Minarelli Exploration Well Environment Plan Summary

Drilling and Completions

Date: August 2013

Status: Final

Controlled Ref No:DC0000AH8722189 Revision:1 Native file DRIMS No: 8722189

TABLE OF CONTENTS

1. INTRODUCTION

1.1 Background and Purpose

Woodside Energy Limited (Woodside), as operator, intends to drill the Minarelli exploration well located in Commonwealth waters in Production Licence Area WA-28-L.

The Minarelli Exploration Well Environment Plan (EP) has been prepared in accordance with the *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009* (Environment Regulations). The EP has been reviewed and accepted by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) in accordance with Regulation 11(4)(a).

This EP summary has been prepared as per the requirements of Regulations 11(7) and (8) of the Environment Regulations.

2. DESCRIPTION OF THE ACTIVITY

2.1 Location of the Activity

The Minarelli exploration well location is in Commonwealth waters in Production Licence Area WA-28-L (see **Figure 2-1**) in 427 m water depth (relative to Lowest Astronomical Tide). This production licence is approximately 51 km north-west of Exmouth and within an area of mature oil and gas operations. **Table 2-1** summarises the well details including surface coordinates, water depth and licence area.

Table 2-1: Minarelli Exploration Well Coordinates, Water Depth

Well	Water Depth (m LAT)	Longitude	Latitude	Licence Area
Minarelli	427	113^{o} 59’ 51.366” E	21^{o} 29’ 25.400” S	WA-28-L

