

9. Environmental Management

9.1 Environmental Management Strategy

The Sunrise Project's Environmental Management Plans (EMPs) will be managed through Woodside's Health Safety and Environmental Management System (HSE-MS). Central to this system is the Environmental Policy which seeks to ensure that planning and performance of all Company activities are undertaken so that adverse effects are either avoided or kept to within acceptable standards, and all statutory requirements are observed.

The Woodside HSE-MS is based on the AS/NZS/ISO 14000 series. The Sunrise environmental management performance will be audited externally. The system will contain a two-tiered system of inspection and internal audits on specific activities or facilities.

Environmental issues will be further identified as part of Project planning as an internal *Register of Environmental Effects* enabling Project management to ensure they were addressed, along with other business priorities, in the early screening and design stages. Progress will continue to be periodically reviewed and documentation updated during project design and execution.

Environmental issues relevant to contractors will be managed through the requirements of Woodside's tendering and contracting procedures. These procedures require tenderers to pre-qualify, amongst other things, on the basis of their environmental management capabilities. Each tenderer is required to submit details on its Environmental Management Policy and Environmental Management System and provide a preliminary EMP. Each external EMP will be further developed if the Tenderer is successful.

Environmental inductions will be provided to all employees involved in all major phases of the project. These inductions will involve input from professional environmental staff.

For activities identified as potentially impacting on the environment, a detailed EMP will be prepared to Woodside's and where appropriate, regulatory agency requirements.

9.2 Environmental Management Plans

Environmental aspects of the Sunrise Gas Project will be managed primarily through development and implementation of EMPs for the 4 phases of the development:

- Drilling;
- Construction and Installation;
- Commissioning and Operation; and
- Decommissioning

Tables 9.1 through **9.4** provide preliminary lists of component tasks to be developed further in the 4 EMPs. The components are organised by Facility/System Sub-Elements, Environmental Sources and Potential Impacts, Management Measures, and supporting Management Plans (on specific issues such as Waste Management, Oil Spill Contingency Management, and Emergency Response).

The EMPs will be developed further following the completion of the environmental assessment and finalisation of project design.

The EMPs will establish management and monitoring plans to minimise actual and potential impacts associated with the four phases of the Sunrise Gas Project, and ensure compliance with all relevant environmental regulations.

The EMPs will identify the timing and scope of individual components and serve as a compliance document – recording the progress of management commitments and their conformity with requirements set by authorities and expectations of the public.

9.2.1 Structure and Scope

Each EMP will contain information covering: corporate environment policy, environment legislation, description of an activity, description of the environment, assessment of environmental risks and effects, performance objectives, standards and criteria, implementation strategy, reporting arrangements and consultations. Full details of consultation with both statutory and non-statutory bodies will be recorded as part of the EMP process.

Corporate Environmental Policy

Woodside's Environmental Policy is contained in **Appendix B**.

Environment Legislation

Each EMP will identify all Commonwealth and State/Territory legislation that must be complied with relevant to the environment and the proposed upstream operations. A table or list identifying the legislation, specific requirements, guidelines or codes of practice and how the operator proposes to address each specific document or legislative requirement would be included.

Description of the Activity

The EMPs will contain sufficient information about each activity to enable identification of potential interactions with the environment. They will contain, at a minimum:

- The location or locations of the proposed activity;
- General construction and layout details of any facility or other structure;
- An outline of the proposed operations (eg, production drilling, production, etc) and proposed timetables; and
- Additional information relevant to consideration of the environmental risks and effects of the activity.

Description of an activity may be made by reference to existing documents prepared for other purposes, if the description is adequate.

Description of the Environment

The EMPs will contain a description of the environment that will be affected or potentially affected by an activity, covering:

- Existing environment;
- Cultural environment; and
- Socio-economic environment.

The description will identify particular values and sensitivities of that environment (eg, cultural and heritage sites, marine protected areas, coral reefs and endangered flora and fauna).

Description and Assessment of Environmental Risks and Effects

Each EMP will contain a detailed assessment of the environmental impact of normal operations and possible non-routine operations (whether accidental or otherwise) that are not normal operations for an activity for the life of the proposal. At a minimum, the following will be included, where relevant:

- a) An identification and evaluation of the environmental risks and effects and their significance arising directly or indirectly from the normal and non-routine operations of an activity including those arising from the:
- Construction and installation of facilities;
 - Presence of fixed, mobile or temporary facilities;
 - Marine operations including:
 - Transport to and from facilities;
 - Standby vessels;
 - Air operations including;
 - Transport to and from facilities;
 - Production drilling operations;
 - Production and pipelining operations; and
 - Storage, transfer and transport of petroleum and other materials.
 - Discharges to land or water including:
 - Drilling muds and fluids;
 - Formation water;
 - Domestic wastes; and
 - Other discharges.
 - Emissions to air including:
 - Flaring;
 - Venting;
 - Fugitive emissions; and
 - Other emissions.
 - Waste management;
 - Noise;
 - Decommissioning; and
 - Rehabilitation.

relative to the:

- The natural environment;
- Cultural environment; and
- Socio-economic environment.

- b) An assessment of the confidence in predicting the environmental effects, risks and significance.

Where possible, risk to the environment will be expressed in a quantitative manner. Where uncertainty exists the best possible semi-quantitative or qualitative measures should be provided. A precautionary approach should be adopted in the consideration of risk to the environment.

