**Macedon Operations**

**(State Waters and Onshore)**

**Environment Plan Summary**

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| **Document No: MACHSE-E-0020-001** |

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| **REVISION RECORD** | | |
| **Rev** | **Date** | **Description** |
| 3 | 18/11/2021 | Resubmission of EP and OSCP to DMIRS for Assessment. |
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| **REVISION RECORD** | | |
| --- | --- | --- |
| **Rev** | **Date** | **Description** |
| 0 |  | New document created and added to the Macedon OMS. |
| 1 | 15/06/2016 | 2.5 year review of OSCP submitted to DMP as required by Regulation 23. |
| 2 | 28/02/2018 | Five yearly update and inclusion of new activities. |
| 3 | 18/11/2021 | Issued to DMIRS. Includes updates following removal of aspects related to the Macedon Gas Plant. |
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**Acronyms and Glossary**

| Term | Description |
| --- | --- |
| AHD | Australian height datum |
| AHO | Australian Hydrographic Office |
| ALARP | As low as reasonably practicable |
| AMBA | Area that may be affected |
| AMSA | Australian Maritime Safety Authority |
| APU | Australian Production Unit |
| AS  (NZS) | Australian Standard  (New Zealand Standard) |
| AUV | Autonomous underwater vehicle |
| BHP | BHP Petroleum |
| CO | Carbon monoxide |
| CRG | Community Reference Group |
| DAWE | Department of Agriculture, Water and the Environment |
| DAWR | Department of Agriculture and Water Resource |
| db(A) | Decibel |
| DBCA | Department of Biodiversity, Attractions and Conservation (formerly DPaW) |
| DBNGP | Dampier to Bunbury Natural Gas Pipeline |
| DoEE | Department of the Environment and Energy |
| DMIRS | Department of Mines, Industry Regulation and Safety |
| DP | Dynamic positioning |
| DPIRD | Department of Primary Industries and Regional Development (formerly DoF) |
| DWER | Department of Water and Environmental Regulation |
| EP | Environment Plan, prepared in accordance with the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 |
| EPA | Environmental Protection Authority |
| EP Act | *Environmental Protection Act 1986* |
| EPBC Act | *Environment Protection and Biodiversity Conservation Act 1999*. Commonwealth legislation designed to promote the conservation of biodiversity and protection of the environment. |
| GHG | Greenhouse gas |
| HSE | Health, Safety and Environment |
| HSEC | Health, Safety, Environment and Community |
| IMO | International Maritime Organisation |
| IMS | Introduced/Invasive Marine Species |
| IMR | Inspection, maintenance and repair |
| IOPP | International Oil Pollution Prevention |
| ISPP | International Sewage Pollution Prevention |
| km | Kilometre |
| km/h | Kilometres per hour |
| m | Metre |
| m3 | Cubic metre |
| m/s | Metres per second |
| MARPOL | International Convention for the Prevention of Pollution from Ships |
| MLWM | mean low water mark |
| MMSCFD | million standard cubic feet per day |
| NGO | Non-government organisation |
| NOx | Nitrogen oxides |
| NWS | North West Shelf |
| OCNS | Offshore Chemical Notification Scheme |
| OEPA | Office of the Environmental Protection Authority |
| OSCP | Oil Spill Contingency Plan |
| RO | Reverse osmosis |
| ROW | Right of Way |
| SDS | Safety data sheet |
| SMPEP | Shipboard Marine Pollution Emergency Plan |
| SOPEP | Shipboard Oil Pollution Emergency Plan |
| SOx | Sulphur oxides |
| TEC | Threatened Ecological Communities |
| TJ/day | Terajoules per day |
| VOC | Volatile organic compounds |
| WA | Western Australia |
| WAFIC | Western Australian Fishing Industry Council |

# Introduction

This public disclosure summary document of the Macedon Operations (State) Environment Plan has been prepared as part of the requirement of Regulation 11(7) and 11(8) of the WA Petroleum Pipelines (Environment) Regulations 2012 and the Petroleum (Submerged Lands) (Environment) Regulations 2012 (collectively referred to hereafter as the Environment Regulations) as administered by the Department of Mines, Industry Regulation and Safety (DMIRS).

The Macedon Operations was approved (Ministerial Statement 844) under Part IV of the *Environmental Protection Act 1986* (EP Act) on 28 October 2010 following environment assessment at Environmental Protection Statement level by the Western Australia Environmental Protection Authority (EPA). Minor changes to the proposal were approved under section 45C of the EP Act on the 17 January 2012.

The Macedon Operations is a Western Australian domestic gas project that commercialises gas reserves in the offshore Macedon gas field located in production licence WA-42-L, in Commonwealth waters.

BHP is the Operator for the project on behalf of the Macedon Joint Venturers which comprise:

* BHP Petroleum (Australia) Pty Ltd; and
* Santos WA PVG Pty Ltd.

The Macedon Operations involves transport of gas via a subsea pipeline to a shore location adjacent to the Griffin Joint Venture pipeline shore crossing (Figure 2‑1). The pipeline continues onshore to a gas treatment and compression plant (Macedon gas plant) located approximately 17 km southwest of Onslow. Treated gas is then exported through a sales gas pipeline to an injection point on the Dampier to Bunbury Natural Gas Pipeline (DBNGP).

