

Ixion-1 Appraisal Well Environmental Plan Summary

This summary of the Ixion-1 Appraisal Well Environment Plan has been submitted to comply with Regulation 11(7)(8) of the *Petroleum (Submerged Lands) (Management of Environment) Regulations 1999*.

Introduction

Woodside Energy Ltd (Woodside) proposes to drill the Ixion-1 Appraisal Well using the drill ship rig, the Chikyu operated by Jamstec (Japan Agency for Marine Earth Science and Technology). Spudding will commence in April 2007. The well is located in the Carnarvon Basin within the Permit Area WA-370-P. The proposed location is 233.5 km north-west of Karratha and 90 km north-west of the Montebello Islands Marine Park.

Project Description

Drilling of the Ixion-1 Appraisal Well will be undertaken using the Chikyu. All holes sections will be drilled with water based muds. It is planned to undertake vertical seismic profiling of the well. No well testing, and hence no flaring, is required.

Coordinates of Activity

The surface location coordinates are: UTM (GDA94 50S):

Easting: 282 429 E	Lat. 019° 40' 47.31" S
Northing: 7 822 623 N	Long. 114° 55' 28.54" E

Description of the Receiving Environment

The Ixion-1 well is located within the North West Shelf (NWS). There are no known areas of environmental significance in the immediate vicinity of the Ixion-1 well location. No endangered or vulnerable species are known to reside permanently within the area although some may pass through on migratory routes.

Physical Environment

The water depth on the continental shelf of the NWS area ranges between 50 and 1,500 m isobaths, although most of the area lies between 50 and 500 m water depth. Two significant banks are present on the gently inclined shelf, the Rankin Bank and Glomar Shoal. The seabed is generally characterised by deep (>5 m) soft, silty sediments which become deeper, softer and finer with increasing depth.

Generally wind patterns in the region are monsoonal with a marked seasonal pattern. Wind direction is predominantly from the SE and NE during April to September with an average wind of speed of 5 - 6 knots. During October to March the prevailing wind direction is from the SW, W and NW and the average wind speeds are less than 10 knots. Tropical cyclones occur in the area typically three to four times per year, most commonly between December and April. Swells of up to 2 m can be expected year round, with April being the calmest month, and January and June the roughest. Wave direction predominantly follows wind direction (ESE in winter, WSW in summer), except during cyclone or storm conditions.

Biological Environment

Sampling of the benthic zone has consistently shown that the soft sediments of NWS support a low abundance, high diversity invertebrate fauna population, largely comprising burrowing polychaete worms (*Phylum annelida*) and crustaceans (*Phylum crustacea*). Echinoderms, bivalves and molluscs also contribute significantly to the faunal composition of the area.

Five species of turtle listed under the EPBC Act, are known to occur in the region, Flatback, Leathery, Green, Hawksbill and Loggerhead Turtles. Individuals of all five species may be expected to pass through the region on their way to and from nesting beaches on the mainland and adjacent islands, however while at sea the density (concentration) of animals is low. A number of whale species may be encountered in the region, including Pygmy, Blue, Sperm and Humpback Whales. The Humpback Whale is listed as Vulnerable under the EPBC Act. The Group IV Humpback Whale (*Megaptera novaeangliae*) population migrates across the NWS during the annual migration. During June, July and early August the whales follow a northward route across the NWS, which appears to follow the edge of the continental shelf, to the calving grounds off the Kimberley Coast. Cow-calf pairings tend to occur in the area from Sept-Oct. Research undertaken by the Centre for Whale Research indicates that cow-calf pairings generally remain in the proximity of the close shore during the southern migration following a relatively narrow route that passes close to the Dampier Archipelago and Montebello Islands.

Surveys off the NWS indicate that seabird distribution is generally very patchy except near islands where shelter and anomalies in surface water concentrate food seasonally. Most of the birds encountered offshore forage in flocks of 20 to more than 200 individuals, often of different species, and are commonly associated with schools of pelagic fish, such as tuna. Foraging groups typically comprise Sooty Terns (*Sterna fuscata*), Wedge-tailed Shearwaters (*Puffinus pacificus*) and the occasional Frigatebird (*Fregata* spp).

Socio-Economic Environment

The offshore NWS supports one open fishery and three offshore fisheries, extending northwards and eastwards from the North West Cape out to the limits of state jurisdiction at a depth of 200 m. The main fisheries in this area include the Pilbara Trawl Fishery, Pilbara Trap Fishery, Western Tuna and Billfish Fishery and the Northern Shark Fishery. There are no recreational fisheries in the vicinity of any of the permit areas on the NWS.

Major Environmental Hazards and Controls

A risk assessment for the drilling of the Ixion-1 Appraisal Well identified the major impacts from drilling activities to be discharge of drill cuttings and fluids, potential spill of hydrocarbons and vertical seismic activities.

A number of whale species may be encountered in the region, including Pygmy Blue, Sperm and Humpback Whales. The Ixion-1 well is located within the Humpback Migratory path; however, drilling will occur outside of the known migration period. To ensure minimal impact on whales in the area supply vessels will maintain a 300 m separation distance, where safe to do so, from any whales sighted and vertical seismic activities will be undertaken as per the DEWR Guidelines for Seismic Activities.

