

Other significant socio-cultural features include the Ningaloo Marine Park (Commonwealth and State Waters), Muiron Islands Marine Management Area and Cape Range National Park.

Major Environmental Hazards and Controls

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 anchoring, rig movements and rig operations;
- Discharge of drilling fluid, drill cuttings and cementing fluids;
- Discharge of deck drainage;
- Discharge of sewage and putrescible domestic wastes;
- Discharge of waste materials;

- Emissions to atmosphere from operating equipment; and
- Accidental hydrocarbon and/or hazardous material spills.

A series of comprehensive environmental management controls will be maintained by Woodside and Maersk to ensure that no significant environmental effects are realised from the drilling operation. Potential spills will be managed according to the oil spill arrangements and procedures outlined in the approved Carnarvon Basin (WA) Oil and Other Noxious and Hazardous Substances Spill Contingency Plan (ERP-3250).

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 and Aspirations • Site specific mooring plan • Nan Hai VI Rig Specific Procedures • Supply Vessel Marine Operations Procedures 	<ul style="list-style-type: none"> • Anchor deployment and retrieval is done 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"> • AQIS Australian Ballast Water Management Requirements • <i>Quarantine Act 1980</i> 	<ul style="list-style-type: none"> • Rig and vessel adhere to AQIS Australian Ballast Water Management Requirements and quarantine requirements.

Objectives	Standards	Criteria
No significant impact to marine fauna	<ul style="list-style-type: none"> • Woodside Environmental Standards and Aspirations • Part 8 EPBC Conservation Regulations 2000 • EBPC Amendment Regulations 2006 	<ul style="list-style-type: none"> • Guidelines for minimising whale disturbance followed. • Required safe distance of 300 m from cetaceans maintained by standby vessels. • Helicopters shall not operate lower than 1650ft or within the horizontal radius of 500m of a known cetacean.
No significant impact on marine environment from drill fluids and cuttings	<ul style="list-style-type: none"> • Woodside Environmental Standards • Woodside's Well Engineering Drilling Fluid Selection Procedure (TP03). 	<ul style="list-style-type: none"> • Use of approved, low toxicity WBM and NWBM. • Fluid and cuttings control equipment inspected and operating correctly prior to commencement of operations. • Drill cuttings mechanically treated using solids control equipment including VSM shale shakers to reduce oil in cuttings to below 10%.
No significant impact on marine environment from routine discharge	<ul style="list-style-type: none"> • Woodside Environmental Standards and Aspirations • Nan Hai VI Deck Drainage Management procedure • MARPOL 73/78 Annex IV 	<ul style="list-style-type: none"> • Putrescible waste macerated to < 25 mm diameter before disposal. • Sewage comminuted and disinfected via a MARPOL Approved system before disposal. • Check for marine mammals within the vicinity of the rig undertaken before discharge of residual water based mud or cement. • Deck drainage contaminated by hydrocarbons is contained and disposed onshore.
No significant environmental impact from solid and hazardous wastes	<ul style="list-style-type: none"> • Woodside Environmental Standards • Woodside Waste Management Plan - 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. • MSDS sheets readily available. • Waste log maintained and quantities of wastes transported ashore recorded.
No hydrocarbon or chemical spills to the marine environment	<ul style="list-style-type: none"> • Woodside Environmental Standards and Aspirations • Nan Hai VI Bulk Transfer Procedures • Nan Hai VI SOPEP • Nan Hai VI Emergency Response Plan • Carnarvon Basin (WA) Oil and other Noxious and Hazardous Substances Spill Contingency Plan (ERP-3250) 	<ul style="list-style-type: none"> • BOP in place. • Approved OSCP in place. • Rig crew induction covers spill response procedures and spill response exercises conducted. • Re-fuelling procedures are in place and followed for rig and standby vessels. • JHA for bulk transfer of diesel and drilling fluids reviewed before each transfer. • At sea refuelling supervised by Vessel Master or nominated Officer. • Dry break couplings and floats used on transfer hoses. • Records kept of inspections and preventative maintenance. • All valves, couplings and the transfer hose checked for integrity prior to use. • Approval is sought and provided prior to dispersant application.

Objectives	Standards	Criteria
Minimise interference with recreational vessels, commercial fishing, and shipping	<ul style="list-style-type: none"> • Woodside Environmental Standards • Nan Hai VI Emergency Response Plan • AMSA requirements 	<ul style="list-style-type: none"> • Functional rig navigational lighting in place and in use. • Consultation with local fishermen, fishing industry groups and management agencies as needed. • Marine notices broadcast according to Standard Maritime Safety Procedures (AMSA), via the Rescue Co-ordination Centre (RCC).

Consultation

Woodside is committed to ensuring stakeholders are consulted on activities associated with the proposed Vincent development, including the proposed drilling programme.

A community consultation programme has been in place since 1997 to inform and update stakeholders on WA-271-P exploration and development activities. 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 embrace development of Vincent. The reference groups have since been used as a model for community consultation in the region by other resource development companies.

Stakeholders were consulted prior to the start of drilling programme, including providing the Vincent Drilling Environment Plan to those stakeholders who requested a copy. Stakeholders for Vincent have included;

- Environmental non-government organisation representatives in Exmouth and Perth;
- Exmouth Shire and peak industry groups;
- Regional indigenous groups;
- Perth and Exmouth community reference group members; and
- Other stakeholders through Woodside's Greater Enfield Area Update newsletter.

Ongoing communication has been undertaken throughout the drilling program, including advertising in local media, newsletters, briefings and provision of a toll free telephone number to ensure stakeholders are appraised of activities and potential impacts.

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