Operations commenced in 2013. A Macedon Operations Environment Plan (EP) (State) ensures that all operational activities onshore and in State waters are planned and conducted in line with BHP’s Charter and Health, Safety and Environment Management System and comply with statutory requirements. The EP was accepted by the Department of Mines, Industry Regulation and Safety (DMIRS) on 20 May 2013, with a revised EP accepted on 6 January 2014. A five-yearly revision to the Macedon Operations EP was submitted to DMIRS and accepted on 23 August 2018. The EP serves as a practicable environmental management tool to be used by BHP throughout operations to implement targeted environmental control measures.

This document summarises the latest updated EP, which was submitted prior to the five year anniversary of the previously accepted version of the EP to meet the requirements of the Environment Regulations.

## Titleholder and Operator Details

BHP Petroleum (Australia) Pty Ltd is a titleholder and the authorised operator for the Macedon Operations. Details of the Operator:

Name: BHP Petroleum (Australia) Pty Ltd

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ACN: 39006923879

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# Description of the Activity

## Location of the Activity

The Macedon gas field is located in Commonwealth waters approximately 40 km north of Exmouth and 100 km west of Onslow, Western Australia.

Transport of the gas is via a 508 mm diameter subsea pipeline (48 km in State waters) to a shore location adjacent to the Griffin Joint Venture pipeline shore crossing. The wet gas pipeline continues for 15 km onshore to a gas treatment and compression plant site, located approximately 17 km from Onslow. Treated gas is then exported through a 67 km sales gas pipeline to an injection point on the DBNGP. A location map is provided in Figure 2‑1.

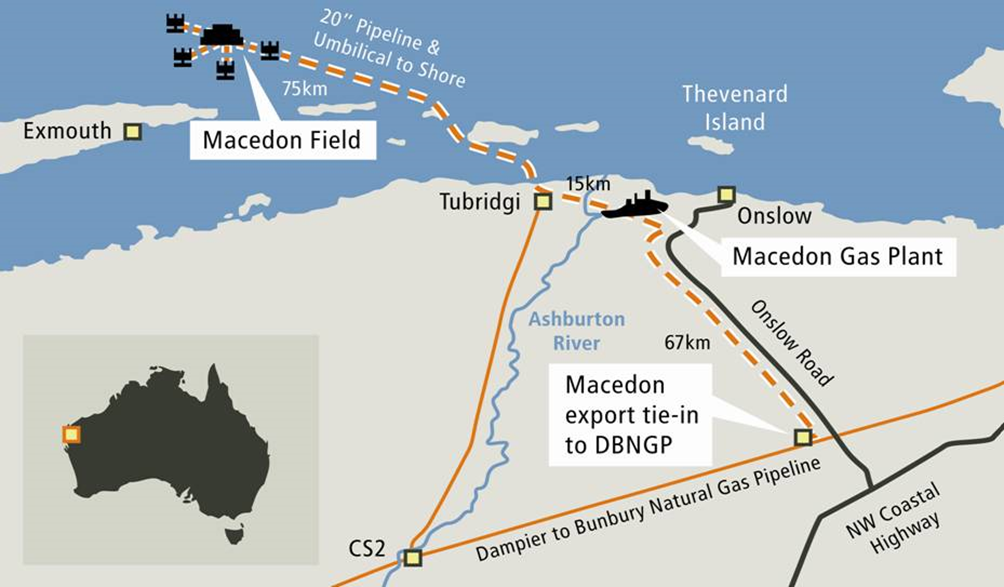


Figure 2‑1: Macedon Field (in Commonwealth waters), onshore gas plant and pipelines

## Operational Area

The Operational Area for this EP is considered to be the area covered by the relevant Pipeline Licences and under which operations, inspection, maintenance and repair (IMR) activities, rehabilitation and remediation will occur.

The facilities covered under the EP are summarised in Table 2‑1.

Table 2‑1: Pipeline Facilities in the Operational Area

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Instrument Number | Start Point | End Point |
| Macedon Sales Gas Pipeline | PL 87 | Pig launcher/receiver at the Macedon Gas Plant  7595426 N; 291150 E | Tie in point at the DBNGP  7556910 N; 343151 E |
| Macedon Wet Gas Pipeline | PL 88 | MLWM connection with the Macedon Offshore Wet Gas Pipeline  7593556 N; 277180 E | Launcher/receiver at the Macedon Gas Plant  7595485 N; 291041 E |
| Macedon Wet Gas Pipeline (Terr Sea) | TPL/23 | Macedon Wet Gas Pipeline at the Cwth/State Water boundary  7615512 N; 241985 E | MLWM connection with the Macedon Onshore Wet Gas Pipeline  7593556 N; 277180 E |

## Operations

The majority of operational activities will be undertaken at the Macedon gas plant site and managed under a Dangerous Goods Licence regime and a prescribed premises operating licence (No L8553/2011/1). Activities at the Macedon gas plant site are therefore outside the scope of the EP.

Operational activities which are covered under the EP comprise:

* Export of wet gas via subsea pipeline at the Commonwealth/State water boundary to the mean low water mark (MLWM) connection with the Macedon onshore wet gas pipeline;
* Export of wet gas via the onshore wet gas pipeline from the shoreline connect to the Macedon gas plant pig launcher/receiver;
* Operation of umbilical that provides power, control and chemical injection to each well;
* Export of dry gas via the onshore dry gas pipeline commencing at the gas plant pig launcher/receiver to the DBNGP tie-in point.