Performance Objectives, Standards and Criteria

The EMPs will contain environmental performance objectives, standards and measurement criteria, to determine if an activity is meeting its environmental objectives and standards.

The performance objectives, standards and criteria must be consistent with reducing environmental risks and effects to 'as low as reasonably practicable' (ALARP).

Implementation Strategy

Woodside will develop an implementation strategy that will include operational systems and procedures that:

- 1) Ensure that the agreed environmental performance objectives and standards are met;
- 2) Identify specific systems, practices and procedures to be used to ensure that environmental risks and effects are reduced to as low as reasonably practicable and that environmental performance objectives and standards are met;
- 3) Establish a clear chain of command that sets out the roles and responsibilities of personnel;
- 4) Ensure that each employee or contractor working on, or in connection with, the activity is aware of their responsibilities in relation to the environment and has the appropriate skills and training;
- 5) Monitor, review and audit environmental performance and the implementation strategy (IS);
- 6) Maintain quantitative records of emissions and discharges to the air, marine, seabed and sub-seabed environment, that are accurate and can be monitored and audited against environmental performance standards and measurement criteria;
- 7) Maintain an up-to-date emergency response manual (including an oil spill contingency plan) that includes detailed response and investigative arrangements;
- 8) Provide for appropriate consultation with relevant government authorities and other interested persons or organisations; and
- 9) Comply with the P(SL)A and corresponding regulations and any other environment legislation applying to the activity.

Reporting Arrangements

Each EMP will include arrangements for recording, monitoring and reporting information about the activity (including information required to be recorded under the P(SL)A and its corresponding regulations or any other environment legislation applying to the activity) that will enable the relevant regulatory authority to determine whether the environmental performance objectives and standards in the EMP have been met.

Consultations

Each EMP may include a report on consultations between the operator and the relevant authority, and other interested persons and organisations (eg, fishing cooperatives and tourism operators, local community and environment Non-Government Organisations) in the course of developing the EMP. It will also include details of ongoing consultation arrangements to be adopted during the operational phase with other marine users and interest groups.

Consultations will begin at an early stage of project development to ensure all concerns are addressed prior to commitment to a preferred option. The level and nature of consultations should be appropriate to the level and nature of the proposed activity.

The Report on Consultations prepared for the various EMPs will identify:

- Relevant government authorities, interested persons and organisations (such as other marine users and interest groups that were consulted);
- Concerns and interests raised during the consultations; and
- Actions or other arrangements to address those concerns, including any ongoing consultation arrangements.

9.3 Monitoring

A detailed environmental monitoring programme will be developed and implemented. The programme will be designed to:

- Provide information on the nature of potential impacts which cannot be precisely predicted;
- Ensure that safeguards are appropriate;
- Ensure that the potential environmental effects are minimised;
- Ensure that the facility complies with any regulations governing particular activities; and
- Enable the implementation of contingency measures, if required.

The monitoring programme will be developed following completion of the environmental assessment and finalisation of project design and will be subject to regulatory approval prior to implementation.

9.4 Management Commitments

Woodside is committed to achieving a level of environmental management and performance consistent with national and international standards and statutory obligations during its pursuit of sound business and financial objectives. The most economically effective, environmentally sound technology and procedures will be incorporated into the design of the project. The adoption of such a strategy will ensure optimal management of all emissions, discharges and waste. Furthermore, Woodside is committed to ensuring that the development of the Sunrise Gas Project will be undertaken in a manner that minimises impacts on the surrounding biophysical and social environments. Accordingly, Woodside proposes numerous management commitments. As the project concept advances it will be possible to refine further a full list of these commitments. These commitments are summarised in **Table 9.5**.

Table 9-1 Draft Environmental Management Plan for Drilling and Associated Activities

