Second offshore trunkline and DOMGAS debottlenecking, North West Shelf

Woodside Offshore Petroleum Pty Ltd

Report and recommendations
of the Environmental Protection Authority

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Summary and recommendations

Woodside Offshore Petroleum Pty Ltd (the proponent) proposes to install a second trunkline to carry gas from its offshore production facilities on the North West Shelf to the existing onshore treatment facilities on the Burrup Peninsula. Also proposed is the debottlenecking of the onshore facilities to facilitate increased domestic gas (DOMGAS) production. This report provides the Environmental Protection Authority's (EPA's) advice and recommendations to the Minister for the Environment on the environmental factors, conditions and procedures relevant to the proposal.

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment on the environmental factors relevant to the proposal and on the conditions and procedures to which the proposal should be subject, if implemented. In addition, the EPA may make recommendations as it sees fit.

The proposal is also subject to assessment by Commonwealth authorities under the *Environment Protection (Impact of Proposals) Act 1981.*

Relevant environmental factors

Although a number of environmental factors were considered by the EPA in the assessment, it is the EPA's opinion that the following are the environmental factors relevant to the proposal, which require detailed evaluation in the report:

(a) Endangered and specially protected (threatened) species - marine mammals and turtles, and terrestrial fauna and flora;

(b) Rock load-out facilities (jetty and wharf extension) - impact on coastal processes and ecology;

(c) Greenhouse gases;

(d) Air emissions - photochemical smog potential due to increased NO_x emissions;

(e) Marine water quality - sediment, hydrotesting, pickle liquors and spills;

(f) Aboriginal culture and heritage - construction on Burrup Peninsula; and

(g) Risk - human health and safety.

Conclusion

The EPA has considered the proposal by Woodside Offshore Petroleum Pty Ltd to install a second offshore trunkline and debottleneck the onshore facilities.

The proposal can be managed to meet the EPA's objectives, provided the recommended conditions and the proponent's commitments are implemented in a satisfactory manner and the proponent meets the requirements of relevant DEP licence conditions.

The key environmental issues of the project should be managed primarily by the environmental controls and safeguards stipulated by the proponent in the Public Environmental Review/Environmental Report (PER). The proponent is committed to preparing Environmental Management Plans (EMPs) for activities such as dredging and quarrying. The project is an extension to existing gas treatment facilities for which an Environmental Management System (EMS) is already in place. Continuing application of the system and incorporation of all environmental aspects of the project will be required to the satisfaction of the EPA on the advice of the DEP.

Recommendations

The EPA submits the following recommendations to the Minister for the Environment:

1. That the Minister considers the report on the relevant environmental factors of: Endangered and specially protected (threatened) species; Rock load-out facilities; Greenhouse gases; Air emissions - potential for photochemical smog due to NOx emissions; Marine water quality; Aboriginal culture and heritage; and Risk - human health and safety;

2. That the Minister notes that the EPA has concluded that the proposal can be managed to meet the EPA's objectives, and thus not impose an unacceptable impact on the environment, provided there is satisfactory implementation by the proponent of the recommended conditions set out in Section 4 and that the proponent meets the requirements of relevant DEP licence conditions;

3. That the Minister imposes the conditions and procedures recommended in Appendix 3.

Conditions

Having considered the proponent's commitments and the information provided in this report, the EPA has developed a set of conditions which the EPA recommends be imposed if the proposal by Woodside Offshore Petroleum Pty Ltd to install a second trunkline, and debottleneck the existing onshore facilities, is approved for implementation. These conditions are presented in Appendix 3. Matters addressed in the conditions include the following:

(a) the proponent shall fulfil the commitments in the Consolidated Commitments statement set out as an attachment to the recommended conditions in Appendix 3; and

(b) in order to manage the relevant factors and EPA objectives contained in this bulletin, and subsequent conditions and procedures authorised by the Minister for the Environment, the proponent shall demonstrate that there is in place an environmental management system which includes the following elements:

- environmental policy and commitment;
- planning of environmental requirements;
- implementation and operation of environmental requirements;
- measurement and evaluation of environmental performance; and
- review and improvement of environmental outcomes.

(c) the proponent shall prepare and implement an Environmental Management Plan (Rock Load-Out Facilities) to the requirements of the EPA, on advice of the DEP.

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1. Introduction and background

Woodside Offshore Petroleum Pty Ltd (the proponent) proposes to install a second trunkline to supply gas from its offshore production facilities on the North West Shelf to the existing onshore treatment plant facilities on the Burrup Peninsula (Figure 1). Together with debottlenecking of the onshore facilities to allow an increase in gas processing, the proposed expansion will facilitate increased gas production for the domestic market.

The offshore production facilities, North Rankin "A" and Goodwyn "A", where trunkline tie-ins will occur, lie in Commonwealth waters. The trunkline will pass through both Commonwealth and State waters *en route* to the onshore facilities located on State land. The proposal will therefore be jointly assessed by Environment Australia (Commonwealth) and the Western Australian Environmental Protection Authority (EPA).

The proposal was referred to the EPA and Environment Australia in accordance with State and Commonwealth legislative requirements, and a Public Environmental Review/Public Environment Report (PER) was prepared by Woodside Offshore Petroleum. The PER report entitled "North West Shelf Gas Project DOMGAS Debottlenecking and 2nd Trunkline Installation Project" was issued in October 1997 and made available for public comment between 21 October 1997 and 18 November 1997.

The EPA will produce its assessment report first and this will be followed by a Commonwealth assessment report. Under the Western Australian system, the Minister for the Environment is responsible for giving environmental approval for proposals. In the Commonwealth system, the relevant Action Minister (in this case the Minister for Resources and Energy) gives approval, on advice from the Commonwealth Minister for the Environment. The Commonwealth Minister for the Environment will in turn confer with his State counterpart so that State and Commonwealth environmental management conditions are complementary.

This EPA report reviews significant environmental aspects of the proposal as presented in the PER and the concerns raised in submissions. The important environmental factors for the project, in the opinion of the EPA, have been identified and evaluated.

Further details of the proposal are presented in Section 2 of this Report. Section 3 discusses environmental factors relevant to the proposal. Section 4 contains conditions and procedures to which the proposal should be subject if the Minister determines that it may be implemented. Other EPA advice is outlined in Section 5. Section 6 presents the EPA's conclusions and Section 7 the EPA's recommendations.

A list of organisations that made submissions is included in Appendix 1. References are listed in Appendix 2, and recommended conditions and procedures and proponent's consolidated commitments are provided in Appendix 3.

The DEP's summary of submissions and the proponent's response to those submissions has been published separately and is available in conjunction with this report.

2. The proposal

2.1 Second Trunkline

The proposal by Woodside Offshore Petroleum is to install a second undersea gas trunkline from the existing offshore Goodwyn/North Rankin production platforms to a new terminal located in the existing onshore treatment plant at Withnell Bay on the Burrup Peninsula (Figure 2). The length of the trunkline, depending upon the route option selected at the platforms, is in the range 148 to 159 km. The trunkline route will be aligned with the existing trunkline and will cross the shore adjacent to and east of the existing trunkline (Figure 3). Other alternative trunkline route options were evaluated but were rejected on grounds of environmental sensitivity and technical difficulty for inshore areas.

The diameter of the trunkline will be 1066 mm (42") and it is designed to operate at 14.5 Megapascals (Mpa). The product transferred in the trunkline will be dehydrated natural gas and condensate at a temperature of 45 degrees C.

New risers will be required on the offshore platforms to connect the production pipework to the trunkline. There will be piping connections to connect the new trunkline onshore terminal (TOT) to the onshore gas/condensate treatment facilities.

The pipe sections will be corrosion treated, weighted with concrete, and stockpiled prior to pipelaying. The preferred site for these activities is the rehabilitated Hearson's Village Construction Camp (Figure 4). The trunkline will be placed on the seabed using standard pipelay barge procedures. Pipe will be delivered to the pipelay barge using vessels loaded from a Burrup Peninsula wharf. The pipe will be welded on the pipelay barge and progressively lowered onto the seabed using specialised clamps and winches.

The trunkline will be installed in deeper waters (approximately 25 km to 150 km offshore) by ploughing and laying the concrete coated pipework in a pre-excavated trench. Where required, the trunkline will be stabilised by covering with rock or natural infill. In shallow waters (up to 25 km offshore) ploughing may not be possible and cutter dredging of calcareous rock will be required for pre-trenching. For areas of hard igneous rocks (0 to 300 metres offshore) and at the reef outcrops approximately 20 km offshore, drilling and blasting will be necessary to remove rock outcrops. Some spoil will be used for backfilling with excess material relocated to an existing designated spoil ground, west of Conzinc Island.

Rock for stabilisation and protection of the trunkline will be quarried, crushed, and transported to a stockpile area prior to loading onto specialist rock dumping vessels. Potential quarry sites and stockpile/loadout areas are indicated in figure 4. The preferred rock source is the existing quarry south of the onshore treatment plant. Possible locations for the stockpile and load-out area are King Bay, Dampier Public Wharf and No-Name Bay/Holden Point (see figure 4). The crushed rock will be transported to the stockpile area using Haulpack-type dump trucks. Specialist vessels will be used to dump rock over the trunkline at specified locations. For deeper waters a rock fall-pipe vessel will be used to deliver the rock over the pipeline. Close inshore for shallow waters, the rock will be discharged using a side dumper vessel.

Following the trunkline construction, pre-commissioning will commence with the pipeline being hydrostatically tested. Sea water will be introduced, most likely at the offshore end, containing small quantities of chemical scale inhibitors and biocides (to control microbial growth inside the trunkline). After pressure testing, the hydrotest water will be released into the ocean at the platform end, and, at the inshore end, into impermeable evaporation ponds to be situated within the Woodside lease area. The total volume of hydrotest water to be disposed of to the evaporation ponds will be approximately 300 cubic metres. The trunkline will be dried and cleaned using vacuum drying and possibly glycol, which would be recovered, treated and recycled. Pickle liquors (chemicals used to treat small diameter pipework) will be recycled where possible or disposed of to the requirements of DEP.

Operation of the trunkline will then commence and a maintenance programme undertaken to indicate any movement in the trunkline and corrosion both internally and externally. Internal trunkline condition monitoring is normally performed using "intelligent pigs" (robot monitoring devices) which are forced through the trunkline.

