

Framework Marine and Intertidal Monitoring Programme



The following is a framework monitoring programme for the marine and intertidal components of the Pluto LNG Development. The purpose of the framework is to outline the principles and key components of the ecological monitoring programme. It is recognised that additional information regarding biological and physical parameters will continue to be obtained throughout the life of the project and that stakeholder concerns, including regulatory bodies, may well alter as newer information is gained.

Woodside's over-riding goal is to plan and perform activities so that impact on the environment is either avoided or minimised to as low as reasonably practicable. A functional aspect of achieving this goal is to have a monitoring programme to measure changes in environmental characteristics attributable to the Pluto LNG Development. Data collected in the monitoring programmes will:

- enable reporting to stakeholders (including regulatory agencies) on environmental performance
- allow differences between predicted and actual impacts to be quantified and the need for additional environmental management identified
- ultimately ensure that no significant adverse environmental impacts occur.

The monitoring programme will be developed in consultation with key stakeholders, including regulatory authorities, and will be reviewed and updated as the project progresses. Input from stakeholders, including NWSV, Pilbara Iron, the Department of Environment and Conservation will be considered during the development of the monitoring programme. An important goal for the marine and intertidal components of the Pluto LNG Development is to achieve effective monitoring programmes and use of resources through opportunities to work in synergy with other regional marine monitoring initiatives, such as monitoring programmes that are progressed by the Dampier Port Authority and by other government agencies, for example in relation to marine conservation and protection areas, such as the Dampier Archipelago Marine Park.

The framework monitoring programme design is based on current best practice, including applicable standards and guidelines, results from baseline environmental surveys, expectations and requirements of regulatory authorities, commitments in the Draft PER and experience gained on similar projects.

The data gathered during specific surveys are used in the description of the project area for the Draft PER (particularly the aspects which were poorly known prior to undertaking these baseline surveys) and to place project area into a regional, national and international context. They also provide data which can be used to design ongoing monitoring programmes, including data for use in a pilot study and for statistical power analyses.

A number of surveys and studies have either already been undertaken or are underway for the Pluto LNG Development. They include:

- geotechnical and seabed surveys
- metocean measurements and hydrodynamic modelling
- offshore environmental and underwater noise surveys
- nearshore survey of turtle activity
- coral and background sediment baseline study.

These studies and surveys cover sites in the immediate project area (field, platform, export trunkline, near shore facilities, beach crossing and LNG processing facilities) and monitoring sites in Mermaid Sound.

Baseline studies involved the collection of a broad range of parameters, based on a combination of 'best of practice', parameters used to assess impacts from other similar developments and parameters targeted at detecting the predicted impacts of the Development. Monitoring parameters will be selected, with the assistance of further baseline surveys where necessary, before construction commences. The assessment parameters below are given as examples and not necessarily the ones that will be included in monitoring programs. Final selection of parameters to be monitored will be chosen after a review of the results of all baseline studies and advice and agreement of the relevant regulatory authorities.

1.1 Monitoring Parameters

The assessment parameters are expected to include:

- epifauna community diversity and abundance, including coral monitoring (refer to Framework Dredging and Spoil Disposal Management Plan, **Appendix I**)
- turtle abundance and turtle nesting activity
- sediment quality – for example metals, particle size distribution, hydrocarbons and organics
- water quality – for example standard physio-chemical parameters (for example, pH, salinity, DO, turbidity, and temperature), hydrocarbons, organics and metals
- treated waste water ecotoxicological assessment.

1.2 Monitoring Locations

The Pluto LNG Development covers a wide geographical area and a range of marine habitats, from intertidal areas to the deeper offshore water and seafloor. The monitoring programmes will target the main environmental sensitivities of the different habitats potentially affected by the Pluto LNG Development. Locations to be monitored include:

- the offshore drill site(s)
- the offshore platform site
- selected sections of trunkline route and shore crossings
- the export jetty
- dredging and spoil disposal grounds
- operational discharge points
- locations in Mermaid Sound that are part of marine monitoring programmes.

1.2.1 Offshore

1.2.1.1 Pluto Gas Field and Platform

Drill site monitoring will focus on the location of the wells on the continental slope and the platform monitoring will focus on the platform location on the continental shelf. The effect of drilling discharges on benthic epifauna and demersal fauna communities was monitored during drilling of the Pluto-2 appraisal well. Further monitoring, using appropriate methods to ensure consistency and allow inter-comparison of results, will be conducted during the drilling of production wells at the Pluto gas field location.

1.2.1.2 Treated Waste Water Discharges

The treated waste water monitoring programme is described in **Table G-3, Appendix G**.

Treated waste water will be monitored for:

- faecal coliforms
- Biological Oxygen Demand (BODs)
- chemical oxygen demand
- total suspended solids
- concentration of MEG in water
- total dissolved hydrocarbon
- total petroleum hydrocarbons
- total suspended solids
- grease.

Ecological monitoring will be carried out at selected sites to confirm predictions made in relation to environmental impacts.

1.2.2 Nearshore

1.2.2.1 ChEMMS

Woodside has been monitoring the environment around the Karratha Gas Plant since 1985 when the Chemical and Ecological Monitoring of Mermaid Sound (ChEMMS) programme commenced. Since that time, semi-annual surveys have been conducted in November/December and April/July of each year, with the programme reviewed and amended, where appropriate, every three years. Relevant aspects of the programme comprise chemical and biological monitoring of the intertidal and subtidal environment adjacent to, and in the vicinity of, Woodside's port facilities in Mermaid Sound. The current programme investigates the concentration of metal and hydrocarbons in oyster and biological monitoring of mangroves, intertidal rocky shore biota and coral communities. The ChEMMS programme will be an excellent long-term baseline and ongoing monitoring programme to measure nearshore impacts along the Burrup Peninsular attributable to the Pluto LNG Development, including the port facilities and any nearshore discharges.

1.2.2.2 Dredging

A Framework Dredging and Spoil Disposal Management Plan is outlined in Appendix I which outlines the monitoring which will be undertaken to minimise impacts associated with dredging activities. Parameters to be monitored include:

- coral health and habitat
- water quality.