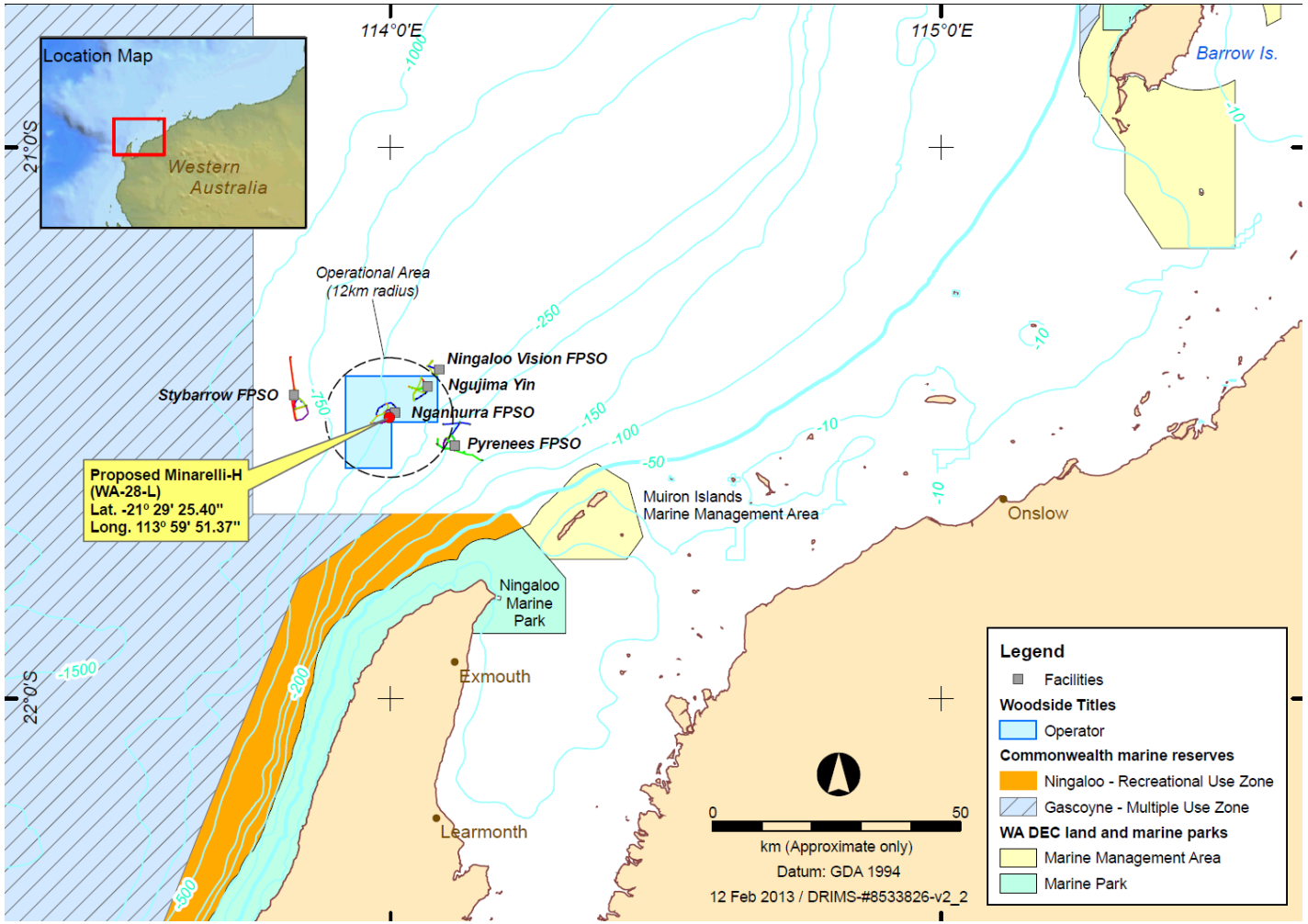

Figure 2-1: Proposed Minarelli Exploration Well Location (Note: The proposed Minarelli exploration well is referred to as "Minarelli H" in the figure)

2.2 Timing of Activity

Installation of the pre-lay anchors will occur prior to the drilling of the proposed Minarelli exploration well. Drilling of the well will take approximately 45 days and is scheduled to be undertaken during the non-cyclonic season between July and November 2013. The schedule is subject to change due to operational requirements and external influences such as drill rig availability.

2.3 Drilling Program

The Minarelli exploration well will be drilled with a mobile offshore drilling unit (MODU) using a combination of water based and non water-based mud. The target depth for the well is approximately 1,815 m below the seabed. Once the drilling is completed, the well will be plugged and abandoned.

Two vessels will be supporting the MODU during the drilling operations. At least one vessel will be on standby in the vicinity of the MODU. A third vessel may be called to assist during specific operational periods.

Drilling of the Minarelli Exploration Well includes the following steps:

1. Drilling of the top hole sections using seawater and pre-hydrated bentonite sweeps
2. Installation and cementing of the drill string casing
3. Testing and installation of the blow out preventer on the wellhead
4. Connection of a marine riser between the blow out preventer and the MODU
5. Displacement of the top hole sections with water based drilling mud
6. Drilling of the bottom hole section to the target depth of the well using water based mud
7. Drilling of a contingent sidetrack. If undertaken, this sidetrack would be drilled with a non water based mud with logging operations once at target depth.
8. Plugging and abandonment of the main bore and sidetrack (if drilled)

3. DESCRIPTION OF THE ENVIRONMENT

3.1 Physical Environment

The Minarelli exploration well will be located on the North West Shelf, within the North West Marine Bioregion (NWMR) on the outer continental slope region in 427 m water depth (relative to lowest astronomical tide). The regional oceanography is dominated by the Leeuwin Current, which flows to the south-west along the edge of the continental shelf.

3.2 Biological Environment

Regional studies on the North West Shelf indicate that the seabed material is likely to be predominantly flat and featureless and comprises thick, unconsolidated fine grained sands. The sediments support soft sediment benthic communities dominated by infauna (mobile burrowing species including molluscs, crustaceans and worms) and isolated larger fauna (free swimming cnidarian, demersal fish and benthic crustaceans). Soft sediment communities in the area are considered of a relatively low environmental sensitivity due to the depth of the water column (427 m), general lack of hard substrate, reduced light and low nutrient loading.

The Commonwealth Protected Matters database lists 11 marine species as 'threatened' and 16 species as 'migratory' under Commonwealth legislation (*Environment Protection and Biodiversity Conservation Act 1999)* that may occur in low abundance within, or pass through the Minarelli exploration well operational area. In general, these species are likely to be transient visitors to the Minarelli operational area (12km radius from well site), and there are no known feeding, breeding, resting or calving grounds within the operational area.

The Minarelli exploration well operational area is located on the outer edge of the humpback whale migration corridors. The timing of the Minarelli exploration well activities may overlap with the blue whale northern migration and the beginning of the southern migration, and the northern and southern migration periods for humpback whales.