2.2 Debottlenecking onshore plant

The two phase mixture of gas and condensate from the trunkline will be treated in plant at a second trunkline onshore terminal or TOT (Figure 5). The TOT will separate the gas phase from the liquid phase and will also receive trunkline "pigs". Options proposed for the small quantity of depressurised gas from pig receiving include venting to atmosphere, flaring or recovery to process trains. The TOT will be located within the boundaries of the existing gas treatment plant. The gas and liquid from the new TOT will be directed to the existing DOMGAS treatment plant.

The current plan by the proponent is to debottleneck the existing DOMGAS facility to increase its design capacity by approximately 65%. The proposal for debottlenecking involves piping modifications and the installation of metering units, a mercury guard bed, sales gas compression units and possibly an additional fractionation unit of the type proposed for use in the Liquids Expansion Project (LEP). No additional gas turbines will be installed. Instead, waste heat recovery units will be fitted to the existing turbines.

2.3 Main characteristics

The main characteristics of the proposal are summarised in Table 1 below. The potential impacts of the proposal initially predicted by the proponent in the PER document (Woodside Offshore Petroleum, 1997) and their proposed management are summarised in Appendix 3, Schedule 2. The location and main features of the project are shown in Figures 1 to 5.

Table 1. Summary of key proposal characteristics

Proposal Characteristic	Description
Construction of second trunkline	A second trunkline will be installed on the seabed between the Goodwyn/North Rankin production platforms on the North West Shelf and the existing gas treatment plant on Burrup Peninsula.
Length of trunkline	148 to 159 km (depending on final route selected)
Location and depth	Aligned with existing trunkline but offset up to 15 km to the North East. Pipeline installed to a depth of 30 to 130 metres in deeper waters and 0 to 30 metres inshore.
Trunkline connections	Risers at offshore platforms and new trunkline onshore terminal (TOT) at gas treatment facilities.
Preparation of pipelengths	The pipe sections will be corrosion-treated, weighted with concrete, and stockpiled prior to pipelaying. The preferred site for these activities is the rehabilitated (previously disturbed) Hearson's Village Construction Camp.
Stabilisation and protection	Ploughed into seabed or in trench and covered with rock material as required.
Land requirements	The rock storage area, load-out and new haul road will require about 5.5 hectares of "new" (previously undisturbed) land. An additional 20-30 hectares of previously undisturbed land will be required for the two quarries.
Quarries	Quarrying of rock will be required to armour the pipeline. The proponent states that the total quantity of rock required has not yet been accurately assessed, but studies to date have shown that the requirements are likely to be of the order of 0.8 to 2 million cubic metres requiring a total of up to 3 million cubic metres of rock to be quarried. The existing quarry behind Holden Point will be extended further south. This would be supplemented by an area further inland in an area proposed for inclusion in Woodside's new lease for future onshore treatment plant expansion. The total area to be quarried (from both areas) will be 20 to 30 hectares.
Rock stockpile	Load-out of 50,000 to 80,000 tonnes of rock a week is anticipated. To support this, a large stockpile area will be required as quarrying rates will occasionally outstrip demand. The location of the rock stockpile has yet to be confirmed but is likely to be at Holden Point.

Proposal Characteristic	Description
Rock load-out (wharf extension and jetty)	Load-out facilities will be required for supplies of rock for armouring the subsea trunkline. Crushed rock will be transported by haulpak-type trucks to a stockpile area and thence loaded onto specialist rock-dumping vessels. A load-out platform for large rock will be constructed by building an extension to King Bay wharf using sheeting and rock back-fill. A trestle jetty/conveyor belt for smaller rock will also be required (location yet to be confirmed). The proponent has made a commitment to remove the trestle structures at completion of the project.
Hydrostatic pressure tests	Constructed trunkline pressure tested and hydrotest water containing corrosion inhibitors and biocides released into ocean at platforms, and, inshore, into impervious (clay lined) evaporation ponds situated within the Woodside lease area. The total volume of hydrotest water to be released into the evaporation ponds will be about 300 cubic metres. Trunkline may also be treated with glycol which would be recovered and recycled. Pickle liquors (cleaning reagents for small diameter piping) will be recycled or disposed of in a manner to be approved by the Department of Environmental Protection.
Debottlenecking onshore plant	Existing DOMGAS plant will be modified to increase design capacity by 65%. Proposal comprises piping modification, installation of metering units, a mercury absorption bed, sales gas compressors and possibly a fractionation unit as proposed in the Liquid Expansion Project (LEP). There will be no additional gas turbines required (waste heat recovery units will be installed on existing turbines).
Greenhouse gas emissions	Woodside's onshore treatment plant (OTP) currently produces approx 5 million tonnes of greenhouse gas equivalents per annum. With use of heat recovery units, the project will result in a 65% increase in plant production, but an estimated increase in annual greenhouse gas emissions of the order of 2%.
NOx emissions	Current OTP operations produce approx 6,000 tonnes of NOx per annum. The proposal is predicted to increase annual NOx emissions by less than 4%.
Operation of pig receiver	Depressurised gas either vented, flared or recovered depending upon frequency of operation.
Operational discharges	No additional produced formation water will be generated as a result of the current proposal. Waste heat will be utilised through heat exchangers. There will be no emissions of waste heat to coastal waters.

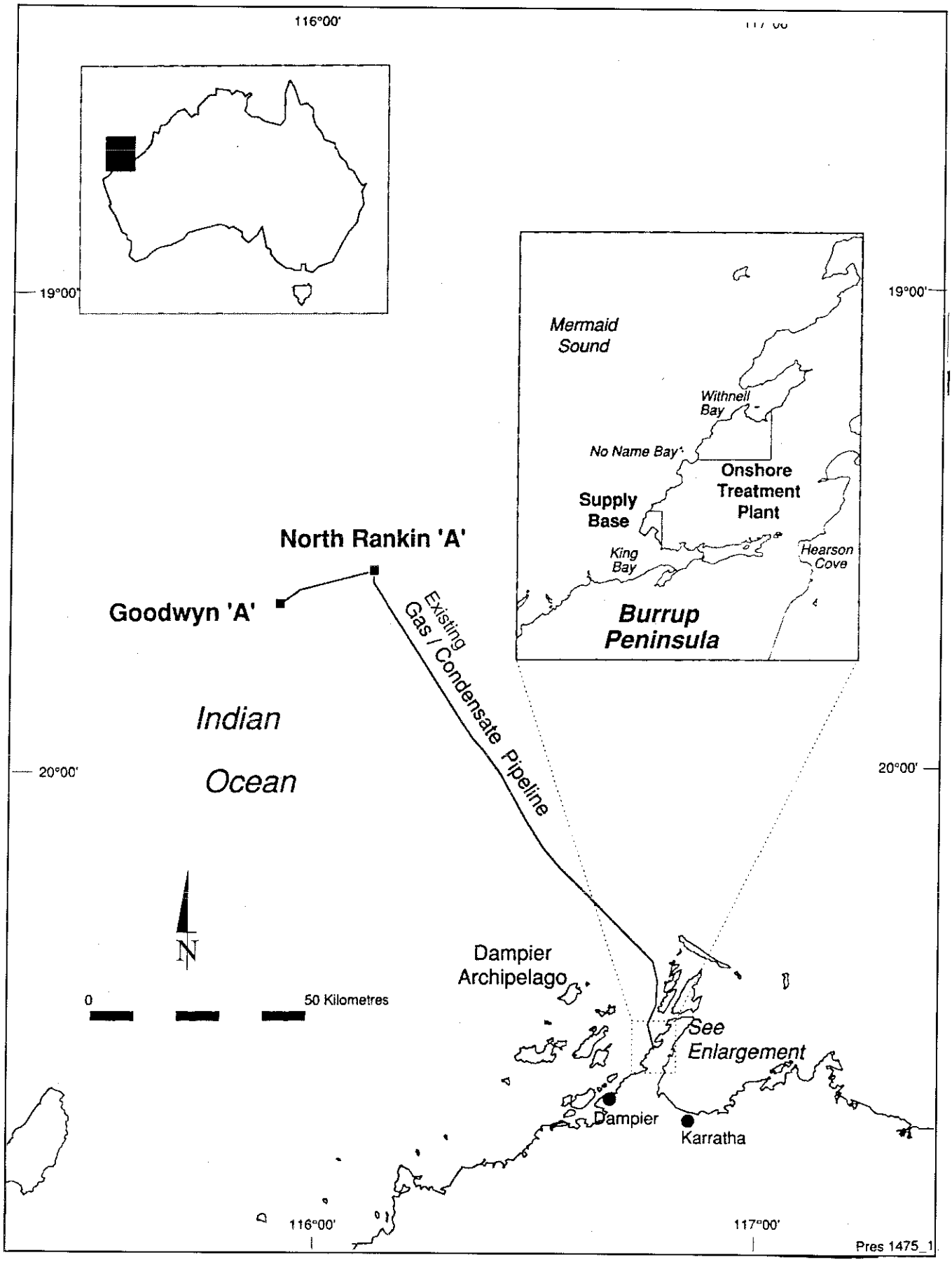

Figure 1. Location map (Source: Woodside Offshore Petroleum PER 1997).

