



RAVENSWORTH 8H6 WELL INTERVENTION ENVIRONMENT PLAN SUMMARY

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Contents

1	INTRODUCTION	3
2	LOCATION OF THE ACTIVITY	3
3	DESCRIPTION OF THE ACTIVITY	5
3.1	Timing	5
4	DESCRIPTION OF RECEIVING ENVIRONMENT	6
4.1	Natural Environment	6
4.2	Biological Environment	6
4.3	Socio-Economic Environment.....	6
5	MAJOR ENVIRONMENTAL HAZARDS AND CONTROLS	8
6	MANAGEMENT APPROACH	10
7	CONSULTATION	10
8	CONTACT DETAILS	11

1 INTRODUCTION

This EP summary covers BHP Billiton's intervention activities for the proposed Ravensworth 8H6 well Intervention. The Pyrenees Development draws crude oil from the Ravensworth, Crosby and Stickle fields. The Ravensworth 8H6 well is located in the BHP Billiton operated Permit Area WA-42-L. The well is approximately 31 km northwest of the tip of the North West Cape and 37 km northwest of Exmouth, Western Australia.

The project specific Environment Plan (EP) has been accepted by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) and ensures that all operations are planned and conducted in line with BHPBP's environmental standards and comply with statutory requirements.

The EP will serve as a practicable environmental management tool to be used throughout the activity by operators to implement targeted environmental control measures.

This summary EP contains the findings and conclusions of the environmental impact assessment undertaken for the proposed activity. This process ensures any potential environmental impacts associated with the activity, during both routine and non-routine (abnormal) operations, have been identified and appropriately assessed. Relevant preventative and mitigation measures have been developed and implemented to ensure any adverse impacts are eliminated where possible or managed to be as low as reasonably possible.

2 LOCATION OF THE ACTIVITY

The Pyrenees Development draws crude oil from the Ravensworth, Crosby and Stickle fields. The Ravensworth 8H6 well is located in the BHP Billiton operated Permit Area WA-42-L. The well is approximately 31 km northwest of the tip of the North West Cape and 37 km northwest of Exmouth, Western Australia.

The Ravensworth 8H6 well is located on the shelf break, the transition from continental shelf to slope, with water depths sloping seaward from 190 m at the shelf edge, to depths of 260 m. The coordinates of the Ravensworth 8H6 well is provided in Table 2-1 and the location illustrated by Figure 2-1.

Table 2-1. Ravensworth 8H6 well location (GDA94)

Well Name	Latitude	Longitude	Depth (m)
Ravensworth 8H6	21° 31' 46.283"	114° 05' 06.999"	200

