MACEDON OPERATIONS

OFFSHORE ENVIRONMENT PLAN SUMMARY

(COMMONWEALTH WATERS)

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Contents

1 INTRODUCTION

The Macedon Operation is a Western Australian domestic gas project to commercialise gas reserves in the offshore Macedon gas field located in graticular blocks which form part of the Pyrenees production licence WA-42-L, in Commonwealth waters.

The Operator for the Project is BHP Billiton Petroleum Pty Ltd (BHPB), operating on behalf of the Macedon Joint Venturers which comprise;

- BHP Billiton Petroleum (Australia) Pty Ltd; and
- Apache PVG Pty Ltd

The Macedon Operation Environment Plan (EP) has been accepted by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) on 20th May 2013 and ensures that all operations are planned and conducted in line with BHPB'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 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 Macedon gas field is located in Commonwealth waters approximately 40km north of Exmouth and 100 km west of Onslow, Western Australia.

Transport of the gas is via a 508 mm diameter subsea pipeline (24 km in Commonwealth waters) to a shore location adjacent to the existing Griffin Joint Venture pipeline shore crossing. The wet gas pipeline continues for 15 km onshore to a gas treatment and compression plant site, located 16 km from Onslow. Treated gas is then exported through a 67 km sales gas pipeline to an injection point on the Dampier to Bunbury Natural Gas Pipeline. A location map is provided in Figure 2-1.