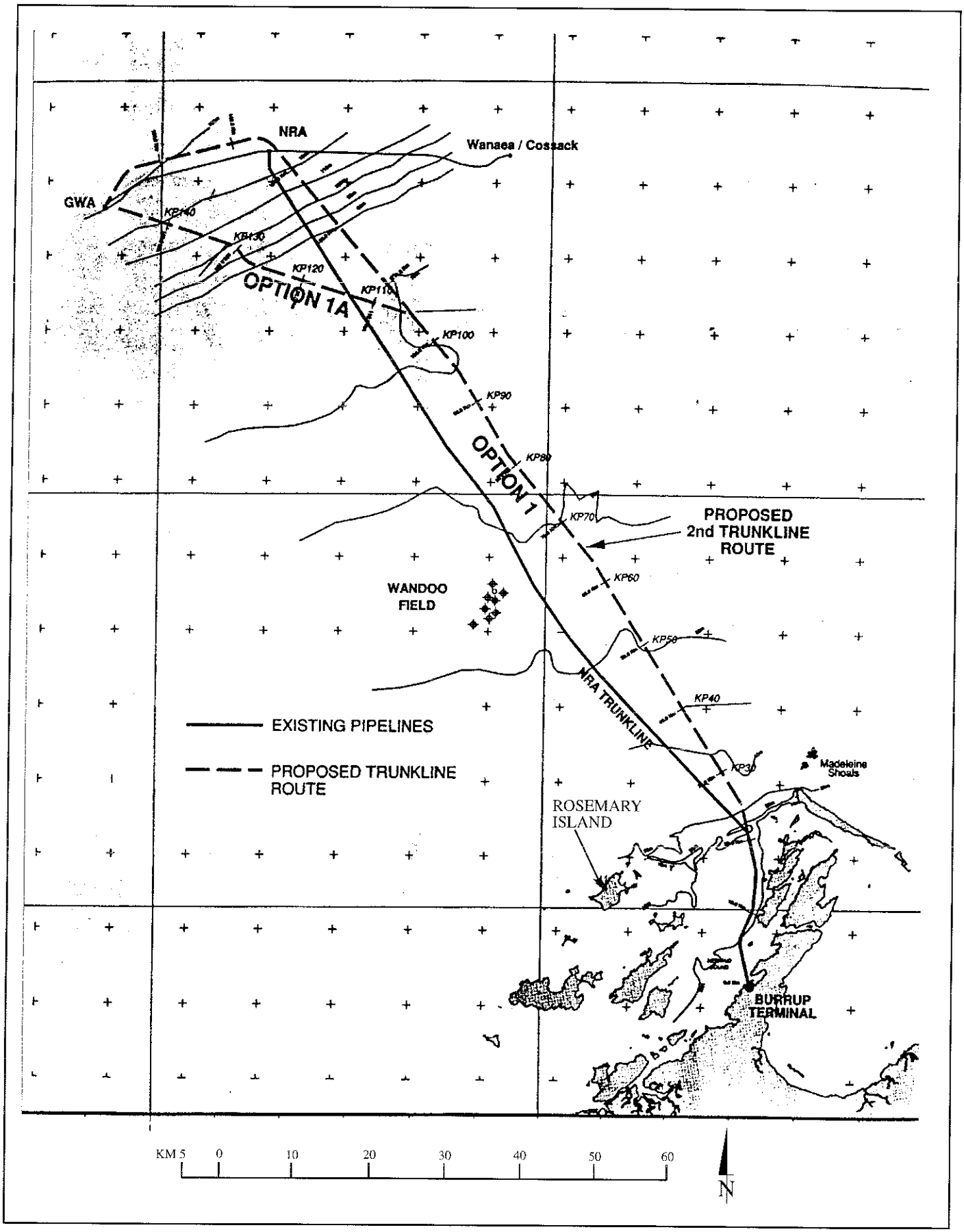

Figure 2. Trunkline route locations — offshore (Source: Woodside Offshore Petroleum PER 1997).

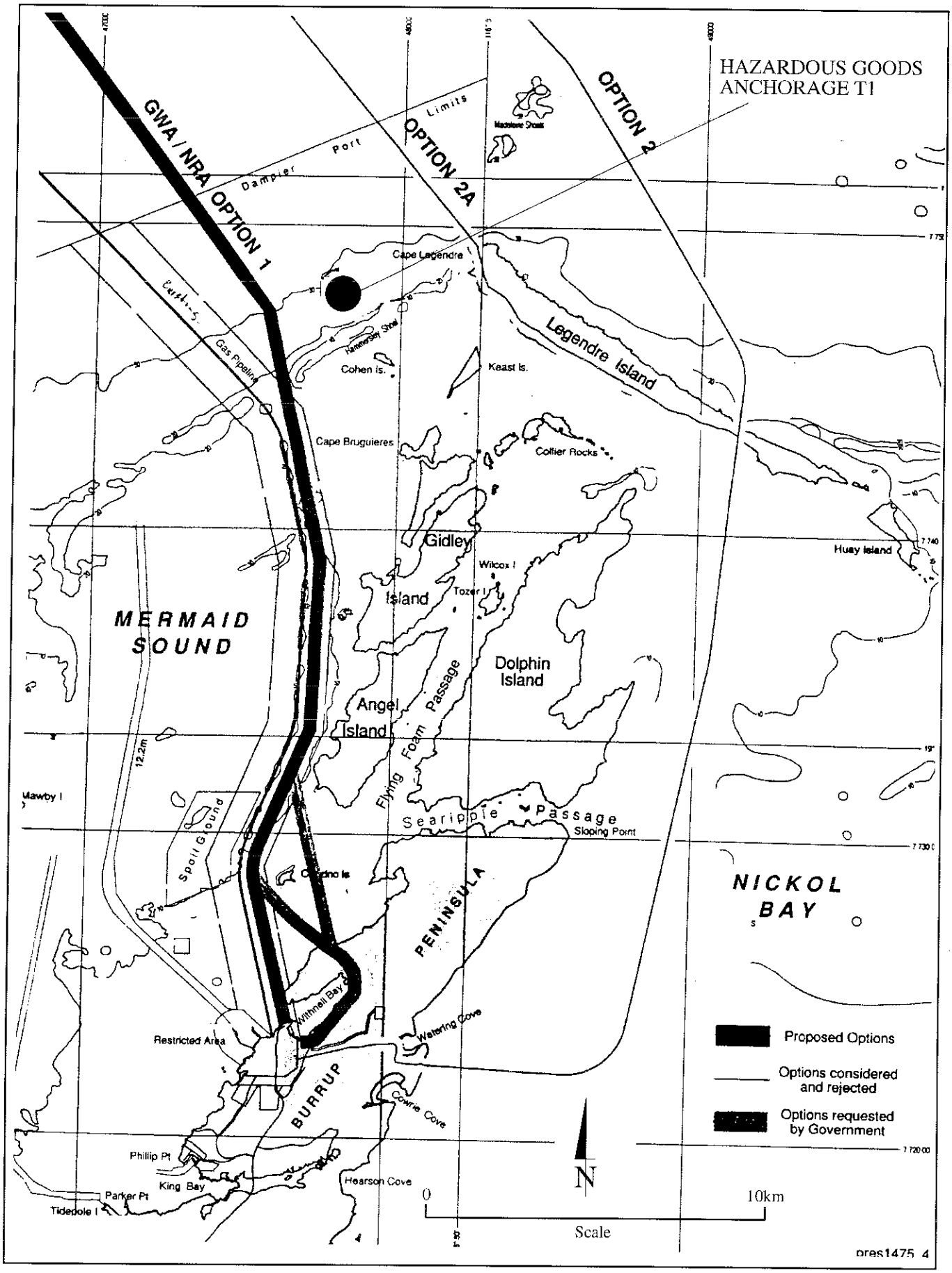

Figure 3. Trunkline route locations - inshore (Source: Woodside Offshore Petroleum PER 1997).

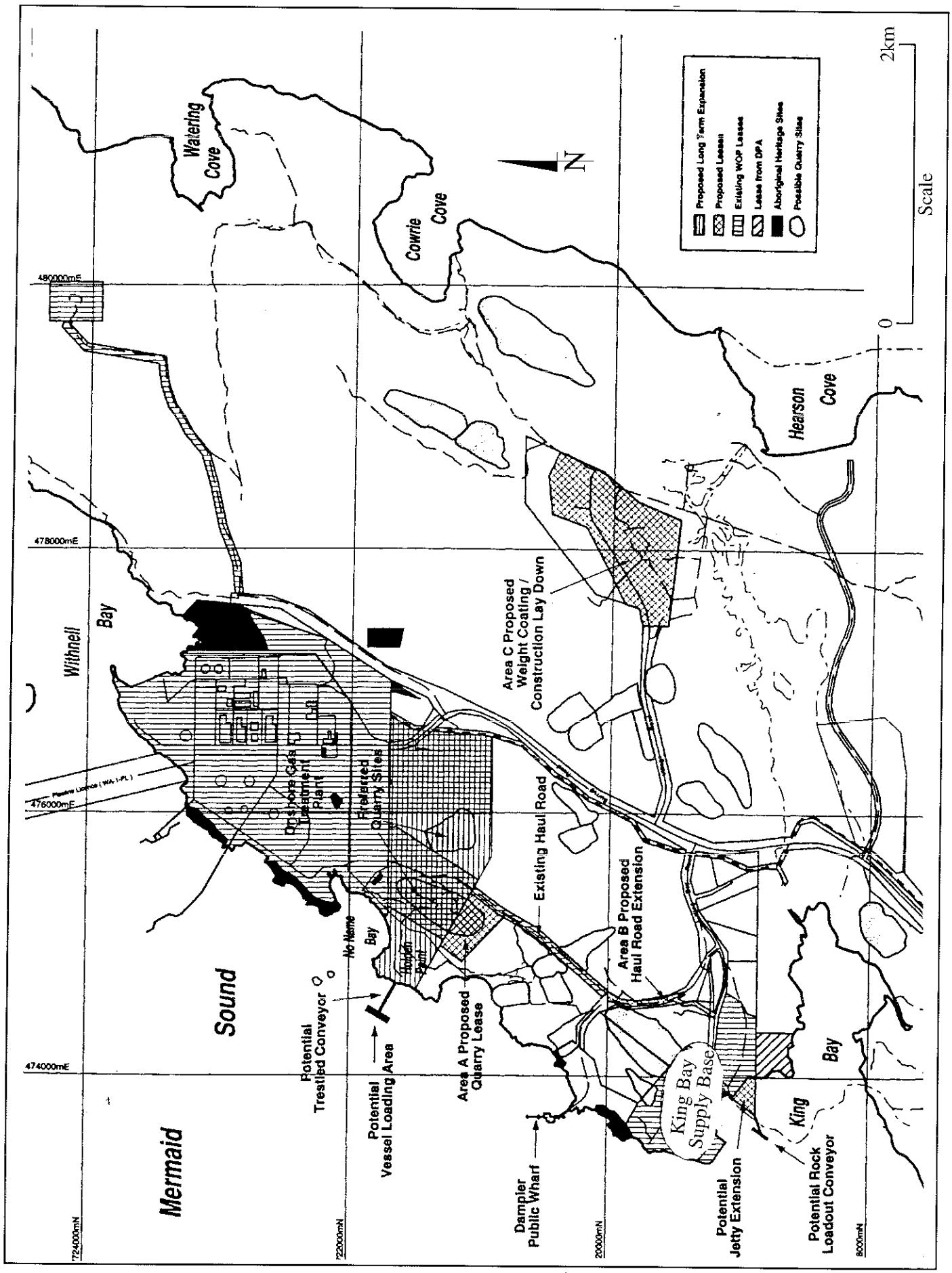

Figure 4. Quarry locations and land requirements (Source: Woodside Offshore Petroleum PER 1997).