Maintenance activities covered under the EP comprise:

* Inspections, maintenance and repairs of offshore and onshore pipelines and umbilicals.

A sales gas metering station is located approximately 67 km from the onshore gas plant adjacent to the DBNGP tie-in on a cleared area of 6,250 m2. Gas from the pipeline passes through filter coalescers to remove any dust and other solid or liquid matter, waxes, gums and gum forming constituents. The metering station analyses hydrocarbon composition, oxygen, hydrogen sulfide and moisture and meter gas prior to the tie-in station. The metering station at the DBNGP tie-in also serves as flow and overpressure control.

Decommissioning and closure activities are not within the scope of this EP and will be subject to separate environment plans in accordance with regulatory requirements.

### Inspection, Maintenance and Repair Offshore

**Offshore**

The subsea facilities will be capable of largely maintenance-free operation, with the exception of ROV work and minor subsea intervention. Inspection and monitoring activities will be performed to provide assurance of integrity, as well as to proactively identify maintenance or repair requirements. Inspections may be routine, or may be triggered by specific events (such as cyclones) that could affect the infrastructure. Maintenance and repair requirements are determined based on the results of inspections and monitoring.

Specific IMR activities that may occur over the duration of the EP include:

* Inspections
  + Visual inspections of subsea components, looking for damage, degradation, debris etc. - may involve remotely operated vehicles (ROVs), autonomous underwater vehicles (AUVs), or divers deployed from a vessel,
  + Cathodic potential readings, to confirm corrosion protection is working - involves ROVs taking field measurements;
  + Side Scan Sonar surveys – involves the use of high frequency, directional sonar towed along the pipeline by a vessel; and
  + ROV / Pigging operations; internal inspection of pipeline - pigs launched via subsea infrastructure in Commonwealth Waters will pass through the production pipeline to the onshore gas plant. Received fluids or wastes will be captured at the onshore gas plant.
* Maintenance
  + Cathodic protection maintenance - replacement/new cathodic protection sacrificial anodes may be installed on or adjacent (within the pipeline corridor) to the production pipeline using a vessel and ROV or divers;
  + Burial / deburial of pipe and / or umbilicals;
  + Removal/relocation of foreign objects – such as boulders, debris, and
  + Stabilisation/ span correction - may involve activities such as installation of grout bags or concrete mattresses, or burial/de-burial via jetting or suction techniques within the pipeline corridor, using a vessel and ROV.
* Repair
  + Removal / replacement / installation of umbilicals – typically ‘like for like’ replacement undertaken using ROV from a vessel; and
  + Pipeline / umbilical repairs - could involve the installation of structural clamps or high-pressure repair clamps. These activities are generally undertaken from a single vessel using ROV spread and possibly requiring lifting equipment. Divers and/or support from an additional vessel may be required.

The scheduling of periodic visits for maintenance activities is expected to occur coincident with inspection works wherever practicable and to involve one to two weeks annually, although this is dependent on weather conditions along the pipeline.

Pigging is carried out on an as required basis determined by results of ongoing system analysis.

Vessels used to support IMR activities may range in length from 35 m to 120 m, and include multi-purpose support vessels and dive support vessels. Typically, only a single vessel would be required to implement IMR activities in State waters. The offshore pipeline is buried from the shore crossing out to approximately 4 km from the shoreline and is in depths too shallow for a typical intervention vessel out to 7.7 kms from the shoreline. A smaller, shallower draft vessel (e.g. 30 m catamaran) will be used for IMR activities in this zone.

Infrequently, there may be a requirement (e.g. a minor repair) for more than one vessel.

Vessels may operate 24 hours a day, although works in shallower areas (i.e. within 7.7 km of shore) are likely to be restricted to day light only. It is anticipated that vessel time for routine inspection activities along the pipeline within State waters will involve no more than one to two weeks per year, depending upon operational requirements. Maintenance and repair activities may result in additional vessel time, depending on the scale and complexity of the work scope, but such activities are expected to be infrequent.

Vessels will generally use dynamic positioning (DP) to maintain position, although anchoring may be required depending on the activity, water depth, and vessel specifications. All vessels will use marine diesel oil or marine gas oil and will be provisioned in Port. There will be no refuelling on site. It is expected that all vessels sourced for IMR activities will have been previously operating on the North-West Shelf (NWS).

**Onshore**

IMR activities for the onshore pipelines include biannual cathodic protection surveys and biannual visual inspections, typically involving personnel driving slowly (~10 km/hr) along the ROW. They generally require only a single vehicle. Internal (pigging) inspections are also completed periodically to check for corrosion.

In the unlikely event that inspections indicate pipeline maintenance or repairs are required, minor excavation works may be undertaken to access buried sections of the pipeline and to undertake a more detailed assessment (e.g. non-destructive testing) and/or remedial works that involve additional personnel and a longer duration. This may require clearing of revegetation in the easement and if so, it would be followed by reinstatement/rehabilitation.

## Timeframe

The Macedon Operations was commissioned in 2013 and has an expected operating life of 20 years. Inspection, monitoring and maintenance/repairs (IMR) are conducted on an ‘as required’ basis throughout the 20 year operation design life.

Offshore IMR activities in State waters will generally comprise a single campaign every year, with the precise frequency and timing dependent on monitoring and previous results. Typically, total vessel days on-site in State waters are expected to be no more than one to two weeks per year, depending on work task requirements.