TOPIC/SUB-ELEMENT	SOURCES AND POTENTIAL IMPACTS	ENVIRONMENTAL MANAGEMENT MEASURES	SUPPORTING MANAGEMENT PLANS
<p>Wellhead Platform Installation</p>	<p>Source of Impact Physical Presence of Wellhead Platform</p> <ul style="list-style-type: none"> ▪ Lighting ▪ Disposal of construction wastes ▪ Presence of construction and support vessels ▪ Discharge of sewage and greywater ▪ Discharge of domestic waste including food scraps <p>Impacts Discharges to the Sea</p> <ul style="list-style-type: none"> ▪ Potential localised reduction in water quality <p>Noise, Vibration, Light and Heat</p> <ul style="list-style-type: none"> ▪ Potential disturbance to marine species <p>Waste to Shore</p> <ul style="list-style-type: none"> ▪ Improper disposal 	<p>Discharges to Sea</p> <ul style="list-style-type: none"> ▪ Strict adherence to regulations for discharges to sea <p>Noise, Vibration, Light and Heat</p> <ul style="list-style-type: none"> ▪ Design to minimise, noise, vibration, light and heat <p>Waste to Shore</p> <ul style="list-style-type: none"> ▪ Develop and implement a Waste Management Plan ▪ Ensure that Waste Management Plan is audited to ensure compliance ▪ Solid waste produced during construction will be stored, contained, separated where appropriate and disposed onshore at an approved facility <p>Other</p> <ul style="list-style-type: none"> ▪ Navigation and safety lighting will be provided to ensure that any shipping or recreational activities are able to clearly identify the presence of the facility. ▪ Notice to mariners will be issued alerting them of the development and associated activities prior to construction and charts will be amended to show the location of the facility. 	<p>Facility Environment Plan Waste Management Plan</p>
<p>Drilling of Platform and Subsea Wells</p>	<p>Discharges to the Sea</p> <ul style="list-style-type: none"> ▪ Smothering effects of accumulated drilling cuttings on marine biota ▪ Increased turbidity in the area if cuttings discharged at the surface ▪ Potential accumulation of metal and hydrocarbon concentrations in seabed sediments leading to toxicity ▪ Potential bioaccumulation/bioconcentration by marine biota of contaminants in non-water based drilling fluids ▪ Potential anoxia of sediment due to natural degradation of drilling muds ▪ Potential reduction in water quality in the area ▪ Potential of a significant fuel spill <p>Noise, Vibration, Light and Heat</p> <ul style="list-style-type: none"> ▪ Potential disturbance to marine species <p>Waste to Shore</p> <ul style="list-style-type: none"> ▪ Improper disposal <p>Other</p> <ul style="list-style-type: none"> ▪ Disturbance to seabed and potential changes to seabed characteristics from drilling unit spud cans. 	<p>Atmospheric Emissions</p> <ul style="list-style-type: none"> ▪ Use of efficient power generation equipment during drilling campaigns ▪ Efficient planning of vehicle and vessel movements will minimise fuel usage <p>Discharges to Sea</p> <ul style="list-style-type: none"> ▪ Strict adherence to regulations for discharges to sea ▪ Solid waste products from drilling will be monitored ▪ Hydrocarbon content in cuttings will be monitored ▪ Cuttings may be either directed to seafloor via chute or disposed down hole. ▪ Recolonisation of drill cutting occurs rapidly within the first 6–24 months if directed to the seabed ▪ Non-water-based fluids must be approved for use by regulatory bodies ▪ Where possible the selection of drilling fluids will give preference to low toxicity ▪ Non-water based drilling fluids can be reused and recycled after use ▪ Government guidelines will be used for management of drilling fluids ▪ Equipment such as shale shakers and centrifuges to be used to separate cuttings from mud and other contaminants. Solids control equipment will be routinely checked ▪ Modelling of cuttings discharge has been undertaken by Asia Pacific ASA ▪ Prepare and implement an Emergency Response Plan and Oil Spill Contingency Plan <p>Noise, Vibration, Light and Heat:</p> <ul style="list-style-type: none"> ▪ Design to minimise emissions of noise, vibration, light and heat. <p>Waste to Shore</p> <ul style="list-style-type: none"> ▪ Develop and implement a Waste Management Plan. ▪ Ensure that Waste Management Plan is audited to ensure compliance. ▪ Drainage from workspace areas will be separately bunded and drained to a central collection system. ▪ Oily waste and potentially contaminated liquid wastes will be collected and contained separately from clean stormwater. <p>Other</p> <ul style="list-style-type: none"> ▪ Areas impacted by anchoring are likely to be recolonised within 6 months of disturbance ▪ Sensitive habitats would be avoided as a result of site selection studies ▪ Baseline surveys of seabed characteristics/communities have been undertaken to facilitate future monitoring ▪ Ongoing monitoring and inspections during the construction phase will ensure that impacts are minimised wherever possible 	<p>Drilling Environment Plan Waste Management Plan Emergency Response Plan Oil Spill Contingency Plan</p>

Table 9-2 Draft Environmental Management Plan for Installation and Construction

TOPIC/SUB-ELEMENT	SOURCES AND POTENTIAL IMPACTS	ENVIRONMENTAL MANAGEMENT MEASURES	SUPPORTING MANAGEMENT PLANS
Subsea Facilities (well heads, manifolds, flowlines, risers, etc)	<p>Source of Impact</p> <ul style="list-style-type: none"> ▪ Installation of subsea facilities ▪ Anchoring of construction vessel(s) ▪ Discharge of sewage and greywater ▪ Discharge of domestic waste including food scraps ▪ Disposal of domestic waste including paper and plastics etc ▪ Power generation ▪ Refuelling at sea <p>Impacts</p> <p>Atmospheric Emissions</p> <ul style="list-style-type: none"> ▪ Greenhouse gases produced by vessel power generation (primarily CO₂) ▪ Atmospheric pollutants (primarily NO_x, SO_x, VOCs and smoke/particulates) <p>Discharges to the Sea</p> <ul style="list-style-type: none"> ▪ Potential significant fuel spill <p>Noise, Vibration, Light and Heat</p> <ul style="list-style-type: none"> ▪ Potential disturbance to marine species and birds <p>Waste to Shore</p> <ul style="list-style-type: none"> ▪ Improper disposal 	<p>Atmospheric Emissions</p> <ul style="list-style-type: none"> ▪ Efficient planning of vehicle and vessel movements will minimise fuel usage <p>Discharges to Sea</p> <ul style="list-style-type: none"> ▪ All Contractors personnel will receive induction training on correct handling and pollution prevention requirements. ▪ Strict adherence to regulations for discharges to sea. ▪ Prepare and implement an Emergency Response Plan (ERP) and Oil Spill Contingency Plan (OSCP). ▪ Bunding of areas that contain chemicals. <p>Noise, Vibration, Light and Heat</p> <ul style="list-style-type: none"> ▪ Design to minimise emissions of noise, vibration, light and heat. <p>Waste to Shore</p> <ul style="list-style-type: none"> ▪ Develop and implement a Waste Management Plan. ▪ Ensure that Waste Management Plan is audited to ensure compliance. ▪ Solid waste produced during construction will be stored, contained, separated where appropriate and disposed onshore at an approved facility. ▪ Offsite fabrication and modularised construction will ensure minimal waste generation on site. <p>Physical Presence of Facilities</p> <ul style="list-style-type: none"> ▪ Selection of the pipeline routes has been optimised to take into account potential environmentally sensitive areas. ▪ Baseline surveys have been undertaken identifying benthic communities during EIA to minimise placement on sensitive marine habitats. ▪ Pipelines will be laid directly on seabed: no trenching, backfilling, dredging or blasting required. 	<p>Facility Environment Plan Waste Management Plan</p>



