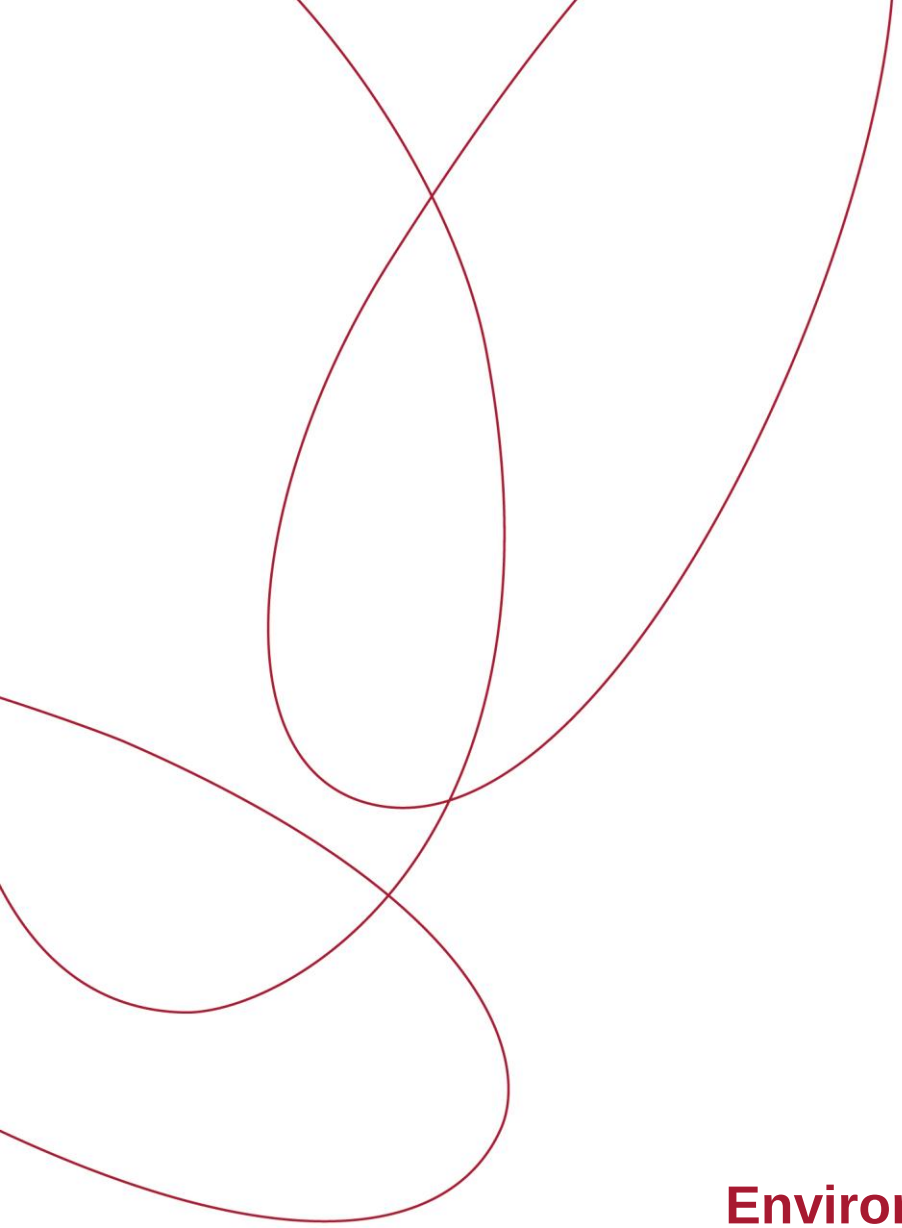

Nganhurra FPSO
Environment Plan Summary

Date 16/06/2011

NGANHURRA OPERATIONS ENVIRONMENT PLAN SUMMARY

The following presents a summary of the *Nganhurra* Floating Production Storage and Offloading (FPSO) Environment Plan (EP). The current EP represents a five yearly update to the original plan as per requirements of Regulation 19 of the *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009*. The update was not initiated as a result of any new activities, changes to currently approved activities or identified increase in environmental risk.