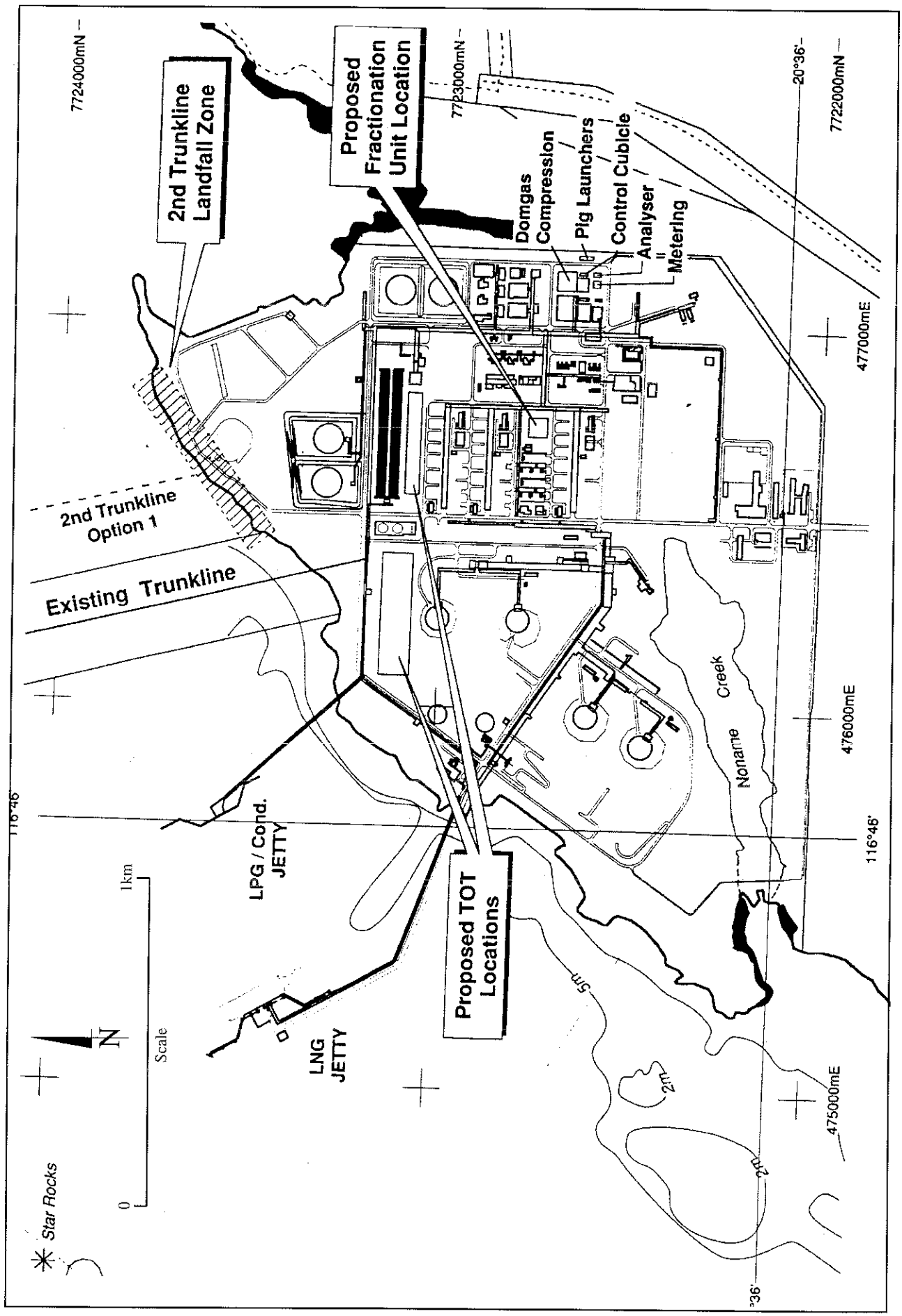

Figure 5. Onshore gas treatment plant layout (Source: Woodside Offshore Petroleum PER 1997).

3. Environmental factors

3.1 Relevant environmental factors

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment on the environmental factors relevant to the proposal and on the conditions and procedures to which the proposal should be subject, if implemented. In addition, the EPA may make recommendations as it sees fit.

It is the EPA's opinion that the following are the environmental factors relevant to the proposal, which require detailed evaluation in this report:

(a) Endangered and specially protected (threatened) species - impact of pipeline construction and onshore works on species including marine mammals and turtles;

(b) Rock load-out facilities (wharf extension and jetty) - impact on coastal processes and ecology;

(c) Greenhouse gases - increase in plant emissions;

(d) Air emissions - control of NO_x emissions and photochemical smog potential;

(e) Marine water quality - impacts of sediment, hydrotesting, pickle liquors and spills;

(f) Aboriginal culture and heritage - construction impacts on Aboriginal sites on Burrup Peninsula; and

(g) Risk - human health and safety.

The above relevant factors were identified from the EPA's consideration and review of all environmental factors (preliminary factors) generated from the PER document and the submissions received, in conjunction with the proposal characteristics (including significance of the potential impacts), the adequacy of the proponent's response and commitments and the effectiveness of the proposed management. On this basis, the EPA considers that Endangered and specially protected (threatened) species, Rock load-out facilities (wharf extension and jetty), Greenhouse gases, Air emissions - NOx emissions and photochemical smog potential, Marine water quality, Aboriginal culture and heritage, and Risk - human health and safety, are relevant factors. Other issues do not require further evaluation by the EPA because they are either minor in impact or can be managed through proponent commitments or approvals by other agencies. The identification of relevant environmental factors is summarised in Table 2, and a summary of their assessment is set out in Table 3.

The relevant environmental factors are discussed in Sections 3.2 to 3.8 of this report.

3.2 Endangered and specially protected (threatened) species - marine mammals and turtles, and terrestrial flora and fauna

Description

Marine mammals and turtles

Green, hawksbill and flatback turtles breed in the area. In addition, the loggerhead turtle has occasionally been recorded in the area. The main turtle nesting beaches exist on Rosemary Island (Figure 2) and Legendre Island (Figure 3). Smaller numbers of turtles breed on beaches on other islands in the Dampier Archipelago.

Table 2. Identification of environmental factors requiring EPA evaluation

PRELIMINARY ENVIRONMENTAL FACTOR	PROPOSAL CHARACTERISTIC	GOVERNMENT AGENCY & PUBLIC COMMENTS	IDENTIFICATION OF RELEVANT FACTORS
BIOPHYSICAL			
Endangered and Specially Protected (Threatened) species	Blasting and pipeline laying may disturb marine mammals and sea turtles. Onshore works may disturb priority flora and rare fauna recorded in area.	Environment Australia has noted that the pipeline route crosses humpback migration route. Pipeline installation / blasting work will need to be managed to avoid disturbance to whales	Potential impacts on marine mammals, sea turtles, and terrestrial fauna and flora. **Factor requires further EPA evaluation.**
Marine water quality	Potential impacts on marine water quality from: • condensate or oil (from spills); • hydrotest fluids/pickle liquors; • produced formation water; • waste heat; and • sedimentation from dredging and disposal of spoil and rock dumping; which could have resultant impacts on marine biota.	DPA & AMSA consider that proposed pipeline route is too close to tanker anchorage T2, and should be altered (or the anchorage should be moved or deleted) to avoid potential accidents resulting from anchor drag or anchoring error.	No formation water will be produced. Waste heat utilised through heat exchangers Proponent has submitted detailed risk assessment of oil/condensate spills, including ecological risk assessment. Proponent required to prepare further management details regarding dredging and spoil disposal for Commonwealth Sea Dumping permit. Method of pickle liquor disposal not specified. **Requires further EPA evaluation.**

PRELIMINARY ENVIRONMENTAL FACTOR	PROPOSAL CHARACTERISTIC	GOVERNMENT AGENCY & PUBLIC COMMENTS	IDENTIFICATION OF RELEVANT FACTORS
Environmental effects of quarrying	Quarrying of rock will be required to armour the pipeline. The existing quarry behind Holden Point will be extended further south. This would be supplemented by an adjacent area proposed for inclusion in Woodside's new lease for future onshore treatment plant expansion. Rock requirements are likely to be of the order of 0.8 to 2 million cubic metres requiring a total of up to 3 million cubic metres of rock to be quarried. The total land area to be quarried will be between 20 and 30 hectares	No external comments received.	The proponent has advised that the two areas to be quarried are within an area zoned for industrial development. The proponent has completed surveys of Aboriginal heritage sites and has consulted the traditional custodians. The proponent is obliged to comply with the requirements of the *Aboriginal Heritage Act* in respect of any sites of Aboriginal heritage significance. The proponent has made commitments to: • prepare an EMP for quarrying, crushing and grading operations (commitments 36, 39); The EMP will ensure that dust, vibration and noise are maintained within acceptable levels. The EMP must be accepted by DME and DEP before quarrying can commence; • carry out vegetation surveys to the requirements of CALM and to destroy any priority flora only as permitted by CALM (commitment 34); and • conduct quarrying so as to reduce impacts on landscape values to the requirements of DEP (commitment 35). **No further evaluation required.**