Table 9-2 Draft Environmental Management Plan for Installation and Construction (Continued)

TOPIC/SUB-ELEMENT	SOURCES AND POTENTIAL IMPACTS	ENVIRONMENTAL MANAGEMENT MEASURES	SUPPORTING MANAGEMENT PLANS
<p>PCUQ Platform and FSO</p>	<p>Source of Impact</p> <ul style="list-style-type: none"> ▪ Transportation of the PCUQ Platform and FSO to site ▪ Installation of the PCUQ Platform and FSO on site ▪ Physical presence of PCUQ Platform and FSO ▪ Installation of foundations of the PCUQ Platform ▪ Disposal of construction wastes ▪ Presence of construction and support vessels ▪ Installation of mooring for the FSO ▪ Power generation ▪ Lighting <p>Impacts</p> <p>Atmospheric Emissions</p> <ul style="list-style-type: none"> ▪ Greenhouse gases produced by vessel power generation (primarily CO₂); ▪ Atmospheric pollutants (primarily NO_x, SO_x, VOCs and smoke/particulates); <p>Discharges to the Sea</p> <ul style="list-style-type: none"> ▪ Potential reduction in water quality in the area <p>Noise, Vibration, Light and Heat</p> <ul style="list-style-type: none"> ▪ Potential disturbance to marine species ▪ Potential attraction of marine species <p>Waste to Shore</p> <ul style="list-style-type: none"> ▪ Improper disposal. 	<p>Atmospheric Emissions</p> <ul style="list-style-type: none"> ▪ Efficient planning of vehicle and vessel movements will minimise fuel usage. <p>Discharges to Sea</p> <ul style="list-style-type: none"> ▪ Strict adherence to regulations governing discharges to sea <p>Noise, Vibration, Light and Heat</p> <ul style="list-style-type: none"> ▪ Design to minimise emissions of noise, vibration, light and heat ▪ Light is a mandatory requirement for safety; however, it can be controlled such that lighting of the sea surface is minimised. <p>Waste to Shore</p> <ul style="list-style-type: none"> ▪ Develop and implement a Waste Management Plan. ▪ Ensure that Waste Management Plan is audited to ensure compliance. ▪ Solid waste produced during construction will be stored, contained, separated where appropriate and disposed onshore at an approved facility. ▪ Offsite fabrication and modularised construction will ensure minimal waste generation on site. <p>Other</p> <ul style="list-style-type: none"> ▪ Navigation and safety lighting will be provided to ensure that any shipping or recreational activities are able to clearly identify the presence of activity. ▪ Notice to mariners will be issued alerting them of the development and associated activities prior to construction and charts will be amended to show the location of the facility. 	<p>Facility Environment Plan</p>

Table 9-2 Draft Environmental Management Plan for Installation and Construction (Continued)

TOPIC/SUB-ELEMENT	SOURCES AND POTENTIAL IMPACTS	ENVIRONMENTAL MANAGEMENT MEASURES	SUPPORTING MANAGEMENT PLANS
<p>Subsea Pipeline</p>	<p>Source of Impact</p> <ul style="list-style-type: none"> ▪ Potential prelay with rock dump ▪ Power generation ▪ Hydrotesting <p>Impacts</p> <ul style="list-style-type: none"> ▪ Power generation ▪ Vehicle operation <p>Atmospheric Emissions</p> <ul style="list-style-type: none"> ▪ Significant emissions of greenhouse gases produced by vehicles and power generation (primarily CO₂); ▪ Significant emissions of atmospheric pollutants (primarily NO_x, SO_x, VOCs and smoke/particulates); and ▪ Dust generation and significant emissions of particulate matter. <p>Discharges to the Sea</p> <ul style="list-style-type: none"> ▪ Smothering of benthos. ▪ Potential exposure of acid sulfate soils resulting in acid generation. <p>Noise, Vibration, Light and Heat</p> <ul style="list-style-type: none"> ▪ Potential disturbance to marine fauna. ▪ Potential disturbances of marine species from lights <p>Waste to Shore</p> <ul style="list-style-type: none"> ▪ Improper disposal. <p>Other</p> <ul style="list-style-type: none"> ▪ Potential spillage of fuel and hydrocarbons. ▪ Temporary disruption of commercial and recreational fisheries and recreational areas. 	<p>Atmospheric Emissions</p> <ul style="list-style-type: none"> ▪ Internal coating to maximise hydraulic efficiency of pipeline in order to minimise future compressor power requirements. ▪ Efficient planning of vehicle movements will minimise fuel usage. ▪ Contractor to maintain engines to ensure optimal operation. <p>Discharges to Sea</p> <ul style="list-style-type: none"> ▪ Ensure minimal use of hydrotest chemicals such as oxygen scavenger and biocide. ▪ Relevant regulatory authorities to be notified of requirement to abstract & discharge water. <p>Noise, Vibration, Light and Heat</p> <ul style="list-style-type: none"> ▪ Emissions of the noise and vibration will be minimised where practicable. <p>Waste to Shore</p> <ul style="list-style-type: none"> ▪ Solid waste produced will be stored, contained, separated where appropriate and disposed at an approved landfill facility. <p>Other</p> <ul style="list-style-type: none"> ▪ Develop and implement an Emergency Response Plan. 	<p>SUPPORTING MANAGEMENT PLANS</p> <ul style="list-style-type: none"> Facility Environment Plan Waste Management Plan Rehabilitation Plan Weed Management Plan Emergency Response Plan