With consideration of the distance offshore (approximately 30 km from North West Cape and Ningaloo Reef), the deep water location of the Minarelli exploration well drilling area (427 m depth), and the absence of potential nesting or foraging sites, i.e. no emergent islands, reef habitat or shallow shoals, the operational area of the Minarelli exploration well drilling activity is not considered an important habitat for marine turtles.

The presence of the operating MODU may result in localised behavioural avoidance however the abundance of threatened and migratory animals is expected to be low and therefore the activity is not considered to significantly impact the population of these species.

3.3 Socio-Economic Environment

The Minarelli exploration well operational area is located within five Commonwealth and State fisheries, however no concerns were raised by the Australian Fisheries Management Authority (AFMA) during stakeholder consultation undertaken for the activity, and AFMA have previously stated that there has been no fishing activity in the area in the last three years.

The region supports significant commercial shipping activity, the majority of which is associated with the oil and gas industry. The Minarelli exploration well is located 45 km south east from the nearest shipping fairway.

The Minarelli exploration well operational area is located approximately 51 km north-west of Exmouth and is rarely visited for tourism activities, aside from fishing charter boats. Two of the seven charter boat operators based in Exmouth offer fishing trips within the licence area.

There are a number of producing oil and gas fields in the North West Shelf region, with facilities including the Nganhurra FPSO (1.5 km from the Minarelli well site), Ngujima-Yin FPSO (10 km), Stybarrow Venture FPSO (18.5 km), Pyrenees FPSO (13.5 km) and Ningaloo Vision FPSO (13.5 km). These facilities are accessed regularly by tankers and support vessels that may be anchored or moving through the general area.

The Minarelli exploration well is located within Defence Restricted Airspace. The Royal Australian Air Force maintains a base at Learmonth, North West Cape. According to the Annual Australian Notices to Mariners some military flying training may occur in the vicinity of the proposed Minarelli exploration well. The Department of Defence has advised that exercises are planned in the area during September 2013.

4. MAJOR ENVIRONMENTAL HAZARDS AND CONTROLS

Woodside undertook an environmental risk assessment to understand the potential environmental risks associated with drilling of the Minarelli exploration well (planned and unplanned activities) to ensure that risks are reduced to a level as low as reasonably practicable (ALARP) and will be of an acceptable level using a method consistent with Woodside standards.

The key environmental hazards and control measures to be applied to the Minarelli exploration well activities are shown in **Appendix A**. These are consistent with Woodside corporate and project-specific objectives, standards and criteria. All control measures associated with the hazards will be implemented to reduce environmental risk to ALARP and ensure that risks will be of an acceptable level.

5. MANAGEMENT APPROACH

The Minarelli exploration well drilling activities will be managed in accordance with the EP accepted by NOPSEMA under the Environment Regulations, other relevant environmental legislation and Woodside's Management System (e.g. Woodside Environment Policy).

The objective of the EP is to ensure that potential adverse impacts on the environment associated with the Minarelli exploration well drilling activities, during both planned and unplanned activities, are identified, are reduced to ALARP and are of an acceptable level.

The EP details specific objectives and standards for each environmental aspect that was identified and assessed in the Environmental Risk Assessment (Section 5 of the EP). For each environmental aspect the range of controls to be implemented (consistent with the standards) to achieve the performance objectives are detailed. The EP then establishes the specific measurement criteria that will be used to demonstrate that the performance objectives and standards have been achieved.

The implementation strategy detailed in the EP identifies the roles/responsibilities and training/competency requirements for all personnel (Woodside and its contractors) in relation to implementing controls, managing non-compliance, emergency response and meeting monitoring, auditing and reporting requirements during the activities. The EP details the types of monitoring and auditing that will be undertaken and the reporting requirements for environmental incidents and reporting on overall compliance of the activities with the EP.

6. CONSULTATION

Woodside conducted a stakeholder assessment for the proposed activity to identify relevant and interested stakeholders based on the well location, proposed activities and timing.

A consultation fact sheet was sent electronically to all identified stakeholders prior to lodgement of the EP with NOPSEMA for assessment and acceptance. This advice was supported by engagement with potentially affected stakeholders.

Woodside received feedback on the proposed activity from a range of stakeholders, including government agencies, recreational fishing organisations and conservation groups. Issues raised by stakeholders included recreational fishing charters and the location of the Minarelli exploration well within a Defence Practice Area.