PRELIMINARY ENVIRONMENTAL FACTOR	PROPOSAL CHARACTERISTIC	GOVERNMENT AGENCY & PUBLIC COMMENTS	IDENTIFICATION OF RELEVANT FACTORS
Environmental effects of rock stockpiling	Stockpiling will be required for supplies of rock for armouring the subsea trunkline. The rock stock pile will be located at Holden Point.	No external comments received.	Rock stockpile to be located in an area previously disturbed. Area will be rehabilitated at completion of project to requirements of DEP (Commitment 45). **No further evaluation required.**
Environmental effects of rock load-out facilities	Load out facilities will be required for rock to armour the trunkline in inshore waters. An extension to King Bay wharf will be constructed using sheeting and rock back-fill. The extension will be used for load-out of large rocks. A trestle jetty will be required for load-out of smaller rock (location yet to be confirmed).	No external comments received. DEP noted that there is potential for impacts on long shore currents, coastal processes, sediment regimes and mangrove ecology.	Effects on nearshore processes and ecology requires evaluation. **Requires further EPA evaluation**
Foreshore stability	Pipeline shore crossing may affect stability of foreshore.	No external comments received	Trunkline crosses directly onto the OTP lease boundary. At the shore crossing the pipeline is buried in a trench excavated in rock. The pipeline will therefore not interfere with shoreline processes. The proponent has committed to avoid disturbance to areas of natural vegetation and landscape, and to recontour the area following trunkline installation. **No further evaluation required.**
Decommissioning	Decommissioning of pipeline required at end of project life.	DME noted that decommissioning plans should be generic and flexible	Proponent committed to prepare a decommissioning plan close to the end of operational life of the proposal. **No further evaluation required.**

PRELIMINARY ENVIRONMENTAL FACTOR	PROPOSAL CHARACTERISTIC	GOVERNMENT AGENCY & PUBLIC COMMENTS	IDENTIFICATION OF RELEVANT FACTORS
POLLUTION			
Groundwater quality	Potential for contamination of groundwater from leakage from shore facilities	No external comments received	Adequately managed by proponent's commitments, including: • oil contaminated water will be conducted from collection bunds via an existing sewer system to separation facilities; • equipment where oil contamination is possible will be bunded; • design standards & operational practice to prevent oil leakage; and • groundwater beneath the OTP is monitored by a series of bores. Under Works Approval and Licensing requirements, the proponent will be required to ensure the bunded areas are appropriately sealed. **No further evaluation required.**
Surface water quality	Run off from operations may contain chemicals.	No external comments received	No permanent surface water in the vicinity of the project area. Proponent has made a commitment to collect, treat and dispose of any waste liquids from operations in an acceptable manner. **No further evaluation required.**
Solid wastes	Potential for pollution / visual impacts if solid wastes not managed effectively.	No external comments received	Proponent has made the commitment that waste management on all phases of the project will be overseen by on-site environmental staff according to existing Woodside procedures and Government requirements. **No further evaluation required.**
Mercury regeneration	Potential for pollution if mercury escapes to the environment.	No external comments received	Proponent has made a commitment to extract mercury for disposal by a specialist third party contractor or manufacturer. Issue will also be addressed through Part V Works Approval. **No further evaluation required.**
Noise	Noise from truck movements may impact residential areas	Local Shire has noted need for consultation with proponent	Area is 15 km from nearest residential area. Noise will be monitored as per normal workplace health measures and liaison will be maintained with the Shire. **No further evaluation required.**

PRELIMINARY ENVIRONMENTAL FACTOR	PROPOSAL CHARACTERISTIC	GOVERNMENT AGENCY & PUBLIC COMMENTS	IDENTIFICATION OF RELEVANT FACTORS
Dust	Dust generated by rock loading, haulage and quarrying activities may impact residential areas.	Local Shire has noted need for consultation with proponent	Area is 15 km from nearest residential area. Proponent committed to monitoring dust levels and to road dampening and stockpile spraying if necessary to reduce dust generation. **No further evaluation required.**
Greenhouse gases	Emissions of CO_2, methane will add to global greenhouse gas loads. Emissions will be from the platform, onshore processing and fugitive emissions.	No external comments received.	**Emissions from the onshore plant require further EPA evaluation. (Emissions from the platform will be addressed under the Commonwealth environmental assessment process).**
Ozone depleting substances	Potential use of ozone-depleting gases in fire fighting systems and for refrigeration.	DEP notes that ozone depleting substances should not be used.	Proponent has advised that ozone depleting substances are being phased out in the OTP consistent with EPA policy and legal requirements. There will be no increase in ozone depleting substances as a result of the current project. **No further evaluation required.**
Air emissions - potential for photochemical smog from NOx emissions	No SOx would be produced. Existing OTP emits approx 6000 tonnes per annum NOx. The project is predicted to add less than 4% to current NOx emissions. Potential for photochemical smog from NOx.	DEP requested further information re estimating NOx emissions	No SOx would be produced. NOx would be produced with potential for photochemical smog (ground level ozone) formation. **Requires further EPA evaluation**
SOCIAL SURROUNDINGS			
Aboriginal heritage and cultural associations	Potential for impacts on Aboriginal heritage sites and cultural associations as a result of quarrying, pipe-weight coating, haulage and stockpiling operations.	No external comments received (proponent is consulting Aboriginal custodians).	**Requires further EPA evaluation**
Historic ship wrecks	Potential impacts to historic ship wrecks from pipelaying.	No external comments received	No listed historic ship wrecks likely to be disturbed by proposal. Proponent will liaise with the WA Museum to ensure historic shipwrecks are identified and avoided. **No further evaluation required.**

PRELIMINARY ENVIRONMENTAL FACTOR	PROPOSAL CHARACTERISTIC	GOVERNMENT AGENCY & PUBLIC COMMENTS	IDENTIFICATION OF RELEVANT FACTORS
Risk - human health and safety	Potential for explosion from plant operations.	Dampier Port Authority (DPA) and the Australian Maritime Safety Authority (AMSA) have noted proximity of the trunkline route to a designated offshore hazardous goods anchorage	Preliminary Quantitative Risk Assessments for the 2nd Trunkline Onshore Terminal (TOT), trunkline and process facilities indicate risk levels remain within EPA criteria. Potential for ships' anchor damage to trunkline and consequent risk of leakage/explosion. **Requires further EPA evaluation**
Impacts on fisheries	Potential interference with trawl fishery from laying of trunkline.	Fisheries WA has noted potential conflict with trawl fishery in Commonwealth Waters.	Issue regarding trawl fishery is in Commonwealth Waters and therefore outside EPA jurisdiction. Proponent has undertaken extensive community consultation, and has committed to the maintain close liaison with user groups such as fishermen, during the term of the project. **No further EPA evaluation required (issue of potential impacts on trawl fishery to be addressed through Commonwealth environmental assessment).**
Social impacts	Potential social impacts from increased workforce.	Shire of Roebourne noted: • local infrastructure should be sufficient to service the proposed workforce. • the proposed pipecoating yard should not impact on the recreational amenity of that area. The Shire supported the temporary closure of King Bay Road.	Proponent has undertaken extensive community consultation, and has committed to the maintain close liaison with Shire and community groups during the term of the project. process. Offshore installation workforce will be accommodated offshore and fly-in/fly-out, with no impact on regional services. Woodside has confirmed that the pipecoating yard will not affect recreational access to Hearson Cove. **No further EPA evaluation required.**

Table 3. Summary of assessment of relevant environmental factors.

RELEVANT ENVIRONMENTAL FACTOR	EPA OBJECTIVE	RELEVANT AREA	ASSESSMENT	EPA'S ADVICE
Endangered and Specially Protected (Threatened) species	Protect Specially Protected (Threatened) species and their habitats consistent with the provisions of the Wildlife Conservation Act 1950; and Protect endangered species consistent with the provisions of the Commonwealth Endangered Species Act and Whale Protection Act.	Marine waters within a 10 km radius of the project area and the land area of the Burrup Peninsula	Offshore construction, including blasting and pipeline laying, may disturb Specially Protected (Threatened) and Endangered marine fauna, such as whales, dugongs and turtles. Onshore works may disturb priority flora recorded in the area and specially protected fauna such as the Olive Python. Proponent's commitments include: 1. Any disturbance to Priority Flora will be to CALM requirements; 2. A marine blasting management plan will be developed to the requirements of CALM and DEP.	Having particular regard to the following: • the proponent's commitments (commitments 12-17) to develop marine blasting management procedures to the requirements of CALM and DEP; • the proponent has made commitments (commitments 34, 41) to minimise the disturbance to Priority flora during the onshore works; • the total land area to be impacted is relatively small and it is most unlikely there would be any significant impacts on populations of Pilbara olive python; and • the proponent's statutory obligations to comply with the requirements of the *Wildlife Conservation Act* , the *Endangered Species Act* and the *Whale Protection Act*; it is the EPA's opinion that the EPA's objective can be met.

RELEVANT ENVIRONMENTAL FACTOR	EPA OBJECTIVE	RELEVANT AREA	ASSESSMENT	EPA'S ADVICE
Rock load-out facilities (wharf extension and jetty)	Ensure that long shore currents, coastal processes, shore line profile and mangrove ecology are not adversely affected.	Coastal area with 10 kilometres of the jetty and wharf extension.	The proponent proposes to install a trestle jetty (location not specified) and to extend the existing King Bay wharf. The trestle structure of the jetty will not impede water movements or long-shore drift. The proponent has made a commitment to remove the trestle jetty at the end of the project. The proponent has indicated that the wharf extension will be in an area devoid of mangroves and will not project into King Bay. It is therefore most unlikely there will be adverse impacts on water movements, coastal processes or mangrove ecology.	Having particular regard to: • the need to confirm that the wharf extension will be designed and constructed so as not to cause adverse effects on long shore currents, coastal processes, shore line profile or mangrove ecology; it is the EPA's opinion that the load-out facilities (jetty and wharf extension) can be designed and built so as to meet the EPA's objective, provided that the proponent prepares and implements an Environmental Management Plan for Load-out Facilities to the requirements of the EPA on the advice of the DEP.

RELEVANT ENVIRONMENTAL FACTOR	EPA OBJECTIVE	RELEVANT AREA	ASSESSMENT	EPA'S ADVICE
Greenhouse gases	Ensure that greenhouse gas emissions meet acceptable standards and requirements of Section 51 of the EPA Act and that all reasonable and practicable measures are taken to minimise greenhouse gas discharge.	Global	Current OTP operations produce ~5 million tonnes of CO_2 equivalents per annum. The proposed project will result in a 65% increase in production but an estimated increase in greenhouse gas emissions of only about 2%. Proponent's commitments include: • waste heat recovery installed on extra power generation units to improve energy efficiency; & • other energy efficiency measures studied during design with the intent of reducing greenhouse emissions per unit energy produced. There may also be some additional emissions for the offshore platforms (to be assessed under the Commonwealth environmental assessment). The project may also facilitate future industrial development not assessed as part of this proposal.	Having particular regard to: • the estimated increase in current emissions by about 2% resulting from the proposed project, which represents a significant decrease in greenhouse emissions per unit of production in comparison to Woodside's existing operation; and • the "Greenhouse Challenge" agreement that Woodside has entered into with the Commonwealth Government; it is the EPA's opinion that the EPA's objective can be met.