Table 9-3 Draft Environmental Management Plan for Commissioning and Operation

TOPIC/SUB-ELEMENT	SOURCES AND POTENTIAL IMPACTS	ENVIRONMENTAL MANAGEMENT MEASURES	SUPPORTING MANAGEMENT PLANS
<p>Well head Platform, Processing, Compression, Utilities and Quarters (PCUQ) and Subsea Facilities</p>	<p>Source of Impact</p> <ul style="list-style-type: none"> ▪ Potential condensate spill ▪ Emergency shutdown of facility ▪ Discharge of Produced Formation Water (PFW) ▪ Disposal of waste associated with maintenance of the platforms ▪ Discharge of cooling water ▪ Disposal of oily waste, waste oil, etc. ▪ Discharge of potentially contaminated stormwater from machinery, workshop etc ▪ Discharge of sewage and greywater ▪ Disposal of domestic waste including food scraps ▪ Increased shipping movements in the area ▪ Potential collision of shuttle tanker or supply vessels with platforms ▪ Operational noise ▪ Power generation producing greenhouse gas emissions to air ▪ Hazardous materials ▪ Potential prelay with rock dump ▪ Rock armouring ▪ Power generation ▪ Hydrotesting <p>Impacts</p> <p>Atmospheric Emissions</p> <ul style="list-style-type: none"> ▪ Comminute or grind food scraps to particle sizes of less than 25 mm prior to discharge ▪ Significant emission of greenhouse gases due to export compression ▪ Significant emission of greenhouse gases due to power generation ▪ Significant emission of greenhouse gases due to flaring ▪ Significant emission of smoke and particulates <p>Discharges to the Sea</p> <ul style="list-style-type: none"> ▪ Potential significant hydrocarbon contamination from condensate spill ▪ Potential significant hydrocarbon contamination from diesel spill ▪ Potential significant contamination from PFW discharge ▪ Potential elevation of water temperature may affect marine organisms ▪ Potential reduction in local water quality ▪ Potential reduction in water quality due to hydrotesting (biocides, scale and corrosion inhibitors and oxygen scavengers) <p>Noise, Vibration, Light and Heat</p> <ul style="list-style-type: none"> ▪ Potential disturbance to marine species and birds ▪ Potential attraction of marine species 	<p>Atmospheric Emissions</p> <ul style="list-style-type: none"> ▪ Selection of efficient power generation and compression equipment ▪ The production facility will be equipped with an Emergency Shut Down (ESD) system and numerous isolation valves. The automated ESD will also be back-up via a manual system ▪ Equipment and fuel selection will be undertaken such that emission characteristics will be minimised ▪ Routine maintenance on combustion equipment will be undertaken ▪ Flaring will be minimal ▪ Banned substances including, CFC, halon and HFC's will not be permitted in facility design ▪ Chemical selection to avoid ozone depleting substances where practicable ▪ Refrigerants will be recovered during maintenance of equipment <p>Discharges to Sea</p> <ul style="list-style-type: none"> ▪ Prepare and implement an Emergency Response Plan and Oil Spill Contingency Plan ▪ PFW may be reinjected to dedicated wells ▪ The quantity and hydrocarbon content of PFW discharged to the sea will be monitored continuously ▪ The PFW system will be designed and managed such that oil in water content is maintained below 30 mg/L (24hr-average) and 50 mg/L (instantaneous) ▪ Alarm on PFW system will be raised when oil in water exceeds 30 mg/L. Water system will alarm when oil-in-water exceeds 50 mg/L ▪ Periodic sampling of PFW discharges will be undertaken ▪ Selection of low toxicity corrosion and scale inhibitors will be given preference ▪ Drainage from process and workspace areas will be separately bunded and drained to a central collection system ▪ MSDSs will be made readily available for all chemicals kept on the platforms ▪ Chemicals having minimal environmentally toxicity and bioaccumulation characteristics but which meet safety requirements will be used ▪ Comminute or grind food scraps to particle sizes of less than 25 mm prior to discharge <p>Noise, Vibration, Light and Heat</p> <ul style="list-style-type: none"> ▪ Emissions of the noise and vibration will be minimised where practicable ▪ Silencers, cladding and other appropriate noise attenuation controls will be installed where practicable ▪ Lighting will be designed to Australian Standards and regulatory requirements that ensure that excess lighting that may result in light overspill is avoided 	