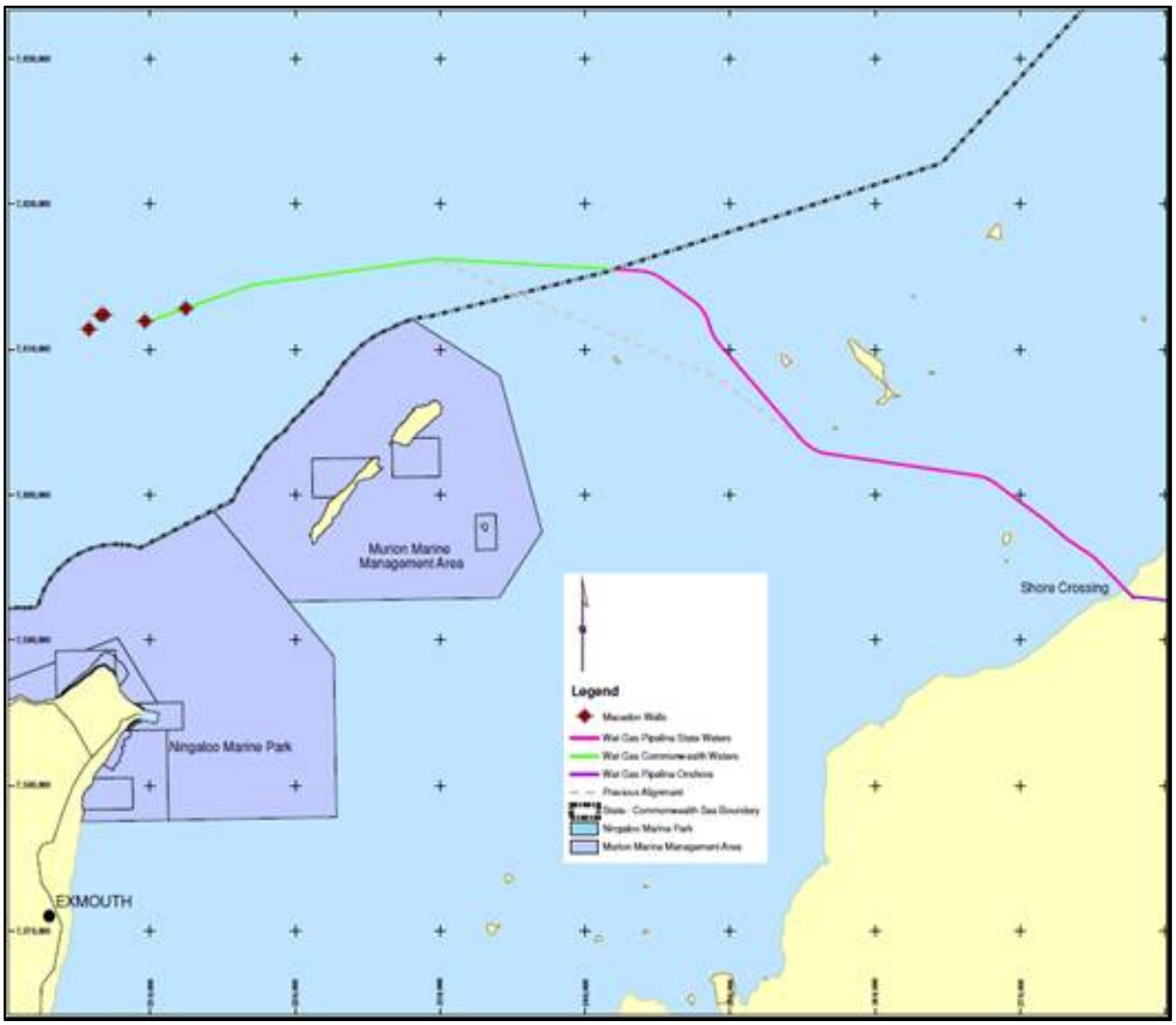

Figure 2-1: Offshore pipeline location (green line - Commonwealth waters) and Macedon Wells

3 DESCRIPTION OF THE ACTIVITY

Macedon Operations involves transport of gas via a subsea pipeline to a shore location adjacent to the existing Griffin Joint Venture pipeline shore crossing. The pipeline continues onshore to a gas treatment and compression plant site. Treated gas is then exported through a sales gas pipeline to an injection point on the Dampier to Bunbury Natural Gas Pipeline.

The Activity related to this Environment Plan consists of three parts:

- Commissioning and hydrotesting: pigging, hydrotesting, dewatering
    - Cleaning pigs will be used to remove any construction or other debris, followed by an internal gauging pig to ensure deformations and local buckles have not been introduced. The operation will be carefully controlled from an offshore support vessel located in the Macedon field dynamically positioned above the manifold. A pigging hose will be lowered from the vessel and the hose will be connected to the subsea pig launcher. The pigs will be pushed from the subsea pig launcher at the offshore end using filtered and treated seawater.
    - Treated seawater will also be used for hydrotesting, where the pipeline is pressurised so that any structural defects or breaches in integrity can be detected. The hydrotest fluid is then disposed via evaporation ponds at the Onshore Gas Plant (OGP).
    - The wet gas pipeline will be dewatered and disposal of the water will be into onshore evaporation ponds. As gas from each well is brought on line, residual moisture on the internal surfaces of the pipe will be transferred into the gas stream, captured in the slug catcher on-shore and disposed of in the evaporation ponds.
- Normal operations: well control
    - Well control will involve intermittent discharges of small amounts (less than $3m^3$ per year) of water-based hydraulic fluid) used to actuate the well-head valves on the four subsea wells. A subsea pig launcher will be attached to the subsea manifold approximately every 2 - 5 years depending on pipeline conditions as part of maintenance of the pipeline. When the subsea pig launcher is attached to the manifold only gas is present in the pipeline.
- Vessel operations:
    - Vessels will be required to undertake the commissioning and hydrotesting activities and to perform inspection and monitoring activities. It is likely that two types of vessels will be required. For commissioning activities and any pigging activities, a Subsea Installation Vessel (Primary Vessel) will be required. This vessel would be able to support lowering of the subsea pig launcher and perform additional ROV surveys and interactions. For annual survey and maintenance activities a Support Vessel will be used. This will support ROV operations along the pipeline route and infield areas.

3.1 Timeframe

Commissioning is to be completed in 2013. Normal operations will be continuous through the 20 year operational life of the project. Supporting vessel operations will be required for a period of up to six weeks during commissioning and then periodically during the inspection and maintenance period of the 20 year operation design life.

4 DESCRIPTION OF EXISTING ENVIRONMENT

4.1 Physical Environment

The offshore pipeline extends from the shore crossing at Urala Station (west of Onslow) some 80 km to the west northwest to the Macedon gas field location, approximately 20 km north of North West Cape. The marine environment in which the offshore project is situated extends from the upper intertidal zone through to the outer margin of the continental shelf at depths of between 100 and 200m.