Woodside considered this feedback in its development of management measures specific to the proposed exploration well.

Woodside will continue to accept feedback from stakeholders during the drilling program.

7. CONTACT DETAILS

Further information about the Minarelli exploration well activity can be obtained from:

Ainslie Bourne
Senior Corporate Affairs Adviser
Woodside Energy Ltd
Woodside Plaza, 240 St Georges Terrace, Perth WA 6000
T: +61 8 9348 4000
E: ainslie.bourne@woodside.com.au

Toll free: 1800 442 977

APPENDIX A: Summary of Key Environmental Hazards and Control Measures to be applied to the Minarelli Exploration Well Drilling Activities (top-hole sections)

Source of Risk (Hazard)	Potential Environmental Impact	Control/Mitigation Measures
Planned (Routine and Non Routine) Activities		
Proximity to other vessels; interference with other vessels (fishing and shipping)	Localised, temporary and minor interference to commercial fishing and shipping activities in the area.	Compliance with Australian Maritime Safety Authority administered marine safety regulations and marine notification requirements. Pre-drilling notification/consultation with stakeholders.
Generation of noise from MODU and vessel operation	Potential disturbance to threatened and migratory cetacean species listed under the EPBC Act, including physical damage or as a behavioural effect.	The interaction of the support vessels with cetaceans will be consistent with Part 8 of the *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth). Support vessels on standby for majority of drilling program, with reduced noise output. Support vessel speed restrictions.
Generation of acoustic signals during vertical seismic profiling of the well	Minor and temporary acoustic disturbance to threatened and migratory whale species listed under the EPBC Act, including physical damage or as a behavioural effect.	Vertical seismic profiling procedure meets requirements of the *Environment Protection and Biodiversity Conservation Regulations 2000*.
Well site and MODU anchoring	Localised disturbance to the seabed and soft sediment/ sensitive benthic habitats. This is a mature area of oilfield development, where the benthic environment has previously been disturbed.	Compliance with Woodside procedures to identify well specific hazards. Anchoring analysis undertaken and implemented to minimise the potential for accidental anchor drag or the MODU dragging off location.
Atmospheric emissions from fuel combustion	Localised temporary reduction in air quality from atmospheric emissions	Compliance with *International Convention for the Prevention of Pollution from Ships 1973* as modified by the protocol of 1978 *(MARPOL 73/78) Annex VI* (as implemented in Commonwealth waters by the *Commonwealth Protection of the Sea (Prevention of Pollution from Ships) Act 1983*) (Cth)) requirements for emissions.
Discharge of sewage, grey water and putrescible wastes to the marine environment	Nutrient enrichment to a localised environment outside the mixing zone (200 m).	Compliance with MARPOL 73/78 - as applied in Australia under *Commonwealth Protection of the Sea (Prevention of Pollution from Ships) Act 1983*; AMSA Marine Orders - Part 96: Marine Pollution Prevention – Sewage, - as required by vessel class.
Routine discharge of bilge water	Localised short term decrease in water quality and	Compliance with MARPOL 73/78 - as applied in Australia under *Commonwealth*