Table 9-3 Draft Environmental Management Plan for Commissioning and Operation (Continued)

TOPIC/SUB-ELEMENT	SOURCES AND POTENTIAL IMPACTS	ENVIRONMENTAL MANAGEMENT MEASURES	SUPPORTING MANAGEMENT PLANS
	<p>Waste to Shore</p> <ul style="list-style-type: none"> ▪ Improper disposal <p>Other</p> <ul style="list-style-type: none"> ▪ Potential loss of access to fishing grounds with a large exclusion zone around development area ▪ Creation of hard substrate that could be colonised by marine pest species ▪ Recolonisation of a different community to that originally found in the area <p>Comment: The probability of a spill is very low. No major spills from exploration activity have occurred to date in Australia. Condensate evaporates rapidly and loses toxicity relatively quickly.</p>	<p>Waste to Shore</p> <ul style="list-style-type: none"> ▪ Develop and implement a Waste Management Plan ▪ Ensure that Waste Management Plan is audited to ensure compliance ▪ Solid waste produced during construction will be stored, contained, separated where appropriate and disposed onshore at an approved facility ▪ Personnel will be appropriately trained to ensure safe handling procedures and approved disposal of waste ▪ Oil and chemical drums will be stored in bunded areas capable of storing 110% capacity of stored volume ▪ Dip trays will be used under all machinery <p>Other</p> <ul style="list-style-type: none"> ▪ Platform design will incorporate features allowing for segregation of clean and dirty areas ▪ Baseline monitoring will be undertaken to facilitate future monitoring programs ▪ Ongoing monitoring and inspections during the operation phase will ensure that impacts are detected and minimised wherever possible 	<p>Facility Environment Plan Emergency Response Plan Oil Spill Contingency Plan</p>
<p>Subsea Pipeline</p>	<p>Source of Impact</p> <ul style="list-style-type: none"> ▪ Hydrotesting of pipeline ▪ Potential rupture of pipeline ▪ Presence of the pipeline <p>Impacts</p> <p>Atmospheric Emissions</p> <ul style="list-style-type: none"> ▪ Potential emissions of natural gas or condensate in the event of a leak <p>Discharges to the Sea</p> <ul style="list-style-type: none"> ▪ Potential reduction in water quality offshore due to release of hydrotest water (biocides, scale and corrosion inhibitors and oxygen scavengers) <p>Other</p> <ul style="list-style-type: none"> ▪ Physical presence of pipeline ▪ Restriction of commercial fishing, recreation or other practices along the pipeline route ▪ Occurrence of fires ▪ Potential spills may contaminate important breeding, nesting and foraging habitats ▪ Potential spills may directly and fatally impact fauna and vegetation ▪ Potential spill resulting in soil contamination 	<p>Atmospheric Emissions</p> <ul style="list-style-type: none"> ▪ The pipeline will be designed to minimise risks of damage from any anticipated storm and cyclonic activities with a 100 year return period. ▪ Prepare and implement a Pipeline Rupture Contingency Plan ▪ Design will incorporate automatic Emergency Shut Down, with back-up allowing for manual shutdown ▪ Regular inspection of subsea pipeline - checking for damage, spans and objects) ▪ Flow rates will be continuously monitored and will detect the occurrence of any leaks along the line. Any drop in flow rate will activate a warning system. ▪ Cathodic protection of the pipeline to mitigate against external corrosion ▪ Continuous monitoring of rate of corrosion and where necessary adjustment of dosage rate ▪ The number of potential leak/ rupture points along the pipeline will be minimised by reducing the number of connection points, valves and flanges to as few as possible <p>Discharges to Sea</p> <ul style="list-style-type: none"> ▪ Selection of low toxicity corrosion inhibitors will be given preference. ▪ Prepare and implement a Pipeline Rupture Contingency Plan addressing the risk to the marine environment 	<p>Facility Environment Plan Pipeline Rupture Contingency Plan</p>

Table 9-3 Draft Environmental Management Plan for Commissioning and Operation (Continued)