The climate of Onslow is arid tropical, with an average annual rainfall of 275 mm. Most rainfall occurs between January and June, either as the result of tropical cyclones or depressions.

Offshore waters deeper than 10m are relatively clear for most of the year, but clarity may be adversely impacted by major storm events, including the passage of tropical cyclones and runoff from major rivers.

4.2 Biological Environment

A study of the habitats and benthic communities along the pipeline route indicated that the bulk of the pipeline route lies over sparsely populated seabed. The pipeline is in water depths ranging from approximately 60 m at the State-Commonwealth waters boundary to approximately 180 m at the Macedon field. The seabed throughout is predominantly comprised of soft sediments with silt to gravel sized particles. Within the Commonwealth waters section of the pipeline and infield infrastructure, surveys conducted for the Macedon project noted that there is a sparse cover on the seabed. Occasional low rises or ridges of exposed or sediment veneered limestone may be present where changes in depth occur, particularly at the shallower end of the slope. Such habitats are regionally common along the Pilbara coast within this depth range.

At 60 m depth the growth of seagrasses and macroalgae are precluded due to lack of light for photosynthesis and many larger sessile invertebrates (sponges, soft corals ascidians etc.) are unable to establish due to the mobility of the sediments, leaving large areas with little or no macroscopic growth (i.e. the sediment is visually bare, although meiofauna and microfauna may be present). At locations where exposed or thinly veneered limestone is present, sessile invertebrates may be present, with sponges, soft corals, gorgonians and seawhips present in shallower waters, and stone sponges and very occasionally deep water species of coral, in deeper waters.

Larger mobile species of marine fauna which may be resident in or pass through the Macedon wellhead area include whales, whale sharks, dolphins, turtles, dugong, fish, sea snakes and jellyfish, while pelagic microscopic species include phytoplankton, zooplankton, and the pelagic larval stages of many benthic species.

On the outer continental shelf and continental slope, soft sediment, which form the dominant habitat in this region, support a low diversity and abundance of burrowing invertebrate fauna, including worms and crustaceans.

4.3 Social Environment

4.3.1 Shipwrecks

The Australian national Shipwreck Database lists eight shipwrecks in the Onslow region, with the Western Australian Museum listing eleven in the region. No wrecks or relics were identified during the pipeline route surveys.

4.3.2 Petroleum Industry

There are a number of petroleum activities within the region, associated with the Griffin, Pyrenees, Vincent, Enfield, Stybarrow and Van Gogh fields.

4.3.3 Fishing

Scalefish trap, line and trawl fisheries operate in the State waters offshore of Onslow. The number of vessels operating in these waters varies and only a small number are based out of Onslow.

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 mitigated controls are indicated below.