RELEVANT ENVIRONMENTAL FACTOR	EPA OBJECTIVE	RELEVANT AREA	ASSESSMENT	EPA'S ADVICE
Air emissions - potential for photochemical smog from increased NOx emissions	Ensure that NOx emissions meet acceptable standards and requirements of Section 51 of the EPA Act and that all reasonable and practicable measures are taken to minimise NOx emissions.	The Burrup Peninsula airshed	Current OPT operations produce ~ 6000 tonnes of NO_x per annum. The proponent predicts that the project will increase NOx emissions by less than 4%.	Having particular regard to: • the low ambient levels of NOx in the area; • the projected increase of NOx emissions by less than 4%; • the nature of hydrocarbon emissions from the plant (relatively non-reactive alkanes); • the proponent's commitment to participate in a joint DEP/industry airshed study; it is the EPA's opinion that the proposal can be managed to meet the EPA's objective for the relevant factor NO_x emissions.

RELEVANT ENVIRONMENTAL FACTOR	EPA OBJECTIVE	RELEVANT AREA	ASSESSMENT	EPA'S ADVICE
Marine water quality	Maintain or improve the quality of marine water consistent with the draft WA Guidelines for Fresh and Marine Waters (EPA, 1993).	Mermaid Sound and adjacent State waters.	Construction and operation of facility has the potential to affect marine water quality through: • condensate or oil spills; • disposal of hydrotest fluids/pickle liquors; • increased sedimentation resulting from dredging and spoil disposal; and • produced formation water and waste heat disposal. Proponent's commitments include: 1. pipeline route selected to minimise disturbance to locally significant marine communities; 2. buffer zone maintained to protect significant communities; 3. dredging management plan to be prepared; 4. pickle liquors will be recycled or disposed of in an approved manner; 5. hydrotest fluid discharged offshore in controlled manner; and 6. Oil Spill Contingency Plan to be updated. The Dampier Port Authority (DPA) has expressed concerns about the proximity of the trunkline route to a designated offshore tanker anchorage and the consequent risk of anchor damage to the trunkline	Having particular regard to: • the proponent's detailed ecological risk assessment; • a detailed dredging management will be prepared; • no additional produced formation water will be produced and waste heat will be utilised through heat exchangers; • the proponent's commitments, and • subsequent advice from the DPA that the tanker anchorage will be moved, thereby reducing the risk of anchor impact on the trunkline. it is the EPA's opinion that the EPA's objective can be met.

RELEVANT ENVIRONMENTAL FACTOR	EPA OBJECTIVE	RELEVANT AREA	ASSESSMENT	EPA'S ADVICE
Aboriginal culture and heritage	Demonstrate that the proposal complies with the requirements of the Aboriginal Heritage Act 1972; and Ensure that changes to the biological and physical environment resulting from the project do not adversely affect cultural associations with the area.	The project area, including onshore and offshore areas.	The Burrup Peninsula is recognised as having very important Aboriginal heritage sites (including internationally significant rock art sites) and cultural values. The project has the potential to impact upon such sites and values. The proponent has advised that surveys of ethnographic and archaeological sites have been completed in consultation with the Aboriginal custodians. The proponent is obliged to comply with the requirements of the Aboriginal Heritage Act and has made a commitment to consult with the Aboriginal Affairs Department regarding both heritage and cultural matters.	Having particular regard to the following: • the fact that archaeological and ethnographic surveys of the area have been completed and a number of sites have been identified in the project area; • the proponent's obligation to comply with the requirements of the WA Aboriginal Heritage Act (Section 18) and commitment to consult with AAD regarding both heritage and cultural matters; it is the EPA's opinion that the EPA's objectives can be met.
Risk - human health and safety.	Ensure that human health and safety risks are managed consistent with current EPA policy	The onshore project area.	Potential risks to human health and safety may increase as a result of construction and operation of the project A Preliminary Quantitative Risk Assessment has been carried out on the 2nd Trunkline Onshore Terminal (TOT) indicating that risk levels remain within EPA criteria. There is evidence that risks associated with the DOMGAS debottlenecking would also be within EPA criteria.	Having particular regard to: • risk assessments indicate that risk levels remain within EPA criteria; & • the current management of risk for the present OTP operations it is the EPA's opinion that the EPA's objective can be met.

The loggerhead turtle is listed under Schedule 1 (fauna rare or likely to become extinct) of the *Wildlife Protection Act 1950* and as endangered under the Commonwealth *Endangered Species Protection Act 1992*. The green and hawksbill turtle are not listed under the *Wildlife Protection Act 1950* but are listed nationally and internationally (by the World Conservation Union) as endangered. The flatback turtle is an Australian endemic species of uncertain conservation status.

The main whale species in the area is the humpback whale which is listed as endangered under the Commonwealth *Endangered Species Protection Act 1992* and as a Schedule 1 species (fauna rare or likely to become extinct) under the *Wildlife Conservation Act 1950*. The dugong also occurs in the general area and is listed as a Schedule 4 species (other specially protected fauna) under the *Wildlife Protection Act 1950*.

The proposed second trunkline will be constructed across the migration route of the humpback whale. The main environmental aspect of concern for this endangered species is marine blasting. Blasting will be required at the entrance to the Mermaid Sound and within a few hundred metres of the onshore terminal. Surface shape charging may be required offshore whereas the drill and blast spread method most likely will be used closer to shore. Injuries to whales (and other marine mammals and turtles) from blasting operations could include lung damage and possible sublethal damage to the hearing system. Humpback whales migrate through the coastal waters between the coast and the edge of the continental shelf (the shelf edge is situated approximately 25 km offshore). Whales only rarely enter Mermaid Sound itself, however other marine wildlife species (turtles, dugong and dolphins) are common within the Sound.

Woodside has made commitments (commitments 12 to 17 inclusive) to develop blasting management procedures to the requirements of CALM and DEP. The procedures will include:

- an agreed safe distance to avoid injury to marine wildlife;
- agreed procedures for maintaining a watch for marine mammals and turtles and delaying blasting activities if these animals are present within the safe distance; and
- using the optimum charge structure to keep overpressurising effects on marine life to a practical minimum.
- investigating alternative explosive packaging to reduce the release of buoyant plastic materials after blasting (these may be ingested by sea birds).
- removing any dead fish from the water surface following each blast to avoid attracting marine wildlife which could then be injured by subsequent blasts.

Terrestrial flora and fauna

No flora are known on the Burrup Peninsula which are listed as rare under the *Wildlife Conservation Act 1950*. However a number of significant Priority 4 flora (other specially protected species) have been identified in the areas proposed for rock quarrying, the haul road and rock storage. A priority 1 species (rare or likely to become extinct) has previously been identified at the rehabilitated Hearson's Village, one of the two preferred sites for pipe coating and weighting. The rare fauna species, the Pilbara olive python, which is known to occur on the Burrup Peninsula, is listed as a Schedule 2 species by the *Wildlife Conservation Act 1950* and therefore requiring special protection.

Two aspects of concern for onshore rare or endangered species comprise 1) rock quarrying, transport and load out and 2) pipeline coating. The proponent notes that project related disturbances on the Burrup Peninsula in areas identified for industrial development shall be consistent with the Burrup Land Use and Management Strategy (Burrup Peninsula Advisory Board, 1996). The proponent has made a commitment to maximise use of the existing King

Bay Supply Base facilities for loadout operations. The proponent will consult CALM prior to any disturbance of Priority flora. Work along the haul road will be undertaken so as to minimise the impact on endangered flora species. The total area to be affected by the project is relatively small (maximum of 35.5 hectares of previously undisturbed land) and it is therefore most unlikely there would be any significant impacts on the populations of the Pilbara olive python.

Assessment

The area considered for assessment of endangered species is the marine waters within 10 km of the trunkline and in the works areas planned for development on the Burrup Peninsula.

The EPA has two environmental objectives in regard to this factor. They are:

- protect specially protected (threatened) fauna and their habitats consistent with the provisions of the *Wildlife Conservation Act*; and
- protect endangered species consistent with the provisions of the Commonwealth *Endangered Species Act* and the *Whale Protection Act.*

The EPA notes

- the requirement for offshore blasting and the potential for impacts on marine mammals and turtles.
- the construction of the trunkline in waters where humpback whales are seasonally present.
- the potential exists for onshore quarrying, hauling of rock material and pipe coating to disturb priority flora and fauna such as the Olive Python.

Having particular regard to the following:

(a) the proponent's commitments (commitments 12-17) to develop blasting management procedures to the requirements of CALM, DEP and Environment Australia. This will include keeping a watch for marine mammals and turtles and delaying blasting and pipelaying if these animals are within an agreed minimum distance to operations;

(b) the proponent has made commitments (commitments 34, 41) to minimise the disturbance to Priority flora identified during vegetation surveys of the onshore works areas;

(c) the total land area to be impacted is relatively small and it is most unlikely there would be any significant impacts on populations of Pilbara olive python; and

(d) the proponent's statutory obligations to comply with the requirements of the *Wildlife Conservation Act*, the *Endangered Species Act* and the *Whale Protection Act*;

it is the EPA's opinion that the proposal can be managed so as to meet the EPA's objective for endangered and specially protected (threatened) species.

3.3 Rock load-out facilities (wharf extension and jetty)

Description

The proponent proposes to install a trestle jetty (location not specified) and to extend the existing King Bay wharf. These structures will be used for rock load-out.

The proponent has made a commitment (Commitment 48) to remove the trestle jetty at the end of the project.

The wharf extension will be built with sheeting and rock/earth backfill. The proponent has indicated that the wharf extension will be in an area devoid of mangroves and will not project into King Bay.

Assessment

The area for this relevant factor is the coast within 10 kilometres of the jetty and wharf extension.

The EPA's objective is to ensure there are no adverse effects on long shore currents, coastal processes, shore line profile or mangrove ecology.

The EPA notes:

- the trestle construction of the jetty which will mean it should not impede water movement or long shore drift;
- the proponent's commitment to remove the jetty at the end of the project;
- the proponent has indicated that, while detailed design information is not yet available, the wharf extension will be constructed in an area devoid of mangroves and will not project into King Bay.

