Appendix P

Framework Marine and Intertidal Monitoring Programme prepared by Sinclair Knight Merz




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Framework Marine and Intertidal Monitoring Programme for the Blacktip Project

The following is a framework monitoring programme for the marine and intertidal components of the Blacktip Project. This framework is intended for planning purposes only and the exact format of the monitoring programme will depend on the results of the baseline surveys and discussions with regulatory bodies.

The objectives of monitoring programmes is primarily to ensure that no adverse environmental impacts are occurring as a result of the Blacktip Project and determine the effectiveness of the environmental management measures put in place. Data collected in the monitoring programmes will:

- enable reporting to regulators on environmental performance and determination of whether environmental performance targets are met,
- allow differences between predicted and actual impacts to be quantified and the need for additional environmental management identified,
- determine rehabilitation success, and
- ultimately ensure that no adverse environmental impacts are occurring.

It is important to note that the Blacktip Project will operate over a long period of time during which time there may need to be changes to the focus of the monitoring programme. A change of focus of the monitoring programme may be a result of:

- advancements in monitoring techniques;
- advancements in the understanding of environmental issues causing changes in monitoring priorities;
- changes in legislation;
- advancements in the environmental performance of gas developments causing changes in monitoring priorities;
- changes to the scope of the Blacktip Project.

The final monitoring programme will be developed in consultation with regulatory authorities and will be reviewed and updated as the project progresses.

The framework monitoring programme design is based on the following:

- current best practice, including applicable standards and guidelines;
- results from baseline environmental surveys;

- expectations and requirements of regulatory authorities;
- commitments in the Draft EIS;
- experience gained on similar projects.

A number of baseline surveys have already been undertaken for the Blacktip Project including:

- geotechnical and seabed surveys;
- metocean measurements and hydrodynamic modelling;
- offshore environmental survey;
- intertidal environmental survey;
- near shore survey of turtle and dugong activity, including turtle nesting and hatching.

These baseline surveys covered sites in the immediate project area (wellhead platform, export pipeline, near shore facilities, beach crossing and gas plant), as well as reference locations.

The data gathered during these specific surveys has three main purposes:

- For use in the description of the project area for the Draft EIS (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.
- To provide data which can be used to design ongoing monitoring programmes, including data for use in a pilot study and for statistical power analyses.

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 project. Monitoring parameters will be selected, with the assistants 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.

Monitoring parameters

The assessment parameters may include but are not limited to the following:

- infauna and epifauna community diversity and abundance;
- plankton community diversity and abundance;
- turtle and dugong abundance and turtle nesting activity;

- sediment quality;
  - metals
  - particle size distribution
  - hydrocarbons and organics
  - radionuclides
  - ecotoxicological assessment
- water quality;
  - standard physio-chemical parameters (for example pH, salinity, DO, Turbidity, temperature);
  - hydrocarbons and organics;
  - metals;
  - ecotoxicological assessment.

Monitoring Locations

Drilling Site

The drill site monitoring programme will focus on the proposed location of the wellhead platform as this will be the site for drilling. The monitoring programme for drilling is intended to be sufficiently rigorous for impacts to be measured. The sampling parameters and number of sampling sites should be determined from power analysis of data collected during the baseline offshore survey. The timing and frequency of the monitoring programme will be agreed with the regulator and will be planned to provide a robust set of results to assist the environmental management process.

The monitoring programme may include:

- field sampling of sediment properties and infaunal communities post drilling to determine impacts and recovery;
- ecotoxicological investigations of the toxicity of drilling muds to assist with the selection of drilling muds and the interpretation of field observations.

The need for a drill site monitoring programme will be determined following advice and agreement of the relevant regulatory authorities.

PW Discharge

The PW monitoring programme may include but is not limited to the following:

- routine monitoring of oil in water and volume of discharge during operations;

- detail chemical analysis of PW;
- ecotoxicological investigation of PW.

Pipeline

The sub-sea pipeline will be regularly inspected to ensure pipeline integrity, stability and absence of leaks. If ROVs are used for monitoring of the condition of the sub-sea pipeline, the video data can be used to assess the colonisation of the pipeline by epifauna and the presence of introduced species (see below). However, the pipeline will be trenched for most of its length and high water turbidity and strong currents are expected to limit the effectiveness of ROVs, particularly in the near shore environment. An impact assessment of the presence of the pipeline during the operational phase of the project is not considered necessary and any monitoring is likely to be opportunistic.

Intertidal

The intertidal monitoring programme will focus on Northern Yelcher Beach where the pipeline crossing is proposed. The sampling parameters and numbers of samples will be determined from power analysis of data collected during the baseline intertidal survey. The baseline survey sampled sandy beach, mangrove and rocky substrates close to the proposed pipeline crossing. However, preliminary results indicate that only a subset of these parameters are useful for monitoring for example the beach samples contained little infauna. The timing and frequency of the monitoring programme will be agreed with the regulator and will be planned to provide a robust set of results to assist the environmental management process.

Turtle and Dugong

The turtle and dugong monitoring programme will concentrate on near shore waters and beaches between Cape Hay and Point Pearce during the construction phase. Particular attention will be focused on restoration of the pipeline crossing beach to its original profile to ensure turtle nesting activity on this beach is not affected.

Decommissioning

Decommissioning monitoring will involve an impact assessment based on the data gathered during baseline and ongoing monitoring programme, as well as any advances in monitoring techniques. The sampling locations will be re-established and the same parameters will be assessed with suitable replication to allow for the detection of decommissioning impacts and to monitor recovery to near pre-installation levels.

The duration and scope of decommissioning monitoring would be determined with the Regulatory Authority near the time of decommissioning.