IMR activities for the onshore pipelines include biannual (six-monthly) surveys and visual inspections.

## Rehabilitation and Remediation

In 2012, BHP commenced rehabilitation of a 285-hectare section of area that was cleared along the Macedon sales gas and wet gas pipelines. A cleared access track along the Right of Way (ROW) approximately 10-15 m wide has been retained along the pipeline easements. As a condition of the environmental approval of the Macedon project (Condition 8 of the Ministerial Statement 844), monitoring was required to demonstrate compliance. Monitoring of transects along the Macedon gas pipeline was completed in 2010 (the baseline survey prior to clearing) and subsequent post-rehabilitation surveys since 2013.

The required standards for rehabilitation for compliance with MS 844 conditions are:

* Rehabilitation to achieve species diversity which is not less than 60 % of known original species diversity; and
* Weed coverage is equal to or less than that of pre‐cleared levels.

The annual monitoring survey enables ongoing assessment of compliance with the MS 844 conditions, and for response actions to be undertaken when required to improve rehabilitation outcomes.

As outlined in the EPS for the development, ultimate rehabilitation requirements for the project area will be described in a Decommissioning Plan which will be developed a minimum of five years prior to project closure. The agreed decommissioning and rehabilitation management will be reflected in the EP in force at that time which will be submitted to DMIRS in advance of the activity ceasing.

## Decommissioning and Closure

BHP maintains a Macedon Closure Management Plan (BHP-MAC-PN-0001) which is reviewed annually. The vision of the Closure Management Plan is to ensure that BHP acts as a responsible corporate citizen while preserving shareholder value. The Plan establishes BHP local management accountability and ownership of closure activity and compliance with relevant industry standards, regulations, or applicable legislative requirements. Further, the Plan provides for compliance with BHP Corporate requirements and all contractual obligations in order to protect public and employee health, safety, and welfare while limiting or mitigating adverse environmental effects or socio-economic impacts and protection of indigenous values.

Onshore pipelines are governed by lease agreements to restore the surface to as near its original condition as is reasonably practical. The extent and methodology of closure will vary based on negotiations with the lease land owner by responsible party. Alternative use negotiation may occur at any point in the lease life, initiated by either the lease holder, or responsible facilities holder.

Onshore infrastructure will be removed within 80 cm of the surface (unless there is agreement to leave in situ) and rehabilitated to pre use conditions unless otherwise agreed. An environmental baseline survey is planned be performed post shutdown, along with flushing and cleaning of the facilities. This survey, combined with all existing data, will form the basis for the environmental ALARP and comparative assessment studies to confirm the optimal path forward with respect to closure.

The design of all subsea infrastructure is such that removal of all structures and components above the sea floor is feasible. It is currently planned for offshore pipelines to be cleared of hydrocarbons, filled with seawater and abandoned in place. Polymer-containing flexible flowlines and umbilicals will be removed. Trees will be removed and disposed onshore, as preferred (currently) by regulators.

Closure planning will mature as the operation proceeds toward closure with further detail provided in subsequent revisions to the Environment Plan.

# Description of the Environment

This section describes the environment that may be affected during routine petroleum operations and under emergency conditions (including onshore and offshore spills), comprising physical, biological, heritage and socio-economic features.

The Operational Area defines the spatial boundary of the operational activities and encompasses the key existing environment characteristics and receptors that may be affected by planned aspects of the Petroleum Activity. The Area that May be Affected (AMBA) encompasses all environmental characteristics and receptors with the potential to be impacted by unplanned events and emergency conditions.

## Natural Environment

The onshore Operations Area is located on the Ashburton Coastal Plain, a widespread alluvial depositional landscape comprising unconsolidated, slightly undulating sand plains with occasional sand dunes, wide flat claypans and deeply incised rivers. The topography is characterised by a series of low dunes. Between the dunes are tidal and supratidal flats. Inland from the coast, colluvial sediments (comprising clay, silt, sand and gravel) generally overlie claypan material.

The offshore pipeline extends from the shore crossing at Urala Station (west of Onslow) some 75 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 200 m.

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.

## Biological Environment

### Onshore

The onshore operations area is located across the boundary between the Fortescue and Carnarvon Botanical Districts and contains elements of both systems. Vegetation types found in the project area include:

* *Acacia coriacea* shrubland over *Triodia* hummock grassland dominated the near-coastal habitats;
* *Tecticornia* clay pans characterised large parts of the northern section of the survey area;
* Other parts in the northern section were characterised by Mesquite (*Prosopis* spp.) tall shrublands;
* Other parts in the northern section were also characterised by *Acacia* spp. (*Acacia pyrifolia*, *Acacia ancistrocarpa*, *Acacia synchronicia*, *Acacia sclerosperma*, *Acacia inaequilatera*, *Acacia tetragonophylla*) shrublands over *Triodia* hummock grasslands on plains and gentle slopes; and
* Inland dunes typically supported *Eucalyptus*, *Corymbia* or *Hakea* scattered low trees or *Grevillea* shrublands over *Triodia* hummock grasslands.

No threatened flora species or Threatened Ecological Communities (TECs) listed under the EPBC Act have been recorded within the onshore operations area including the 10 km buffer. One Priority One (*Abutilon* sp.) and three Priority Three flora species (*Eleocharis papillosa, Eremophila forrestii subsp. viridis, Triumfetta echinata)* were identified as potentially occurring within the onshore operations area.