1. COORDINATES OF THE ACTIVITY

Woodside Energy Limited (Woodside) is part owner and operator of production permit WA-28-L (previously exploration permit WA-271-P). Woodside has made a number of hydrocarbon discoveries within the WA-271-P permit, with the Enfield Project having developed the Nganhurra FPSO to produce oil from the wells in the Enfield area..

The *Nganhurra* FPSO is located in 400 m of water depth approximately 38 km from the North West Cape coast line, in location: 189 895 mE, 621 658 mN GDA94.

2. THE RECEIVING ENVIRONMENT

The licence area does not impinge on any existing or proposed marine parks or nature reserves, with the FPSO located approximately 21km from the northern boundary of the Ningaloo Marine Park (Commonwealth Waters).

WA-28-L is situated in an area with water depths ranging between 100 m and 2,000 m, and consequently, it contains no inter-tidal or supratidal environments. The seabed in this area is dominated by a north-south trending scarp and several east-west trending submarine canyons. The majority of the seabed in the area is generally featureless and consists of fine to medium sediment (silts and sands). Biological seabed surveys conducted across the licence area have indicated that benthic communities across the shelf and slope are typical of the north western Australian region. Abundance and diversity of benthic organisms in the area generally decreases with depth, with the greatest abundance and diversity of biota observed on the continental shelf, in depths to 150 m. Biota are generally more abundant and diverse around areas of complex seabed topography or coarse sediments.

Surface waters around the FPSO location typically contain a sparsely distributed and ocean-travelling marine life, including whales and whale sharks and other pelagic fish such as mackerel, tuna, marlin and sailfish. Humpback whales migrate through the area between June and December, while pygmy blue whales have been recorded in low numbers in offshore waters of the region throughout the year. Seabirds also occur offshore, where they may raft on the water surface. Resources of ecological significance in the offshore waters of the licence area are thus typically mobile species mostly occurring in low numbers and widely dispersed.

Prevailing winds in the region are from the southern and south-western quadrants during summer (October-March) and from the eastern, south-eastern and southern quadrants during winter (May/August). During the transition months of April and September, both summer and winter air flows may be expected. Cyclones in the area most frequently occur between January and March, but they have been recorded from November to May. Local currents flow predominately towards the southern and western quadrants from August to April, with the exception to this being October, when a significant portion of the currents move towards the northern and eastern quadrants. During May to July there is a more variable pattern with significant current flows towards the northern and eastern quadrants as well as strong southern and western flows.

3. DESCRIPTION OF THE ACTION

The function of the *Nganhurra* FPSO is to extract, process, store and offload oil from reservoirs. The *Nganhurra* FPSO is a standard Suezmax of double hulled construction with a cargo storage capacity of approximately 143,000 m^3 (900,000 barrels) and it is equipped with a disconnectable mooring and its own propulsion system to allow evasion of tropical cyclones. In normal 24 hour operations, an offshore crew averaging 29 personnel is accommodated onboard. The topsides processing facilities consists of oil/water/gas separation systems, water injection and gas compression equipment.

Reserves are extracted using subsea wells with flowlines tied back to the *Nganhurra* FPSO. Gaslifted wells are used to produce the Enfield fluids. Water injection wells are required for the disposal of produced water supplemented by injection of seawater to provide reservoir support for Enfield. Excess gas is reinjected into the reservoir.

4. MAJOR ENVIRONMENTAL HAZARDS AND CONTROLS

Offshore installation activities have been subject to a comprehensive impact and risk assessment process which allows certain impacts and potential risks to be systematically identified and addressed.