Source of Risk (Hazard)	Potential Environmental Impact	Control/Mitigation Measures
to marine environment	toxic effects to marine biota.	*Protection of the Sea (Prevention of Pollution from Ships) Act 1983*; AMSA Marine Orders - Part 91 Marine Pollution Prevention – Oil, where applicable.
Routine discharge of drilling fluids, cementing fluids and sub-sea fluids to the marine environment from the MODU	Localised short term decrease in water quality and toxic effects to marine biota	All potentially hazardous materials and chemicals will be reviewed and approved through relevant Woodside procedures.
Routine discharge of drill cuttings (water based mud) to the marine environment	Localised burial or smothering of benthic habitats in the immediate vicinity of the discharge point.	The management of drill cuttings will be consistent with applicable Woodside engineering standards.
Routine discharge of drill cuttings (non water based mud) to the marine environment	Localised burial or smothering of benthic habitats in the immediate vicinity of the discharge point. Toxic effects to marine fauna	The management of drill cuttings will be consistent with applicable Woodside engineering standards and procedures. A third party audit of the non water based mud system will be undertaken.
Unplanned Activities (Accidents/ Incidents)		
Collision between support vessels and threatened and migratory whale species	Potential injury or mortality to threatened and migratory whale species listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) due to vessel strike	The interaction of the support vessels with cetaceans will be consistent with Part 8 of the *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth).
Dropped objects to the marine environment	Localised and short term damage of the benthic subsea habitats in the immediate location	Equipment and material dropped to the marine environment will be recovered where practicable. Rig contractor policies and initiatives in place to prevent dropped objects
Accidental loss of solid waste to the marine environment	Pollution and contamination of the environment and secondary impacts on marine fauna (e.g. ingestion or entanglement)	Compliance with MARPOL 73/78 - as applied in Australia under *Commonwealth Protection of the Sea (Prevention of Pollution from Ships) Act 1983*; AMSA Marine Orders - Part 95 Marine Pollution Prevention – Garbage, where applicable.
Deck spills to the marine environment	Minor and temporary reduction in water quality and toxic effects on surrounding marine flora and fauna.	Compliance with MARPOL 73/78 - as applied in Australia under *Commonwealth Protection of the Sea (Prevention of Pollution from Ships) Act 1983*; AMSA Marine Orders - Part 91 Marine Pollution Prevention – Oil, where applicable. The management of chemical storage, hoses and deck drainage will be consistent with applicable Woodside engineering standards. Adequate number of spill kits positioned in strategic locations on deck.
Hydrocarbon spill to the marine	Minor and temporary disruption to protected	Compliance with MARPOL 73/78 - as applied in Australia under *Commonwealth*

Source of Risk (Hazard)	Potential Environmental Impact	Control/Mitigation Measures
environment during bunkering activities	species such as oiling of marine mammals, reptiles and seabirds. Localised minor and/or temporary contamination of water which may lead to toxic effects to marine biota.	*Protection of the Sea (Prevention of Pollution from Ships) Act 1983*; AMSA Marine Orders - Part 91 Marine Pollution Prevention – Oil, where applicable. The management of transfer hoses and deck drainage will be consistent with applicable Woodside engineering standards.
Hydrocarbon release to the marine environment due to loss of vessel structural integrity	Toxic effects to marine biota Oiling of marine mammals, reptiles and seabirds Minor and temporary disruption to protected species that may migrate through the area.	Establishment and enforcement of a 500 m safety zone around the MODU. Use of support vessels to warn third parties and inform of exclusion zone. Compliance with relevant Marine Orders for navigation and prevention of collisions.
Hydrocarbon release to the marine environment due to loss of well integrity	Toxic effects to marine biota, particularly sessile benthos of the shallow sub tidal and intertidal zones such as fringing coral reefs, seagrass beds and mangrove habitat. Oiling of marine mammals, reptiles and seabirds	*Preventative* • Use of a range of industry standard well barrier equipment, materials and procedures as part of the well design, construction and abandonment. • Barriers and testing requirements will be consistent with applicable Woodside engineering standards and procedures. *Spill Response* • Spills to sea will be managed as per Woodside's Corporate Oil Spill Response Plan and the Minarelli Exploration Well Oil Spill Action Plan. • Monitoring/observation of the spill to guide the spill response. • Recovery and containment undertaken to minimise potential environmental impact.
Accidental discharge of non water based mud to the marine environment during bulk transfer	Minor and temporary disruption to protected species such as oiling of marine mammals, reptiles and seabirds. Localised minor and/or temporary contamination of water which may lead to toxic effects to marine biota.	The management of transfer hoses and deck drainage will be consistent with applicable Woodside engineering standards. Compliance with North West European Area Guidelines for offshore supply
Accidental discharge of non water based mud to the marine environment from failure of slip joint packers	Minor and temporary disruption to protected species such as oiling of marine mammals, reptiles and seabirds. Localised minor and/or temporary contamination of water which may lead to toxic effects to marine biota.	Slip joint packers to be compliant with applicable Woodside engineering standards, including dual seals. Slip joint packer pressure gauges regularly inspected while drilling with non water based mud

Source of Risk (Hazard)	Potential Environmental Impact	Control/Mitigation Measures
Accidental damage to existing subsea flow line infrastructure resulting in gas discharge	Toxicity effects to marine fauna from H_2S release	Compliance with relevant safe work procedures and standards to prevent dropped objects. Anchoring analysis undertaken and implemented to minimise the potential for accidental anchor drag.