TOPIC/SUB-ELEMENT	SOURCES AND POTENTIAL IMPACTS	ENVIRONMENTAL MANAGEMENT MEASURES	SUPPORTING MANAGEMENT PLANS
FSO and Shuttle Vessels	<p>Source of Impact</p> <ul style="list-style-type: none"> ▪ Potential spill during condensate transfer to shuttle tankers ▪ Ballast water discharge from offtake tankers once on site ▪ TBT and other antifoulant paints on tankers ▪ Vessel hulls fouled with marine organisms ▪ Cargo tank venting to atmosphere ▪ Potential collision with shuttle tankers or supply vessels ▪ Power generation emissions ▪ Discharge of sewage and greywater ▪ Disposal of domestic waste including food scraps <p>Impacts</p> <p>Atmospheric Emissions</p> <ul style="list-style-type: none"> ▪ Cargo tank emissions from loading of FSO and shuttle tankers <p>Discharges to the Sea</p> <ul style="list-style-type: none"> ▪ Contamination of marine environment by anti-fouling agents. ▪ Introduction of marine pest species from off-take tanker de-ballasting and hull fouling ▪ Potential significant hydrocarbon contamination from condensate spill ▪ Potential significant hydrocarbon contamination from diesel spill <p>Other</p> <ul style="list-style-type: none"> ▪ Interference with shipping. 	<p>Atmospheric Emissions</p> <ul style="list-style-type: none"> ▪ Losses associated with loading and storage will be minimised as far as is practical <p>Discharges to Sea</p> <ul style="list-style-type: none"> ▪ Prepare and implement an Emergency Response Plan (ERP) and implement current Oil Spill Contingency Plan (OSCP) ▪ Ships to comply with AQIS guidelines with respect to de-ballasting ▪ Ballast water exchange restricted to deep ocean waters ▪ FSO and shuttle tanker to have segregated ballast tanks ▪ By 2003 new vessels will be required to use an alternative antifoulant to TBT. Existing vessels are required to have TBT removed by 2008 ▪ Transfer of product and diesel between vessels will be continuously monitored and supervised ▪ The drainage on the deck of the FOS will be designed to prevent spills going over the side ▪ Floating hoses containing condensate will be fitted with breakaway self-sealing couplings ▪ MSDSs will be made readily available for all chemicals kept on FOS <p>Other</p> <ul style="list-style-type: none"> ▪ Shipping movements will be co-ordinated according to accepted industry standards 	<p>SUPPORTING MANAGEMENT PLANS</p> <ul style="list-style-type: none"> Facility Environment Plan Emergency Response Plan Oil Spill Contingency Plan

Table 9-4 Draft Environmental Management Plan for Decommissioning

TOPIC/SUB-ELEMENT	SOURCES AND POTENTIAL IMPACTS	ENVIRONMENTAL MANAGEMENT MEASURES	SUPPORTING MANAGEMENT PLANS
Wellhead Platform and Wells and Associated Subsea Facilities	<p>Source of Impact</p> <ul style="list-style-type: none"> ▪ Plugging and abandonment of wells ▪ Removal of well heads ▪ Removal of flowlines, manifolds and risers ▪ Vessel and rig movements <p>Impacts</p> <p>Discharges to the Sea</p> <ul style="list-style-type: none"> ▪ Potential discharge of residual hydrocarbons <p>Noise, Vibration, Light and Heat</p> <ul style="list-style-type: none"> ▪ Disturbance to noise sensitive marine life <p>Waste to Shore</p> <ul style="list-style-type: none"> ▪ Improper disposal <p>Other:</p> <ul style="list-style-type: none"> ▪ Disruption of benthic communities that have established on and adjacent to the facilities 	<p>Discharges to Sea</p> <ul style="list-style-type: none"> ▪ All flow lines will be flushed thoroughly to minimise oily waste discharges. <p>Noise, Vibration, Light and Heat</p> <ul style="list-style-type: none"> ▪ Emissions of the noise and vibration will be minimised where practicable. <p>Waste to Shore</p> <ul style="list-style-type: none"> ▪ All wastes will be collected and contained for disposal or recycling onshore. <p>Other</p> <ul style="list-style-type: none"> ▪ At the time of decommissioning, an investigation into the marine habitats surrounding the facilities will be undertaken to ensure that optimum abandonment philosophy is adopted. ▪ Decommissioning to be conducted in accordance with industry standards and legislation of the time. 	<p>Facility Environment Plan Decommissioning Plan</p>
PCUQ and FSO	<p>Source of Impact</p> <ul style="list-style-type: none"> ▪ Removal of Wellhead Platform components and equipment ▪ Jackup and removal of the PCUQ ▪ Disconnection of FSO from flowlines ▪ Movement of FSO offsite <p>Impacts</p> <p>Discharges to the Sea</p> <ul style="list-style-type: none"> ▪ Potential hydrocarbon contamination by oil spillage <p>Noise, Vibration, Light and Heat</p> <ul style="list-style-type: none"> ▪ Disturbance to noise sensitive marine life <p>Waste to Shore</p> <ul style="list-style-type: none"> ▪ Improper disposal <p>Other</p> <ul style="list-style-type: none"> ▪ Disruption of benthic communities that have established on and adjacent to the facility 	<p>Discharges to Sea</p> <ul style="list-style-type: none"> ▪ Potential sources of hydrocarbon emission to the sea will be thoroughly flushed to minimise discharges <p>Noise, Vibration, Light and Heat</p> <ul style="list-style-type: none"> ▪ Emissions of the noise and vibration will be minimised where practicable <p>Waste to Shore</p> <ul style="list-style-type: none"> ▪ All wastes will be collected and contained for disposal or recycling onshore <p>Other</p> <ul style="list-style-type: none"> ▪ At the time of decommissioning, an investigation into the marine habitats surrounding the facilities will be undertaken to ensure that optimum abandonment philosophy is adopted ▪ Decommissioning to be conducted in accordance with industry standards and legislation of the time 	<p>Facility Environment Plan Decommissioning Plan</p>
Subsea Pipeline	<p>Source of Impact</p> <ul style="list-style-type: none"> ▪ Abandonment of subsea pipeline ▪ Removal of subsea pipeline ▪ Potential discharge of residual hydrocarbons <p>Impacts</p> <p>Discharges to the Sea</p> <ul style="list-style-type: none"> ▪ Potential hydrocarbon contamination by oil spillage ▪ Discharge of pipeline cleaning and flushing chemicals <p>Noise, Vibration, Light and Heat</p> <ul style="list-style-type: none"> ▪ Disturbance to noise sensitive marine life <p>Waste Production</p> <ul style="list-style-type: none"> ▪ Improper disposal <p>Other:</p> <ul style="list-style-type: none"> ▪ Disruption of benthic communities established on/by the pipeline 	<p>Discharges to Sea</p> <ul style="list-style-type: none"> ▪ The pipeline will be flushed thoroughly to minimise oily waste discharges <p>Noise, Vibration, Light and Heat</p> <ul style="list-style-type: none"> ▪ Emissions of the noise and vibration will be minimised where practicable <p>Waste to Shore</p> <ul style="list-style-type: none"> ▪ All wastes will be collected and contained for disposal or recycling/reuse to an approved facility <p>Other</p> <ul style="list-style-type: none"> ▪ At the time of decommissioning, an investigation into the marine habitats, surrounding the pipeline will be undertaken to ensure that optimum abandonment philosophy is adopted ▪ Decommissioning to be conducted in accordance with industry standards and legislation of the time 	<p>Facility Environment Plan Decommissioning Plan</p>