Dry and wet season baseline surveys of the onshore operations area were undertaken in 2008 and 2009 (BHP, 2010). Of the 310 taxa that were recorded during the surveys, no threatened or priority flora were reported (BHP, 2010).

In the field surveys of the onshore operations area, ten introduced weed species were recorded (BHP, 2010).

Most of the pipeline route follows a previous gas pipeline and traverses sandy and spinifex plains with minor and major watercourses. The only major watercourse crossed by the Macedon pipeline is the Ashburton River where an existing road crossing and weir have changed the water flow.

Fauna surveys of the area recorded two native terrestrial mammal species, one introduced mammal species, fifty-two bird species and nine reptile species. No Short Range Endemic Species have been recorded. Feral animals likely to be found in the area include the common house mouse, goats, feral cats and wild dogs.

### Offshore

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. No major reefs are encountered in the State waters section of the pipeline, but some secondary features, such as areas of limestone pavement, raised pavement and low relief reef are crossed (in the vicinity of the shore crossing), with small reefs present at the margins.

In shallow waters to depths of ~30 m, the seafloor along the pipeline route is described as sparsely vegetated with patchily distributed ephemeral seagrass (mainly *Halophila* spp.). Seaward, the bottom type is more variable with more frequent outcropping of pavement and the development of a more extensive soft bottom ‘sponge garden’ community.

Larger mobile species of marine fauna which may be resident in or pass through the pipeline 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.

## Socio-Economic Environment

The nearest town to the Macedon Operation is Onslow, approximately 17 km north east in the Shire of Ashburton.

### Shipwrecks and Heritage Sites

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.

There were a number of heritage sites identified and approval was sought under Section 18 of the *Aboriginal Heritage Act 1972* to disturb some sites within the infrastructure corridors. All remaining sites within the operational boundaries deemed to be of Aboriginal Heritage have been identified and are avoided as part of operational procedures.

### Petroleum Industry

There are a number of petroleum activities within the region, notably the Griffin, Pyrenees, Vincent, Enfield, Stybarrow and Van Gogh fields. The Macedon shore crossing is located adjacent to the existing Griffin gas pipeline.

### Fisheries

The Onslow prawn fishery operates in State waters through which the Macedon subsea gas pipeline passes. The Onslow prawn fishery involves vessels from the Exmouth and Nickol Bay (Karratha) prawn fisheries in addition to vessels based at Onslow. Scalefish trap, line and trawl fisheries also operate in the waters offshore of Onslow. The number of vessels operating in these waters varies and only a small number are based out of Onslow.

# Environmental Impacts and Risks

BHP has established a Risk Management governance framework with supporting processes and performance requirements that provide an overarching and consistent approach for the identification, assessment and management of risks. BHP policies have been formulated to comply with the intent of the Risk Management Policy and be consistent with the AS/ISO 31000-2018 *Risk Management Principles and Guidance*.

An integrated risk assessment and impact process was utilised to identify the most appropriate management strategy and relevant controls for each source of risk to ensure the impact (planned events) or risks (unplanned events) is acceptable to BHP and reduced to ALARP. This process included the incorporation of historic stakeholder, legal and environmental monitoring data on the relevant environmental impacts.

The identified aspects, potential environmental impacts or risks and control measures are summarised in Table 4‑1.