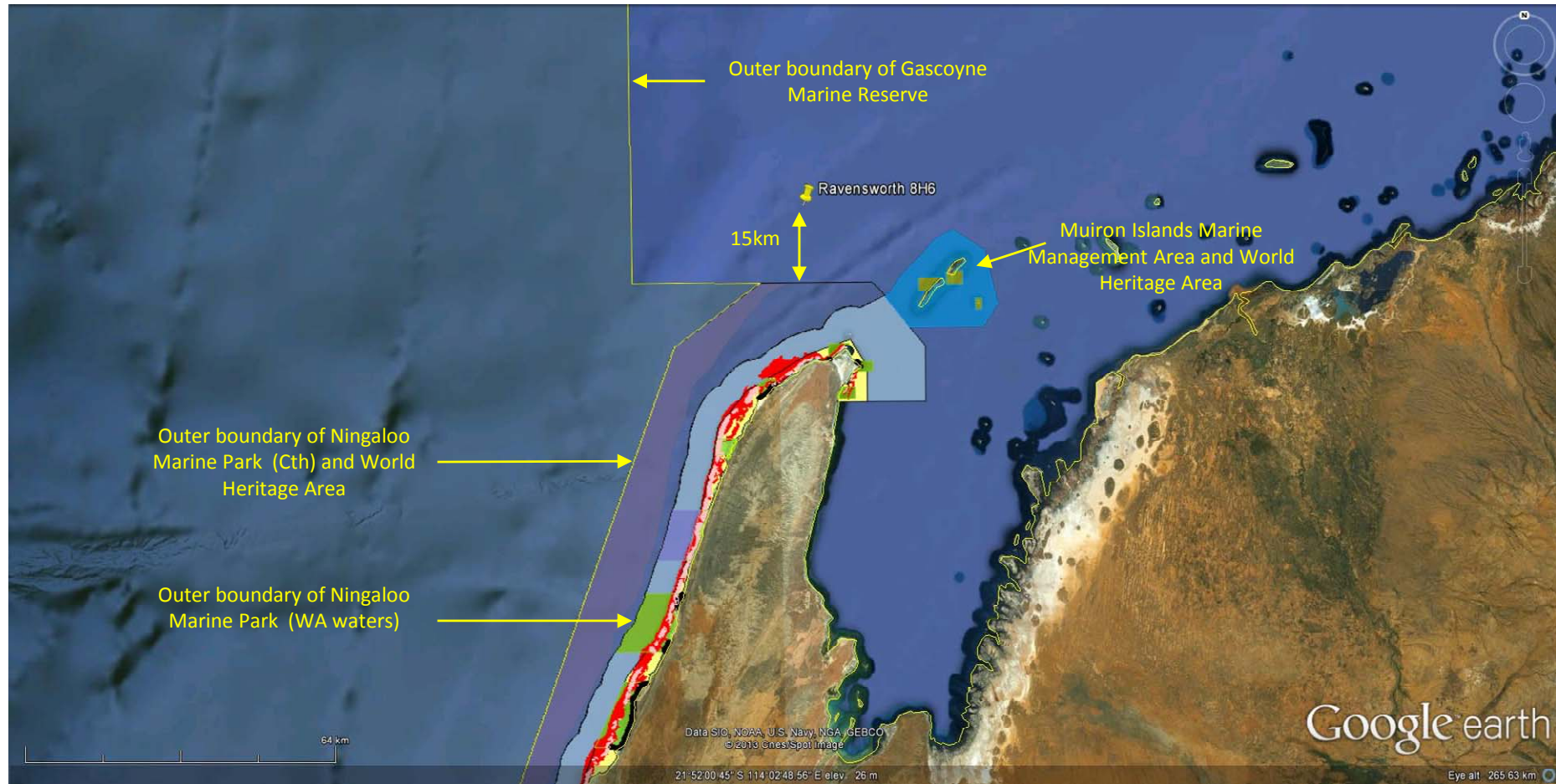


Figure 2-1. Location diagram showing Ravensworth 8H6 well centre

3 DESCRIPTION OF THE ACTIVITY

A semi-submersible drilling rig, the *Nan Hai VI*, will be used for the Ravensworth 8H6 well intervention. The *Nan Hai VI* has a complement of up to 100 personnel and will be supported by a minimum of two Anchor Handling and Supply Vessels (AHSVs). The *Nan Hai VI* will be held on location by eight drag embedment anchors connected to the rig by mooring lines. The anchors will be carried by the AHSVs to the pre-identified deployment spot and lowered to the seabed at site. The rig will then winch in the slack from the mooring lines to a pre-determined optimal tension. Removal of anchors is the reverse of the deployment procedures described above.

A summary of activities to be undertaken for the well are detailed below. The main steps in the intervention will be:

- Suspend production by stopping gas lift, allowing well to die shutting in well at Christmas tree valves and SSSV
- Perform inflow test of all barriers from reservoir and process, including blow down of annulus gas pressure to low pressure production flowline
- Move in MODU
- Run BOP and marine riser package
- Pressure test BOP
- Recover internal tree cap on drill pipe
- Run subsurface test tree on landing string and rig up slickline equipment
- Perform slickline runs to retrieve tubing hanger plug, run protection sleeve, deep set plug and valve catcher
- Cold vent gas through bleed off package, maximum anticipated volume of 15 m³.
- Retrieve existing gas lift valve from side pocket mandrel and run new replacement
- Perform slickline runs to retrieve deep set plug and valve catcher, run protection sleeve, and run tubing hanger plug
- Recover subsurface test tree and rig down slickline equipment
- Run internal tree cap, test barriers
- Recover BOP and marine riser package
- Release MODU
- Return well to production using gas lift to kick off

3.1 Timing

The Ravensworth 8H6 well intervention will be conducted entirely within Petroleum Permit Area WA-42-L over an approximate one month period between March 2013 and May 2013 inclusive.