Table 9.5 Summary of Woodside’s Commitments for the Sunrise Gas Project

No.	Management Commitment	Objective	Timing
Atmospheric Emissions			
1	Prepare a Drilling Environment Plan to ensure efficient power generation and planning of vehicle and vessel movements.	Minimise emissions of greenhouse gases in accordance to Commonwealth policies and accepted industry practice.	Pre-drilling
2	Prepare a Facility Environment Plan to ensure efficient power generation, planning of vehicle and vessel movements and overall optimal operation.	Minimise emissions of greenhouse gases in accordance to Commonwealth policies and accepted industry practice.	Pre-construction and pre-commissioning
3	Minimise flaring where possible.	Minimise emissions of greenhouse gases in accordance to Commonwealth policies and accepted industry practice.	Design and operation
4	Prohibit the use of ozone depleting substances-CFCs and halons.	Minimise emissions of greenhouse gases in accordance to Commonwealth policies and accepted industry practice. Meet ozone depleting substances legislation.	Design, drilling, construction and operation.
5	Undertake regular inspections/maintenance of the subsea pipeline in accordance with DNV OS F101 (2000).	Provide adequate protection to the pipeline.	Operation
Discharges to Sea			
6	Obtain approval for non-water based drilling fluids. An Environment Plan will be drawn up and approved for the drilling programme prior to commencement.	Minimise potential for water quality reduction and subsequent impacts on marine biota.	Pre-drilling
7	Implement an Emergency Response Plan (ERP).	Minimise potential for water quality reduction and subsequent impacts on marine biota from non-routine events. The potential for pipeline rupture would be included in the ERP and drawn up in consultation with Emergency organisations etc.	Detailed Design
8	Implement WEL existing Timor Sea Oil Spill Contingency Plan. Amend this plan if required.	Minimise potential for water quality reduction and subsequent impacts on marine biota from oil spills.	Pre-drilling
9	Induct all personnel with particular attention given to correct handling of chemicals and pollution prevention requirements.	Minimise potential for water quality reduction and subsequent impacts on marine biota. Compliance with Emergency Response Plan and Oil Spill Contingency Plan.	Pre-drilling, pre-commissioning and appointment of new personnel
10	Continuously monitor the quantity and hydrocarbon content of Produced Formation Water.	Minimise potential for water quality reduction.	Operation
11	Monitor cooling water for temperature and hydrocarbon content.	Minimise potential for water quality reduction and subsequent impacts on marine biota.	Operation
12	Restrict ballast water exchange to deep, ocean waters.	Minimise potential for water quality reduction.	Operation
13	Continuously monitor and supervise the transfer of product and diesel between vessels.	Minimise risk on water quality from potential spills during product and diesel transfer.	Operation

No.	Management Commitment	Objective	Timing
14	Install breakaway self-sealing couplings on floating hoses that contain condensate.	Minimise risk on water quality from potential ruptures or leakages of floating hoses.	Design and Construction
15	Design an adequate stormwater drainage system to allow oily waste and potential contaminated liquid waste to be collected and contained separately from clean stormwater.	Minimise potential for surface water contamination	Design
Noise, Vibration, Light and Heat			
16	Install appropriate noise attenuation controls including silencers cladding where practicable.	Minimise impacts on fauna and maintain species abundance.	Design
Waste to Shore			
17	Prepare and implement a Waste Management Plan.	Avoid adverse impacts on the environment.	Design
Other			
18	Issue Notice to Mariners alerting them of development and associated activities.	To ensure risk to fisheries is as low as reasonably practicable and complies with acceptable standards.	Pre-drilling and on a regular basis thereafter
19	Prepare and Implement a Decommissioning Plan.	Minimise potential impacts and risks on the environment.	Pre-decommissioning
20	Prepare and implement greenhouse gas strategy to minimise emissions of greenhouse gas	Minimise atmospheric pollution	Design
21	Design and implement operational measures to minimise flaring and venting	Minimise atmospheric pollution	Design
22	The reduction of methane emissions to negligible levels through the combustion of regeneration offgas;	Minimise atmospheric pollution	Design
23	Maximise the use of waste heat from gas turbines:	Minimise atmospheric pollution	Design