Table 4‑1: Summary of Potential Impacts, Risks and Control Measures

| Environmental Aspect | Source of Environmental Risk | Summary of Control Measures |
| --- | --- | --- |
|
| Operations – Onshore | | |
| Atmospheric emissions and GHG | Gaseous emissions (NOx, CO, SOx, VOCs) reducing local air quality | BPM used to meet ambient air quality standards at sensitive receptors (as per Macedon Air Emissions Best Practice Report, PMA-EN-EIA-0003).  Leak Detection and Repair program at six monthly intervals of selected areas (e.g. sales gas metering station tie-in).  Infrared thermal camera used to detect VOC emissions. |
| Emission of dust and organic vapours | Maintenance activities associated with the pipelines are confined to the right of way or within the gas plant boundary at the pig launcher/receivers.  Procedures/controls to reduce dust; permit to work/ inspections. |
| Light emissions | Disorientation of marine migratory fauna | Light sources to be at height of no greater than 15 m AHD (except emergency flare and temporary or manually activated lighting).  Glare shields used for all area lights (light posts) at the onshore gas plant.  Pipeline maintenance activities undertaken during daylight hours. Where night work is required for operational reasons, the JHA shall be updated to consider the minimisation of impacts from lighting. |
| Noise emissions | Interference with sensitive receptors (i.e. Ashburton River closest camping site) | Noise monitoring demonstrated that no audible noise from the Macedon Gas Plant was present at nearby sensitive receptors (WSP, 2013). |
| Incomplete rehabilitation | Loss of plant species diversity | Rehabilitation and on-going monitoring in accordance with Conditions in Ministerial Statement 844 and subsequent DBCA recommendations (15 June 2018). |
| Fauna interaction | Collision with and potential fatalities to fauna | Site induction covers trafficable area.  Unauthorised vehicle access clearly marked.  Drivers trained on four-wheel drive and defensive driving.  Reduced speed limits on Right of Way (ROW). |
| Trapped in open excavation / trench leading to fatality | Open trenches will have a sloped egress point to allow for the escape of inadvertently trapped fauna.  Open excavations / Bellholes will be stepped down for ease of access.  Excavations / trenches will be checked every morning prior to works and prior to backfilling. |
| Unplanned discharges to land and water | Contamination of soil or groundwater | Pipeline undergoes inspection and testing.  Corrosion inhibitor batch dosed once per day into wet gas pipeline.  Corrosion spool provides indication of pipe wall thickness.  Design pipeline as per standards.  Sales gas pipeline only has dry gas in it.  Regular groundwater monitoring for hydrocarbons. |
| Contamination to soils and water (water course and groundwater) from unplanned release of hazardous materials during storage, handling or use. | All environmentally hazardous substances required for maintenance activities on the pipeline are temporarily stored with secondary containment and spill clean up materials.  Procedures for bringing chemicals to site are followed including assessment and hierarchy of control applied and ensuring a Safety Data Sheet (SDS) is available.  Permit to Work required for any opening of valves that might contain liquid hydrocarbons to minimise the risk of unplanned discharges/spills. |
| Weeds | Loss of biodiversity | Inspection of vehicles that travel along ROW for vegetative material, mud and debris prior to departure. Covered under inductions.  Weed spraying of key species along the ROW as required in the Mt Minnie Conservation area until key criteria are met in consultation with DBCA to assist in rehabilitation. |
| Clearing and soil disturbance | Reduction in native vegetation area  Reduction in soil structure and quality | Ground Disturbance and Excavation Certificate required before any clearing or soil disturbance.  No unplanned disturbance to take place during operation.  Minimise maintenance through equipment design.  Clearing restrictions included in site inductions.  Clearing to be undertaken only in BHP easements and leases.  Access for vehicles and machinery will be along designated access tracks and parking areas only (as defined in work order, JHA or clearing plan);  In the unlikely event onshore maintenance in the pipeline easement within the Mt Minnie Pastoral Lease requires clearing/soil disturbance, reinstatement/ rehabilitation will occur in accordance with the Rehabilitation Monitoring and Evaluation Plan. |
| Waste management | Physical impedance of organisms entangled in waste | Any waste generated during IMR on the pipelines will be placed in designated waste bins which are temporarily stored on the job site before being removed for disposal.  Covered in inductions and weekly vehicle inspections. |
| Contribution to landfill | As per Australian Production Unit (APU) Waste Management Plan (AOHSE-E-0014) non-hazardous materials are segregated into clearly marked containers for disposal in accordance with BHP Charter, i.e. reuse, recycle etc. and stored separately. |
| Operations – Offshore | | |
| Introduced marine species (IMS) | Introduction of exotic marine organisms to the local environment with the potential to cause an imbalance to the marine ecosystem. | Vessels sourced locally (already operating on NWS) where practicable. All vessels to comply with BHP IMS Management Procedure. Marine audits of vessels. All vessels contractually obliged to comply with Department of Agriculture and Water Resource (DAWR) requirements. Ballast water exchange procedures for ships entering Australian waters in accordance with DAWR, MARPOL and International Maritime Organisation (IMO) guidelines (Australian Ballast Water Management Requirements require at least 95% dilution). No exchange of ballast water <12 nautical miles from land. |
| Light emissions | Potential attraction and/or disorientation of turtles (hatchlings attracted to vessels affecting behaviours, increasing predation risk). | Minimum practicable lighting in place to meet navigation and safety requirements. |