Having particular regard to:

- the need to confirm that the wharf extension will be designed and constructed so as not to adversely affect long-shore currents, coastal processes, shore line profile or mangrove ecology,

it is the EPA's opinion that the load-out facilities (jetty and wharf extension) can be designed and built so as to meet the EPA's objective, provided that the proponent prepares and implements an Environmental Management Plan (EMP) for Load-out Facilities to the requirements of the EPA on the advice of the DEP. The EMP should provide details on the design, location, dimensions and construction of the jetty and wharf extension and should indicate expected environmental impacts (if any), and proposed methods to manage and mitigate any such impacts.

3.4 Greenhouse gases

Description

Policy framework

The Commonwealth, in cooperation with the States and Territories, is currently finalising a National Greenhouse Strategy. In the interim, the Commonwealth Government is progressing voluntary cooperative agreements ("Greenhouse Challenge" agreements) with industry to reduce greenhouse gas emissions.

At the State level, the EPA has released a draft policy on reducing greenhouse gas emissions (EPA, 1997b) which requires that proponents:

1. estimate the amount of greenhouse gases that may be emitted from the proposed project during its lifecycle;
2. indicate the intended measures to be adopted to minimise greenhouse gas emissions in the proposed project;
3. compare the greenhouse gas efficiency of the proposed project (per unit of product and/or other agreed performance indicators) with the efficiency of other established projects using the same or different technologies producing a similar product;
4. indicate whether the project will be entered into the Commonwealth "Greenhouse Challenge" voluntary cooperative agreement program.

The draft EPA policy also requires proponents to address greenhouse emissions in an environmental management plan before commissioning the project. In addition, there is an overarching requirement under the *Environmental Protection Act 1986* that all reasonable and practical measures should be taken to minimise the discharge of greenhouse gases. The DEP will impose annual monitoring and reporting requirements for greenhouse gas emissions in a manner suitable for input into State and National Greenhouse Gas Inventories.

Greenhouse gas implications of the current proposal

Consistent with the EPA draft policy on reducing greenhouse gas emissions, the proponent has provided the following information about increased greenhouse gas emissions from the proposed second trunkline and DOMGAS debottlenecking project:

1. Estimate of greenhouse gas emissions from the proposed project.

   Experience from the existing onshore gas treatment plant (OTP) indicates a current emission rate of approximately 5.5 million tonnes of "CO_2 equivalents" (CO_{2e}) greenhouse gases per annum. The major source of these emissions are combustion gases from the heaters and turbines used in power production (CO_2 and NO_x) and gas emitted from process or inadvertent natural gas (methane) venting.

   The original proposal called for the installation of an additional 3 gas turbine power generators. However the proponent has since advised that these will not now be required. Instead, waste heat recovery will be used and this will result in a substantial increase in efficiency. The result will be that the project will result in a 65% increase in plant production but an estimated increase in greenhouse gas emissions of the order of 2%.

   In addition, the increase in gas supply to the domestic market and other future markets resulting from the project would generate further "end of pipe" emissions. There may also be some additional greenhouse gas emissions from the offshoreplatforms (to be addressed by the Commonwealth environmental assessment process).

2. Intended measures to minimise greenhouse gas emissions.

   The proponent intends providing waste heat recovery units to increase the energy efficiency and decrease the quantity of combustible gases. This is considered "Best Practicable Technology" for such projects.

3. Efficiency of proposed project relative to other comparable projects.

   The DOMGAS expansion will result in a 65% plant capacity increase but an estimated increase of the order of 2% in greenhouse gas emissions. This represents a very significant decrease in greenhouse gas emissions per unit of production.

   The proponent also notes that, in a global sense, the increased utilisation of natural gas rather than other fossil fuels provides for energy generation with a substantial reduction in greenhouse gas emissions. On a lifecycle basis, the emissions from LNG are approximately half those of competing fossil fuels of oil and coal. Greenhouse emissions from domestic gas are even less on a lifecycle basis in that relatively little energy is used during processing.

4. "Greenhouse Challenge" agreement.

   The proponent signed a "Greenhouse Challenge" agreement with the Commonwealth Government on 18 November 1997. The agreement covers a number of emission abatement techniques for possible implementation in this and other future projects.

Proposed LNG expansion project

In addition to the present proposal, Woodside proposes an LNG expansion project. This will be subject to a separate environmental impact assessment involving both State and Commonwealth authorities. The LNG expansion project would produce substantially more greenhouse gas emissions than the current proposal and this issue will be one of the main environmental factors for the assessment.

Assessment

The area considered for assessment of this factor is global.

The EPA's objective in regard to this environmental factor is to ensure that greenhouse emissions meet acceptable standards and requirements of Section 51 of the EPA Act and that all reasonable and practicable measures are taken to minimise greenhouse gas discharge.

The EPA notes:

- the increase in greenhouse gas emissions from the project in the form of combustible gases from power generation at the gas treatment plant and from inadvertent discharges of natural gas from the onshore facilities.
- the measures to be implemented by the proponent to reduce greenhouse gas discharges and improve energy efficiencies.

Having particular regard to:

(a) the estimated increase in current emissions of the order of 2% resulting from the proposed project, which represents a significant decrease in greenhouse emissions per unit of production in comparison to Woodside's existing onshore operation; and

(b) the "Greenhouse Challenge" agreement that Woodside has entered into with the Commonwealth Government, which includes commitments to investigate a number of emission abatement technologies for this and subsequent projects,

it is the EPA's opinion that the proposal can be managed to meet the EPA's objective for the relevant factor greenhouse gases.

3.5 Air emissions - photochemical smog potential due to increase in NO_x emissions

Description

The existing onshore gas treatment plant discharges approximately 6000-7000 tonnes per annum (tpa) of nitrogen oxides (NO_x). The emissions occur as a result of high temperature gas turbine combustion. The potential exists for nitrogen oxides to react with airborne volatile organic compounds to form photochemical smog within the air shed of the Burrup Peninsula. Photochemical smog is characterised by high concentrations of ground level ozone (O_3) and nitrogen dioxide (NO_2).

The current DEP licence source limit for NO_x from the onshore treatment plant is 350 mg/Nm^3, and the proponent states that the current average measured source concentration is approximately half this. The current NO_x load from the onshore treatment plant of 6000-7000 tpa is shared over 25 gas turbines. There will be no new gas turbines installed as part of the present proposal. Instead, waste heat recovery units will be installed, whereby heat which is presently wasted will be converted to steam. Steam generation will be supplemented by "co-firing" of natural gas, with generation of some NOx. The amount of additional NOx produced is expected to be less than 4% of current emissions (Mr S Waller, Woodside, *pers. comm.*).

The *Environmental Protection Act 1986* requires that emissions of NO_x meet acceptable standards and that all reasonable and practical measures are taken to minimise discharges. The proponent will install waste heat recovery units so that only small amounts of additional NOx will be produced. This approach is considered "Best Practicable Technology".

Results of preliminary air quality monitoring carried out by the Commonwealth Scientific and Industrial Research Organisation (CSIRO) indicate maximum ambient ground level concentrations of NO_2 at Karratha of 4 parts per billion (ppb) in August and 7 ppb in March (Mr S Waller, Woodside, *pers. comm.*). The draft National Environment Protection Measure (NEPM) specifies that NO_2 levels shall not exceed 125 ppb over one hour.

The predicted increase in NOx emissions is less than 4%. In addition, the potential for photochemical smog formation is limited since the hydrocarbon emissions from the plant are predominantly alkanes which are relatively non-reactive (Dr K Rayner, DEP, *pers. comm.*). It is therefore most unlikely that there would be a significant increase in photochemical smog as a result of the proposed DOMGAS expansion project.

The proponent has made a commitment to participate in a joint DEP/industry air quality study of the area to better characterise air quality meteorology over the Burrup Peninsula. The study will provide essential information for the assessment of the Woodside's proposed LNG expansion and for the proposed Gorgon LNG project.

Assessment

The area considered for assessment of this factor is the Burrup Peninsula airshed.

The EPA's objective in regard to this environmental factor is to ensure that NO_x emissions meet acceptable standards and requirements of Section 51 of the EPA Act and that all reasonable and practical measures are taken to minimise NO_x emissions.

The EPA notes:

- the proponent's commitment to use waste heat recovery rather than install additional gas turbines; and
- the predicted relatively small increase in NO_x discharges.

Having particular regard to:

(a) the low ambient levels of NOx;

(b) the projected increase of NOx emissions by less than 4%;

(c) the nature of hydrocarbon emissions from the onshore plant which are in the main relatively non-reactive alkanes; and

(d) the proponent's commitment to participate in a joint DEP/industry airshed study,

it is the EPA's opinion that the proposal can be managed to meet the EPA's objective for the relevant factor NO_x emissions.

3.6 Marine water quality — sediment, hydrotesting, pickle liquors and spills

Description

Pipeline installation

The installation and stabilisation of the trunkline has the potential for impacts on marine water quality with subsequent impacts on marine life.

Short-term sediment disturbance causing temporary increases in water turbidity and sedimentation will result from anchor movement by the pipelaying barge, the laying of the trunkline on the seabed, operation of the marine plough, trench excavation, dredging and rock dumping. The suspended sediment plume is expected to move with the tidal currents predominantly in the north west and south east direction, approximately parallel to the trunkline. Significant sedimentation effects, such as smothering, are expected to be restricted to within 100 metres of the trunkline corridor. Evidence obtained during the laying of the first trunkline indicated that effects of deposition of material resulting from dredge spoil disposal or pipeline installation were restricted to within approximately 500 metres of the trunkline. Additionally, long term disturbance and repositioning of soft sediment could arise from inshore construction works, in particular dredging.