All hole sections of the wells will be drilled with low-toxicity water based drilling mud that is considered 'almost non-toxic' or 'non toxic'. Study findings from single well drilling activities in similar environments both within Australia and overseas, show that environmental effects attributable to the discharge of drill cuttings can be expected to be localised (<250 m) and short lived. As such, a sufficient buffer from routine drilling activities exists between the well site and any sensitive habitats.

The risk of a major hydrocarbon spill during routine drilling activities is very low. The results of modelling from the Maenad-1 well site, in WA-267-P approximately 57 km to the south-west of the Ixion-1 well, showed a very low potential for the exposure of the Montebello Islands, Barrow Island or the WA coast to spilled hydrocarbons

A series of comprehensive environmental management controls such as well control and refuelling procedures, permit to work system and Job Hazard Analysis will be maintained by

Woodside and Jamstec 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 Western Australia and Dampier Sub-Basin Oil Spill Contingency Plan (ERP-3210).

Summary of Management Approach

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

Objectives	Standards	Criteria
No significant impact to seabed and benthic habitats.	<ul style="list-style-type: none"> Woodside Environmental Standards and Aspirations Standby Vessel Marine Operations Procedures 	<ul style="list-style-type: none"> Use of dynamically position drill ship. Use of ROV to position and remove transponders. 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"> Drill ship and vessels adhere to AQIS Australian Ballast Water Management Requirements and quarantine requirements.
No significant impact to transient marine life.	<ul style="list-style-type: none"> Woodside Environmental Standards and Aspirations <i>EBPC Amendment Regulations 2006</i> DEH Guidelines for Minimising Disturbances to Whales 	<ul style="list-style-type: none"> Guidelines to minimise whale disturbance followed. Required distance of 300 m from cetaceans maintained by standby vessels where safe to do so. VSP Survey Procedures followed.
No significant impact on marine environment from drill fluids and cuttings.	<ul style="list-style-type: none"> Woodside Environmental Standards and Aspirations Chikyu Preventative Maintenance System (PMS) Woodside's Well Engineering Drilling Fluid Selection Procedure (TP03). 	<ul style="list-style-type: none"> Use of approved, low toxicity water based mud Fluid and cuttings control equipment inspected and operating correctly prior to commencement of operations.
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 drill ship 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 meets MARPOL requirement.
No significant environmental impact from solid and hazardous wastes.	<ul style="list-style-type: none"> Woodside Environmental Standards and Aspirations Woodside Waste Management Plan MARPOL 73/78 Annex IV 	<ul style="list-style-type: none"> Waste Management Plan 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. Recording and reporting of all items lost overboard.

Objectives	Standards	Criteria
No hydrocarbon or chemical spills to the marine environment.	<ul style="list-style-type: none"> • Woodside Environmental Standards and Aspirations • Western Australia and Dampier Sub-Basin Oil Spill Contingency Plan (ERP-3210) • Chikyu SOPEP • Chikyu Emergency Response Plan 	<ul style="list-style-type: none"> • BOP in place. • Approved OSCP in place. • Chikyu crew induction covers spill response procedures and spill response exercise conducted. • Re-fuelling procedures are in place and followed for Chikyu and standby vessels. • JHA for bulk transfer of diesel and drilling fluids reviewed before transfers. • At sea refuelling supervised by Vessel Master or nominated Officer. • Dry break couplings used on transfer hoses. • All valves, couplings and transfer hoses checked for integrity prior to use. • Approval is sought and provided prior to all dispersant applications. • Dynamic Positioning (DP) Operator in the control room at all times.
No significant impact on recreational vessels, commercial fishing, and shipping.	<ul style="list-style-type: none"> • Woodside Environmental Standards and Aspirations • Chikyu Emergency Response Plan • AMSA requirements 	<ul style="list-style-type: none"> • Functional navigational lighting in place and in use. • Consultation with local fishermen, fishing industry groups and management agencies as needed. Operations carried out in a manner that does not interfere with navigation and fishing to a greater extent than is necessary. • Marine notices broadcast according to Standard Maritime Safety Procedures (AMSA), via the Rescue Co-ordination Centre (RCC).
Minimise emissions to atmosphere from incineration of wastes	<ul style="list-style-type: none"> • Woodside Environmental Standards and Aspirations • MARPOL 73/78 Annex VI • MEPC.76(40) Standard Specification for Shipboard Incinerators • Incinerator Operating Manual 	<ul style="list-style-type: none"> • Incinerator certified to meet MARPOL requirements. • Incinerator operated as per Incinerator Operating Manual. • Only combustible non-hazardous waste, with the exception of oil and oily material, to be incinerated. • Ash to be contained and transported onshore for disposal. • Flue gas outlet temperature monitored together with fed/start up controls.

Consultation

Vessels in the Western Tuna and Billfish Fishery may be operating in the permit area, hence the Commonwealth Fisheries Association, West Australian Fishing Industry Council, TunaWest and Tuna Boat Owners' Association of Australia will be contacted prior to drilling commencing to inform them of the drill rig location. Consultation with broader stakeholders was deemed not to be required due to the small area affected, short duration of drilling and lack of sensitive environments close to the drill well location.

Contact Details

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