| Noise emissions | Noise radiated underwater can cause fauna avoidance thereby causing disruption to important behaviours. | Vessel Masters to operate vessel in accordance with EPBC Regulations Part 8 Division 8.1 (r. 8.05) 'Interacting with cetaceans' (modified to include turtles and whale sharks):  - vessels will not knowingly travel at greater than 6 knots within 300 m of a whale/whale shark, 150 m for a dolphin, and 50 m of a turtle (caution zone);  - vessels will not knowingly approach closer than 100 m for a whale/whale shark, 50 m for a dolphin, and 25 m of a turtle.  Crew inductions - BHP Environmental Awareness training provided to personnel involved with maintenance prior to mobilisation.  If available and suitable, DNV Comfort Class support vessels favoured by BHP selection process.  Marine fauna watch on all vessels, observation and recording of all sightings, including observed avoidance behavior.  Onboard machinery maintained in accordance with planned maintenance system.  Vessels prohibited from entering Ningaloo Coast World Heritage Area and Muiron Marine Management Area. |
| Atmospheric emissions | Temporary localised impact on air quality (increase in ambient air pollutants NOx, SOx, CO2). | Class and flag state requirements (i.e. ISPP Certificate, IOPP Certificate) for eligible vessels.  All fuel will be MARPOL compliant with respect to sulphur.  Exhaust emissions to be within regulatory standards.  Vessel scheduled maintenance.  If available and suitable, DNV Comfort Class support vessels favoured by BHP selection process.  Temporary activity limits time on site. |
| Seabed disturbance - subsea infrastructure / vessel anchoring | Localised disturbance to seabed. | Vessels typically DP, where anchoring required mooring analysis undertaken and anchoring procedures implemented. |
| Seabed disturbance –dropped objects | Localised disturbance to seabed. | Work (lifting) procedures to minimise potential for dropped objects.  Vessel audit (lifting/operating procedures, equipment etc.).  Demob clearance survey and recovery of objects if safe, practicable and of environmental benefit. |
| Physical presence | Disruption to fishing or shipping activity – temporary loss of small area; interference with fauna movements. | Pipeline gazetted and marked on navigation charts.  Notice to mariners for periods when vessel on site >7 days per activity.  Consultation to inform relevant stakeholders of activities and allow them to plan their operations and reduce potential disruptions. |
| Fauna collision -potential mortality or injury of individual marine species. | Vessel Masters to operate vessel in accordance with EPBC Regulations Part 8 Division 8.1 (r. 8.05) 'Interacting with cetaceans' (modified to include turtles and whale sharks):  - vessels will not knowingly travel at greater than 6 knots within 300 m of a whale/whale shark, 150 m for a dolphin, and 50 m of a turtle (caution zone);  - vessels will not knowingly approach closer than 100 m for a whale/whale shark, 50 m for a dolphin, and 25 m of a turtle.  Crew inductions.  Crew on vessels record marine fauna sightings (secondary to primary task) |
| Damage to or loss of gear, reduced fishing catch – snagging risk. | Pipeline gazetted and marked on navigation charts.  Notice to mariners for periods when vessel on site >7 days per activity.  Consultation to inform relevant stakeholders of activities and allow them to plan their operations and reduce potential disruptions. |
| Waste management | Increase in landfill from managed waste disposal. | Waste disposal in accordance with BHP Charter, i.e. reuse, recycle etc. |
| Loss of material overboard results in toxic impacts on marine organisms (hazardous materials) or ingestion/entanglement (non-hazardous materials). | Hazardous material will be contained onboard in bunded containment; non-hazardous materials are segregated into clearly marked containers, manifested and stored securely for onshore disposal; waste disposal in accordance with BHP Charter, i.e. reuse, recycle etc. |
| Marine discharges – sewage and putrescible wastes | Contamination to water column; sub lethal effects to marine organisms; localised increase in nutrients affecting populations of some marine organisms. | Adherence to MARPOL 73/78 Annex IV.  Vessel has current “International Sewage pollution Prevention Certificate” in accordance with Regulation 4 MARPOL Annex IV.  Sewage discharged from vessel within 3 nm of nearest land to be compliant with Regulation 9 (1) (1) of Annex IV of MARPOL.  Putrescibles macerated to <25 mm discharged >3 nautical miles from the nearest land; putrescibles not macerated discharged >12 nautical miles from the nearest land.  Maintenance of garbage record book.  Training provided in waste disposal and management onboard vessels.  If available and suitable, DNV Comfort Class support vessels favoured by BHP selection process. |
| Marine discharges – RO brine, cooling water, grey water, deck drainage | Localised reduction in water quality; sub lethal effects to marine organisms. | Class and flag state requirements for eligible vessels.  MARPOL requirements.  Risk assessment for chemicals in discharges.  Scuppers in place around deck, drainage directed into bilge and treated; No wash down overboard.  Approved vessel SOPEP.  Deck spills cleaned up as per SOPEP. |
| Unplanned releases/leaks from subsea infrastructure | Acute/chronic toxic effect on marine organisms from hydrocarbons.  Decrease in marine water quality.  GHG emissions and localised reduction in air quality. | Pipeline design as per standards. All pipeline welds inspected and signed off.  Wet gas pipeline is clad with corrosion resistant alloy located in the pipeline where corrosion rates are potentially higher.  Corrosion monitoring spools provide indication of wet gas pipeline wall thickness.  Corrosion inhibitor injection into wet gas pipeline.  Cathodic protection survey of wet gas pipeline undertaken on minimum 3 year basis.  Condensate return volume is continuously monitored.  Ongoing inspection and monitoring of subsea structures and pipeline provide assurance of ongoing integrity:   * Macedon Subsea and Pipeline Integrity Management Plan (MACAIMS-PS-0006); * Macedon Wet Gas Pipeline Annual Integrity Report (PMA-BHP-PL-REP-0029).   Control systems are in place including alarms and shutdown valves to shut-in thereby reducing spill risks from wells and pipeline.  OCNS ‘D’ rating or better for umbilical fluids.  Use of dynamic positioning or pre-planned mooring / anchoring analysis for all vessels involved with IMR activities. |
| Uncontrolled loss of diesel from bulk storage | Toxicity to marine biota; decrease in marine water quality, shoreline impacts. | Class and flag state requirements for eligible vessels (i.e. SOPEP, SMPEP, IOPP).  NAVAIDS / lighting / radar.  Perimeter warning alarms.  Gazetted safety zones on marine charts.  Bridge watch.  Trained and competent marine crew.  Australian Maritime Safety Authority (AMSA) notification, stakeholder consultation.  OSCP. |