4 DESCRIPTION OF RECEIVING ENVIRONMENT

4.1 Natural Environment

The Ravensworth 8H6 well lies on the shelf slope within the Central Western Shelf Transition Bioregion. This bioregion covers approximately 7,340 km² on the continental shelf from north of Carnarvon to the tip of the North West Cape.

The western half of the development area (190 to 260 m depth) is characterised by gravely fine to coarse carbonate sands, while the seabed sediments in the eastern part of the area (190 to 200 m depth) are soft, fine sediments, mainly carbonate silts and clays.

4.2 Biological Environment

Seabed communities in the Pyrenees area are relatively sparse, with diversity and abundance tending to decrease with increasing depth, except where occasional areas of exposed or outcropping rock occur, resulting in localised increases of abundance and diversity. Soft sediment communities are dominated by invertebrate infauna, including polychaetes, crustaceans, molluscs, echinoderms and sponges. Exposed or outcropping rocky areas are dominated by sponges, soft corals and gorgonians, with various finfish, ascidians, crustaceans, echinoderms (urchins and brittle stars), polychaetes and molluscs also occurring.

A number of different pelagic fish occur in the deeper offshore waters of the region. Pelagic fish species are seasonally abundant and may pass through the area during annual migrations. The most notable species of deep water pelagic fishes in the area are the billfish, which include sailfish, marlin and swordfish. The region also supports diverse and abundant shark and ray populations.

Five species of sea turtle are known to possibly occur in the region, including green turtles, loggerhead turtles, hawksbill turtles, flatback turtles and leatherback turtles.

The most common whale species in the North West Shelf region is the humpback whale, which migrates through the region, during their movement along the Western Australian coast. In addition to the humpback whale, the blue whale, the minke whale and several other toothed whales may be sighted in the vicinity of the Ravensworth 8H6 well. The abundance of the whales present in the area is likely to vary seasonally from low numbers during December to May and low to moderate abundance from June to November.

The region also supports diverse and abundant shark and ray populations. Whaler sharks are the most numerous and diverse, occurring in a wide range of habitats such as intertidal (black-tip reef shark), offshore reef drop-offs (grey reef shark) and deep ocean areas (oceanic white-tip). The whale shark is also known to frequent the region.

Dolphins are common inhabitants of the offshore waters of the region. Spinner dolphins and striped dolphins are expected in deeper waters while bottle-nosed dolphins are common in shallow water areas of the North West Shelf.

A large number of seabird species migrate across the region, and may pass through the permit areas, including ten species of migratory seabirds protected under international agreements.

The southern giant petrel and the soft plumaged petrel, which are listed Threatened species, may be sighted in the vicinity of the Ravensworth 8H6 well.

4.3 Socio-Economic Environment

There are no conservation reserves or parks located within the WA-42-L permit area. The closest marine conservation areas to the Ravensworth 8H6 well are the Muiron Islands Marine Management Area (24 km),

the Gascoyne Marine Reserve Multiple Use Zone (20 km) and the Ningaloo Marine Park (Commonwealth boundary) located 15 km from the well centre.

No state-managed fisheries overlap the 8H6 well location. There are three Commonwealth commercial fisheries operating in the drilling area and area of potential effect, these being:

- Western Deepwater Trawl Fishery - the fishery is mainly focused on the continental slope along the western coast of Australia. It is therefore unlikely that this fishery will be actively operating in the area.
- Western Tuna and Billfish Fishery - the fishing season is currently open all year (from February–January), but most activity occurs during November to February. Due to the timing of the intervention activities, it is possible that vessels operating in this fishery will occur in the area, albeit in low numbers.
- North West Slope Trawl Fishery - given the Ravensworth 8H6 well location occurs within the boundaries of this fishery, it is possible that vessels operating in the fishery may occur in the area in low numbers, however the majority of fishing effort is focused around the Rowley Shoals and Mermaid Reef, and the 200 m bathymetry line northwest of Dampier.