The environmental hazards that have been identified as key risks for the operational activities of the *Nganhurra* FPSO and the controls/commitments to manage these risks are listed in Table 1 below:

Table 1 – Summary of Key Hazards Identified

Hazard	Controls/Performance Criteria
Hydrocarbon spill during offtake operations	Spills of hydrocarbon >80 litres to ocean will be reported to DMP (Reportable Incident).
	Fuel bunkering to the FPSO will be conducted in accordance with the facility Offtake Procedure.
	Offtake records required by the procedure will be completed and retained.
	Dry break couplings will be provided on the FPSO offtake hoses. Dry break couplings and hoses will be formally inspected periodically. Inspection records will be retained.
	Offtake hoses and fittings are compatible with supply vessel pump pressures. Bunkering hoses are certified as suitable for a safe operating pressure range at purchase – records of certification shall be kept.
	Vessel to vessel fuel bunkering procedures to be adhered to and bunkering records required by the procedures will be completed and retained.
	In the event of a spill to the marine environment the Carnarvon Basin Oil Spill Contingency Plan may be activated (depending on the volume spilt and likelihood of escalation).

Hydrocarbon spill during bunkering operations	Spills of hydrocarbon >80 litres to ocean will be reported to DMP (Reportable Incident). .
	Fuel bunkering to the FPSO will be conducted in accordance with the facility Bunkering Procedure.
	Bunkering records required by the procedure will be completed and retained.
	Dry break couplings will be provided on the FPSO diesel bunkering hoses. Dry break couplings and hoses will be formally inspected periodically. Inspection records will be retained.
	Diesel bunkering hoses and fittings are compatible with supply vessel pump pressures. Bunkering hoses are certified as suitable for a safe operating pressure range at purchase – records of certification shall be kept.
	Vessel to vessel fuel bunkering procedures to be adhered to and bunkering records required by the procedures will be completed and retained.
	In the event of a spill to the marine environment the Carnarvon Basin Oil Spill Contingency Plan (ERP 3250) may be activated (depending on the volume spilt and likelihood of escalation).
Hydrocarbon release due to well blowout	Woodside has determined, and integrated into the production system, a well integrity envelope for each production well. Operations will be conducted within this envelope.
	Pressure, temperature and sand production rates will be monitored at the subsea tree and recorded. These will be compared against design allowances and the integrity envelope, to ensure equipment stays within a safe operating range.
	Subsea shut-in and Emergency Shutdown (ESD) valves will be subject to routine testing and records of tests will be kept.
	To protect against accidental damage from anchors, dropped objects, fishing gear and the like, the location of production wells has been marked on the relevant navigational charts by the Australian Hydrographic Office and will be maintained.
	In the highly unlikely event of a well blowout, or partial blowout, the Carnarvon Basin Oil Spill Contingency Plan (ERP 3250) will be activated. It is likely that the Western Australian and National Oil Spill Plans (WestPlan MOP and NatPlan respectively) would be triggered if this eventuated.
Hydrocarbon release due to flowline or riser damage	The FPSO navigational equipment (radar, navigational aids (lighting and AIS)) will be maintained for the life of the offshore facilities and repaired as a matter of priority if equipment failure occurs.
	ROV inspections of the pipeline and inspections of the risers, riser protection frames etc will be conducted regularly.

	Woodside has in place repair strategies for the flowlines, which will form the basis of any repair works, in consultation with the Designated Authority.
Hydrocarbon release due to flowline failure	Corrosion monitoring and trending, along with chemical residual analysis (to ensure that the appropriate amount of corrosion inhibitor is passing along the pipeline system) will be undertaken and results recorded.
	ROV inspection, to detect external pipeline threats (scour, spanning), internal threats (wall thickness reductions etc) and damage will be undertaken.

5. SUMMARY OF THE MANAGEMENT APPROACH

The management approach follows Woodside's Management System (in line with an ISO-14001 management system). A systematic approach is taken through the identification and assessment of hazards and risk, the establishment of objectives, performance standards, criteria and the development of appropriate documentation.

Environmental management when in the field and connected to the riser will be the responsibility of the FPSO Offshore Installation Manager (OIM).

6. CONSULTATION

The *Nganhurra* FPSO is currently operational and updates to this EP reflect revisions made as part of the statutory five yearly review process. The draft revision was issued to the DMP for review on 10 March 2011 and comments were addressed as part of the final submission. The Exmouth Community Reference Group (CRG) were also given the opportunity to review and comment on the draft. Woodside will continue to consult with relevant stakeholders appropriately throughout the life of the development.

7. CONTACT DETAILS

For further information please contact Emilio Papiccio, Environment Manager Production, on +618 9348 5180.