# Management Approach

The overall purpose of the EP is to ensure that all activities associated with the Macedon Operations are planned and conducted in line with the BHP Charter and BHP Petroleum’s HSE Management System. The EP has been prepared in accordance with the Environment Regulations.

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. Finally the EP establishes the specific measurement criteria that will be used to demonstrate how performance objectives are achieved.

## Implementation Strategy

The implementation strategy in the EP identifies:

* Measures, systems, practices and procedures to ensure environmental performance objectives and standards are met;
* Chain of command, key roles and responsibilities for key personnel in relation to the EP implementation, management and review;
* How training, competencies and on-going environmental awareness will be maintained for the duration of the activity, for all personnel and contractors with responsibilities under the EP;
* Monitoring, auditing and management of non-conformance;
* Records management;
* Routine and incident reporting;
* Oil spill response arrangements;
* Oil Spill Contingency Plan (OSCP);
* Review and testing arrangements of the OSCP.

## Review and Update of the EP

BHP will update and submit a revision of the EP within five years of acceptance of the updated EP, as required by the Environment Regulations.

BHP will also review and if necessary submit a proposed revision to the EP in accordance with Regulation 18 of the Environment Regulations before:

* Commencing a new activity;
* Any significant modification or change, or a new stage of an existing activity;
* Or as soon as practicable after, any significant new environmental impact or risk occurs, or any significant increase in an existing environmental impact or risk which occurred or is to occur.

# Consultation

In accordance with Regulation 17(1)(b) of the Environment Regulations, the EP includes a report on all consultations between the Operator and relevant authorities and other relevant interested persons and organisations undertaken in the course of developing the EP.

BHP has consulted broadly with relevant stakeholders, including sharing information with stakeholders and responding directly to enquiries. No objections or significant concerns were raised by stakeholders during consultation in the preparation of the EP.

BHP has a process for ongoing stakeholder engagement and any concerns raised by stakeholders subsequent to EP submission will be duly considered and addressed.

## Consultation Summary

BHP has been actively engaging with stakeholders in the Onslow region since the development of the Griffin Joint Venture in the early 1990’s. This project included the Griffin gas export pipeline, located immediately adjacent the Macedon wet gas pipeline shore crossing. 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).

The Exmouth Community Reference Group (CRG) and Onslow CRG were established to facilitate consultation in relation to BHP’s multiple assets in the North West Cape region, including offshore and onshore Macedon operations. The CRG forum aims for proactive and regular interaction to promote open and inclusive communication with relevant stakeholders. Meetings are held regularly (three times per year) and participants are invited to raise any concerns or issues. Meeting agendas are prepared and circulated in advance of meetings, minutes are recorded and feedback sought from stakeholders. The BHP Corporate Affairs toll-free 1800 number and email address are made available to stakeholders.

In addition, for specific operational activities that occur between meetings, notifications are sent to relevant stakeholders and placed on local notice boards and at the Shire office in Onslow. BHP 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, extensive stakeholder engagement was undertaken including numerous meetings to consult with relevant stakeholders. BHP is committed to ongoing engagement and consultation with stakeholders during all project stages.

Key stakeholders that have been engaged, and who continue to be consulted, include:

* Office of the Environmental Protection Authority (OEPA);
* WA Department of Primary Industries and Regional Development (DPIRD);
* WA Fishing Industry Council (WAFIC);
* WA Ministers and Regulators;
* Commonwealth Department of Environment and Energy (DoEE)[[1]](#footnote-2);
* Local Government (Shires of Ashburton and Exmouth);
* Other petroleum operators;
* Commercial fisheries, including representative associations and individual licence holders;
* Onslow Salt;
* Pastoral lease holders; and
* NGOs.

Stakeholder engagement and consultation activities informing this EP revision include:

* Onslow CRG meetings. Note: the latest Onslow CRG meeting was held in November 2020; additional CRG meetings were schedule for April 2020 and April 2021 but were cancelled due to COVID-19 restrictions;
* Email to relevant stakeholders (refer Covering Email and Activity Summary) and invitation to comment;
* Postal correspondence to fishing licence holders within State-managed fisheries that overlap AMBAs identified that detailed the operational activities and invitation to comment; and
* Consideration and assessment of all responses from stakeholders received prior to original submission of the EP in 2018.

All stakeholder engagements records are maintained by BHP Corporate Affairs. Relevant consultation regarding the activities associated with this EP.

## Ongoing Consultation

Stakeholder consultation will be ongoing and BHP will work with stakeholders to address any future concerns if they arise throughout the validity of this EP. Should any new stakeholders be identified, they will be added to the stakeholder database and included in all future correspondence as required.

BHPs commitments to ongoing consultation include:

* Responding in a timely manner to all stakeholder and community contact regarding Macedon activities;
* Stakeholders who raise objections and claims will be responded to directly, and should any concerns raised have not already been addressed in the EP, these will be assessed in the same manner as all risks identified by BHP;
* Prior to mobilisation of vessels for inspection/intervention activities, BHP will:
  + Issue advance notification of the location and duration of activities to the Australian Hydrographic Office (AHO) who will issue a ‘Notice to Mariners’ for activities of >7 days duration; and
  + Ensure vessel(s) notify AMSA’s Joint Rescue Coordination Centre for the promulgation of navigation warnings 24-48 hours before operations commence;
* Continued regular Onslow CRG meetings that include updates on activities for Macedon Operations.

# Chemical Disclosure

Macedon Operations does not involve any wells onshore or in State waters and hence the activities covered by the EP do not involve the downhole use of chemicals or other substances.

# References

BHP Petroleum (2010). PMA-BHP-EN-EIA-0001 Macedon Gas Project Environmental Protection Statement July 2010 – Final.

URS (2007). Pilbara LNG Baseline Marine Water Quality Monitoring. Prepared for BHP Billiton Petroleum Pty Ltd, October 2007.

1. Now the Department of Agriculture, Water and the Environment (DAWE) [↑](#footnote-ref-2)