The Western Australian Maritime Museum database identifies five shipwrecks in the general area off North West Cape, but none in the area of the Ravensworth 8H6 well.

5 MAJOR ENVIRONMENTAL HAZARDS AND CONTROLS

Risk analysis has been undertaken for all environmental aspects of the activity, consistent with the procedures outlined in the Australian and New Zealand Standards AS/NZS ISO 31000:2009 (Risk Management – Principles and Guidelines) and BHP Billiton's Drilling Worldwide Management Policies (WWD000).

These aspects, potential impacts and preventative and mitigative controls are indicated below. All mitigation measures associated with hazards will be used to reduce environmental risk to ALARP and will be of an acceptable level.

Environmental/Other Aspect	Potential Impact	Management and Mitigation Methods
Timing and location of MODU and support vessels/ physical presence	Interference with fishing, shipping and/or other users	Maintaining 500m safety zone; Maritime Safety Information Notice; Notice to Mariners; Consultation Plan
Anchoring and seabed contact	Damage to seabed habitat	Anchors carried by support vessels directly to deployment location; Anchor Analysis Plan; AHSVs not to anchor near well site
Interference to fauna	Interference with fauna migratory patterns or permanent animal populations Displacement or attraction of fauna Physical impact from collisions	Adherence to EPBC Regulations; Briefing/induction for AHSV and helicopter personnel on cetacean/turtle interaction guidelines; Trained Marine Fauna Observer onboard
Noise	Acoustic disturbance to marine fauna	Adherence to EPBC Regulations ; Briefing/ induction of personnel on cetacean, whale sharks and turtle interaction regulations/ guidelines; Trained Marine Fauna Observer onboard
Light	Disorientation of marine fauna	Illumination of working areas on the MODU and support vessels for safe working practices only.
Atmospheric emissions	Emission of greenhouse gases	Low sulphur diesel; preventative maintenance system; compliance with Marine Orders 97 (Marine Pollution Prevention, Air Pollution); Rig and support vessels have current International Air Pollution Prevention Certificates; annual inspection of machinery
Intervention fluid	Localised reduction in water quality (turbidity); potential toxicity to marine fauna; visual pollution	Intervention fluid components used are ranked "D" or better on OCNS ranked list or "Gold" CHARM rated
Liquid wastes	Localised nutrient increase; minor increase in salinity; introduction of potential contaminants in water column from sewage, grey water, food waste, RO brine rejects, cooling water Oil and grease contamination to marine environment from deck drainage Toxicity to marine biota from BOP control fluid	Certificate of STP compliance with either MEPC.159(55) [post 2010 installation] or MEPC.2(VI) [installed pre 2010]; food wastes macerated to less than 25 mm prior to discharge Current IOPP certificate (International Oil Pollution Prevention); bunding; plugging or closing drains; current SOPEP; clean up equipment on board; operation and maintenance procedures; chemical selection process for least environmental harm BOP control fluid is ranked "D" or better on OCNS ranked list; MSDS on board
Solid wastes	Impact on the marine environment from waste disposal	Waste stored on board in appropriate containers; inductions of personnel in waste management procedures; no solid wastes to be disposed overboard
Introduction of non-indigenous or invasive marine species	Displacement of native species by marine pests from ballast water and biofouling	Adherence to AQIS Australia Ballast Water Management Requirements; IMS risk assessment; MODU/vessels have current Certificate of Anti-Fouling Systems (IAFS)

This document may contain proprietary and/or confidential information.