Source of Risk (Hazard)	Potential Impact	Management and Mitigation Methods
Timing and location of vessel activity	Interference with fishing and/or shipping	Maintaining 500m safety zone; Maritime Safety Information Notice; Notice to Mariners
Seabed contact	Damage to seabed habitat	Vessels to use DP; maintenance activities will not require anchoring; support vessels will not anchor at well location
Interference to fauna	Physical impact from collisions	Adherence to EPBC Regulations; Briefing/induction for crew on cetacean interaction guidelines; qualified Marine Turtle Monitor onboard
Noise	Interference to marine fauna	Adherence to EPBC Regulations ;
Light	Disorientation of marine fauna	Illumination of working areas for safe working practices only; lights not normally directed outward
Atmospheric emissions	Emission of greenhouse gases from vessel operations	Low sulphur diesel; preventative maintenance system; compliance with MARPOL 73/78 Annex VI; Compliance with Marine Orders 97 (Marine Pollution Prevention, Air Pollution); Vessels have current International Air Pollution Prevention Certificates; annual inspection of machinery
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	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 Bunding; plugging or closing drains; current SOPEP; clean up equipment on board; operation and maintenance procedures; chemical selection process for least environmental harm
Solid wastes	Impact on the marine environment	Waste stored on board in appropriate containers; inductions of personnel in waste management procedures; no solid wastes to be disposed overboard
Control fluid discharge	Impact to marine environment, reduction in water quality	All hazardous substances have MSDS on board; potentially hazardous materials and chemicals subject to review and approval; Use of OCNS D-rated or better for umbilical fluids
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
Failure of well head containment	Reduction in water quality, potential toxic effects to fauna	Use of dynamic positioning vessels instead of anchoring
Pipeline liquid and gas discharge	Reduction in water quality and potential toxic effects from discharge of treated seawater; emission of greenhouse gases from pigging or rupture	Use of OCNS D-rated or CHARM gold-rated chemicals for seawater treatment; corrosion inhibitor used; pipeline material specs and welding certification; Corrosion Resistant Alloy cladding where required; gas stream monitoring; corrosion monitoring
Umbilical liquid discharge	Reduction in water quality and potential toxic effects from umbilical rupture	Robust umbilical design; OCNS D-rated or better for umbilical chemicals; use of dynamic positioning vessels instead of anchoring
Marine spills of stored chemicals or refined oil	Contamination or pollution of the water column; visual pollution and potential toxicity	Bunding; preventative maintenance system; compliant SOPEP; clean up equipment on board; chemical selection process; operating and maintenance procedures

Uncontrolled leak of diesel from bulk storage	Contamination or pollution of the water column; visual pollution	Petroleum safety zone; approved navigation systems; adherence to maritime safety/navigation procedures; SOPEP; spill kits on board and personnel trained; Macedon Oil Spill Contingency Plan
Spill of diesel during transfer operations	Contamination or pollution of the water column; visual pollution	Transfers only in port; no transfers during commissioning or operations

6 MANAGEMENT APPROACH

The overall purpose of the Environment Plan (EP) is to ensure that all operational activities associated with the Macedon Operations are planned and conducted in line with BHP Billiton Petroleum HSE Management System. The EP has been prepared in accordance with the *Offshore Petroleum and Greenhouse Gas Storage Act 2006.*

The EP details specific objectives and standards for each environmental aspect identified and assessed in the Environmental Risk Assessment. The EP then details for each environmental aspect the range of controls to be implemented (consistent with standards) to achieve the performance objectives. The EP 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 in relation to implementing controls, managing noncompliance, emergency response (oil spills) and meeting monitoring and auditing and reporting requirements during operations. The EP details the types of monitoring and auditing that will be undertaken and reporting requirements for environmental incidents (recordable and reportable incidents), and reporting overall compliance.

7 CONSULTATION

BHP Billiton has been actively involved in stakeholder engagement in the Onslow region since the development of the Griffin Joint Venture in the early 1990's. This project included the Griffin gas plant at Tubridgi, located approximately 20 km south of Onslow. This development triggered the start of a long term relationship with the town of Onslow, local pastoralists, Ashburton Shire and the Thalanyji (the recognised Native Title holders).

BHP Billiton's ongoing development in the region includes the Stybarrow and Pyrenees projects and the early project studies associated with the Pilbara LNG Project. To support these developments the Exmouth Community Reference Group and the Onslow Community Reference Group have been established to facilitate consultation. The Onslow CRG continues to meet every 3 to 4 months. The CRG forum aims for proactive and regular interaction to promote open and inclusive communication with relevant stakeholders. Meetings are minuted with actions recorded and tracked. In addition, for specific operational activities that occur between meetings, notifications are sent directly to relevant stakeholders. BHPB engages with the traditional owners, the Thalanyji, through representation on the CRG, the Macedon Thalanyji Liaison Committee and through Thalanyji heritage monitors.

Throughout the environmental assessment phase of the Macedon project numerous meetings to consult with relevant stakeholders have been undertaken. Key stakeholders have been engaged, and will continue to be consulted, including (but not limited to):

- Commonwealth Department of Sustainability, Environment, Water, Population and Communities
- WA Department of Mines and Petroleum
- Australian Maritime Safety Authority
- WA Department of Environment and Conservation
- Commercial fisheries
- Local Government (Shires of Ashburton and Exmouth)
- NGOs

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.