Marine spills of stored chemicals or refined oil	Contamination or pollution of the water column; visual pollution and potential toxicity	Bundling; preventative maintenance system; compliant SOPEP; IOPP certificate; clean up equipment on board;
Uncontrolled leak of diesel from bulk storage	Contamination or pollution of the water column; potential large area of acute and chronic toxicity; visual pollution; impact to other users; complaints	Navigation aids; competent crew; petroleum safety zone; support vessel on standby to maintain exclusion zone; SOPEP; spill kits on board and personnel trained; Pyrenees Expansion Oil Spill Contingency Plan; IOPP certificate; Maritime Safety Information Notice; Notice to Mariners
Spill of diesel during transfer operations	Contamination or pollution of the water column; visual pollution	Transfers only under acceptable sea state and daylight hours; Certified transfer hoses; dry breakaway couplings; oil recovery system in drainage; tank alarms; clean up kit in proximity; SOPEP; IOPP certificate
Loss of well control	Contamination or pollution of the water column; visual pollution	Approved Well Operations Management Plan (WOMP); OSCP

6 MANAGEMENT APPROACH

The Ravensworth 8H6 well intervention activities will be managed in compliance with the Ravensworth 8H6 Well Intervention Environment Plan accepted by NOPSEMA under the regulations and BHP Billiton's risk management policy.

The objective of the Environment Plan is to ensure that potential adverse impacts on the environment associated with the activities, during both routine and non-routine operations, are identified, and will be reduced to ALARP and will be of acceptable level.

The Environment Plan details specific objectives and standards for each environmental aspect that was identified and assessed in the Environmental Risk Assessment. The Environment Plan then details for each environmental aspect the range of controls to be implemented (consistent with standards) to achieve the performance objectives. The Environment Plan then established the specific measurement criteria that will be used to demonstrate that performance objectives are achieved.

The implementation strategy identifies the roles and responsibilities and the training and competency requirements for all personnel (BHP Billiton and contractors) in relation to implementing controls, managing noncompliance, emergency response (oil spills) and meeting monitoring and auditing and reporting requirements during the activity. The Environment Plan details the types of monitoring and auditing that will be undertaken (including audits and monitoring during the activity) and reporting requirements for environmental incidents (recordable and reportable incidents) and reporting overall compliance of the activity.

7 CONSULTATION

BHP Billiton has been actively involved in stakeholder engagement in the region since a community reference group was first established in Exmouth during preparation of the Stybarrow Development Environmental Impact Statement (EIS) in 2004, meeting on a quarterly basis. These community reference group meetings were expanded in 2005 during preparation of the Pyrenees Development Draft EIS to encompass the Pyrenees Development.

An Exmouth Sub-basin Stakeholder Engagement Management Plan (SEMP) has been in place since the start-up of the Stybarrow FPSO in November 2010. The SEMP is reviewed and updated annually. The stakeholder list contained within the Exmouth Sub-basin SEMP is updated each time a new activity is planned within the region or an Environment Plan is to be submitted.

In support of the Ravensworth 8H6 well intervention operations, BHP Billiton undertook an assessment of the proposed activities and potential environmental, social and economic impacts. All relevant stakeholders were sent an Environment Plan Fact Sheet, containing: a map showing the location of the proposed activity; a description of the activity including timing and duration; a description of the socio-environmental risks and mitigation measures; and details on where to seek additional information if required.

In addition, stakeholders were provided with

- face to face meetings;
- a presentation of information on the activity via the Exmouth Community Reference Group meeting;
- follow-up telephone calls to solicit comments or questions relating to the proposed activities; and
- a toll-free 1800 number and email address for queries

BHP Billiton will continue to engage with stakeholders in the lead up to the commencement of activities through regular community reference group meetings. In addition, we will directly communicate any material change to the activity as described in the Fact Sheet to all relevant stakeholders. Prior to mobilisation of the vessels BHP Billiton will issue a notice to mariners and distribute a vessel fact sheet to Exmouth and regional recreational and commercial marine users.

8 CONTACT DETAILS

For further information about this activity please contact BHPB Petroleum Government and External Affairs Team on 1800 110 258 or send an email to bhppetexternalaffairs@bhpbilliton.com.