The proponent proposes to manage the impact on environmentally sensitive areas by moving excess spoil to a designated dumping ground off Conzinc Island. Dredging and trenching will only be adopted where ploughing is not technically or economically feasible. The proponent has

made a commitment carry out dredging and pipeline installation *outside* the time of coral spawning. The dredging operations could have other impacts on water quality in the form of oil contamination resulting from spills during operation. For the purpose of maintaining marine water quality of acceptable standard the proponent proposes to prepare and implement a dredging Environmental Management Plan (EMP) for dredging operations, spoil disposal and water quality monitoring. In addition to DEP approval of the dredging EMP, dredging and spoil disposal will require a sea dumping permit under the Commonwealth *Environment Protection (Sea Dumping) Act 1981.*

Hydrotesting and chemical treatment

Hydrotesting of the installed trunkline will involve the discharge of hydrotest water containing dilute chemical reagents such as oxygen scavengers, corrosion inhibitors and possibly also biocides (used to control microbial growth in the trunkline) into the marine environment at the offshore platform. The hydrotest water would probably be sprayed into the air and then allowed to fall into the sea in order to promote oxygenation and breakdown of the treatment chemicals (S Waller, Woodside, *pers. comm.*). At the landward end, hydrotest water will be discharged (without spraying) to evaporation ponds. The evaporation ponds will be located in an area which has previously been disturbed and within the existing Woodside lease area. A total of approximately 300 cubic metres of hydrotest waters will be released into the ponds. The proponent expects this quantity of water will take about 6 months to evaporate.

The trunkline will be dried and cleaned using vacuum drying and possibly glycol, which would be recovered, treated and recycled.

In addition, cleaning reagents (pickle liquors) will be used during precommissioning to treat small diameter piping. Pickle liquors are usually predominantly ammonium citrate. Pickle liquors will be recycled where possible or disposed of in an acceptable manner to the requirements of DEP licence conditions.

Oil or condensate spillage

The installation of the second trunkline will increase the risk of gas/condensate loss during operations. The proponent has assessed the potential for gas/condensate spillage from the trunkline for a variety of scenarios including release point, trunkline rupture size, release quantity and seasonal weather conditions (Woodside, 1997). In summary, the findings were that the probability of a spill from either trunkline installation or from holing or rupture of the trunkline was extremely low.

Possible spill scenarios include incidents during installation (eg barge refuelling accident) and leakage from the trunkline as a result of corrosion or physical damage (eg from anchor drag). The Mermaid Sound sections of the trunkline will be rock armoured, effectively reducing the risk from accident event scenarios (with the exception of corrosion damage) to negligible levels. It is also important to note that, should a spill occur, condensate evaporates rapidly, with 55% of the volume being lost in less than 10 minutes and 72% lost within 60 minutes (Woodside, 1997).

For each of a number of spill scenarios, the proponent has estimated an "overall probability", which is the product of the probability of a spill occurring and the transport probability. For trunkline leakage, the highest probability scenario is a corrosion hole of 5 mm. For this scenario, the highest overall risk is that condensate would reach the shores of Angel Island/Gidley Island (see Figure 3). This event has an estimated probability of $6x10^{-6}$ per year (or 1.2×10^{-4} over a 20 year project lifetime). For the same leak scenario, the estimated overall probability is $3x10^{-6}$ per year ($6.0x10^{-5}$ over a twenty year project lifetime) that condensate would reach the Western Burrup shore line (see Figure 3). These probabilities are comparable to those estimated for another offshore gas project, the Wonnich gas development off the Montebello Islands (EPA, 1997a).

The worst case scenario would be a trunkline rupture. No such incident has been recorded anywhere in the world for a pipeline of this size and the proponent has therefore extrapolated from other available data. The proponent has used a scenario based on a full bore rupture at 30 km from land (ie beyond the rock armoured section of the trunkline). On that basis, the

proponent has estimated that, for a full bore rupture scenario with release of 14,000 tonnes of material, the highest probability would be condensate impact in the area of Rosemary Island (Figure 2) with an estimated overall probability of 6.8×10^{-8} per year (or 1.36×10^{-6} over a twenty year project lifetime).

The ecological risk assessment identified the sensitive habitats of the Dampier Archipelago. The proponent's Oil Spill Contingency Plan (OSCP) would be activated following detection of a spill. The OSCP is now being revised in light of the proposed second trunkline and will be reviewed and approved by the State Committee for Combating Marine Oil Pollution in consultation with Department of Minerals and Energy (DME), the DEP and the Dampier Port Authority (DPA).

A submission from the DPA and the Australian Maritime Safety Authority (AMSA) expressed concern about the proximity of a designated tanker anchoring area (area T1, a rarely used hazardous goods anchorage north-west of Legendre Island - see figure 3) to the proposed second trunkline and the consequent potential for damage to the trunkline from anchor drag. The DPA has since confirmed that, to avoid this risk, the anchorage will be relocated well away from the trunkline route.

Produced formation water and waste heat

The proponent has advised that there will be no additional produced formation water generated as a result of the proposed project and there will therefore be no additional impacts on marine water quality from this source. In addition, there will be no thermal pollution of inshore waters from waste heat disposal as waste heat will be utilised through heat exchangers. The water used in the heat exchange units will be recirculated (there will be no heated water released to the environment).

Assessment

The area considered for assessment of this factor is Mermaid Sound and adjacent State waters.

The EPA's objective in regard to this environmental factor is to maintain or improve the quality of marine water consistent with the draft WA guidelines for Fresh and Marine Waters (EPA, 1993).

The EPA notes:

- the potential for marine waters in the vicinity of the proposed trunkline to become contaminated with sediments, hydrotest liquids, pickle liquors and oil or condensates.
- the selection of the pipeline route so as to minimise dredging and subsequent impact of sediments on sensitive environmental areas.
- a detailed dredging Environmental Management Plan (EMP) will be prepared (commitment 9).
- the extremely low probability of a significant spill of condensate from the new trunkline.
- the Dampier Port Authority has confirmed that the tanker anchorage nearest to the proposed second trunkline will be closed so as to reduce any risk of damage to the pipeline from anchor drag.
- the additional effects of the second trunkline to be incorporated in the proponent's updated Oil Spill Contingency Plan.
- there will be no additional discharges of produced formation water or waste heat to the ocean.
- the proponent has made a commitment (commitment 10) to carry out dredging and pipeline installation *outside* the time of coral spawning to reduce any impacts on coral reproduction.

Having particular regard to:

(a) the detailed risk assessment of petroleum spills, including ecological risk assessment, submitted by the proponent;

(b) the requirement for an oil spill contingency plan to be prepared to the requirements of the State Committee for Combating Marine Oil Pollution;

(c) a detailed dredging management plan is required to be prepared by the proponent for Commonwealth and EPA approval;

(d) the relocation of the designated tanker anchoring area;

(e) the requirement for the DEP to approve the proposed method of pickle liquor disposal;

(f) there will be no discharge of hydrotest water (containing pipeline treatment chemicals) into coastal waters. Hydrotest water will instead be released into evaporation ponds on land and offshore (into Commonwealth Waters); and

(g) the proponent's commitments;

it is the EPA's opinion that the proposal can be managed to meet the EPA's objective for marine water quality in Western Australian coastal waters.

The EPA notes that the proponent proposes to release pipeline hydrotest waters (containing pipeline treatment chemicals) into offshore Commonwealth waters. The proponent has made a commitment that pipeline treatment chemicals will be screened for environmental properties and discharges offshore will be monitored and targeted at less than 10% of the LC_{50} concentration values. It is not possible to assess whether this will meet ANZECC water quality criteria without specific information on the chemical composition of the pipeline treatment products to be used. (These offshore discharges fall under Commonwealth jurisdiction and will be subject to Commonwealth environmental impact assessment).

3.7 Aboriginal culture and heritage - construction impacts on Aboriginal sites on the Burrup Peninsula

Description

Aboriginal rock art sites on the Burrup Peninsula rock art sites are recognised as being of international importance. A comprehensive Aboriginal site survey was conducted over a wide range of the Burrup Peninsula by the WA Museum in 1979 (Western Australian Museum, 1979, cited in Woodside, 1997, page 3-9) with the objective of identifying potential constraints to development of the North West Shelf Gas Project. CALM commissioned a subsequent survey (cited in Woodside, 1997, page 3-9).

Project developments within the treatment plant boundary, at the proposed quarry sites, on the haul road and at the land proposed for rock stockpiling have the potential to impact Aboriginal culture and heritage values located within these areas.

The area is currently under claim by two groups of Native Title claimants representing the Ngulama Injibada and the Yaburara Mardudhunera groups respectively. The proponent states that negotiations are in progress with both groups through an agreed process.

The proponent has advised that archaeological and ethnographic surveys in areas not previously surveyed have now been completed. A number of sites have been identified in the project area. As required under Section 18 of the Aboriginal Heritage Act, submissions will be made to the Aboriginal Cultural Materials Committee in respect of those sites.

Assessment

The area considered for assessment of this factor is the project area including onshore and offshore areas.

The EPA has two environmental objectives in regard to this factor. They are:

- Demonstrate that the proposal complies with the requirements of the *Aboriginal Heritage Act 1972*; and
- Ensure that changes to the biological and physical environment resulting from the project do not adversely affect cultural associations with the area.

The EPA notes:

- the Burrup Peninsula is recognised for its archaeological and ethnographic sites, notably the rock art sites which are of international significance.
- Areas containing Aboriginal rock art sites on the Burrup Peninsula have been listed or nominated for protection under the Register of the National Estate.
- The construction of the trunkline and associated rock quarrying, transport and load out has the potential to adversely affect Aboriginal heritage sites and cultural associations.

Having particular regard to:

- the fact that the proponent has completed archaeological and ethnographic surveys of the project area in consultation with the Aboriginal custodians of the area;
- the proponent's obligation to comply with the Aboriginal Heritage Act, and commitment to consult with the Aboriginal Affairs Department regarding heritage and cultural matters; and
- as required by the Aboriginal Heritage Act, submissions will be made to the Aboriginal Cultural Materials Committee in respect to sites identified within the project area;

it is the EPA's opinion that the proposal is capable of being managed to meet the EPA's objectives for Aboriginal culture and heritage, subject to the proponent's obligations and commitments as well as the negotiations with Aboriginal communities.

3.8 Risk — human health and safety

Description

The construction and operation of the expanded gas supply and treatment facility has the potential to increase risk to human health and safety.

The major source of risk from the project is associated with the second trunkline onshore terminal (TOT). The proponent has undertaken a preliminary quantitative risk assessment of the TOT, including consideration of cumulative risks, and potential for escalation to other nearby facilities. The studies concluded that the risk contours from the proposed TOT are similar to those for the existing onshore treatment plant. The results therefore indicate there is negligible additional risk from the new TOT to the public or local environment.

Another source of risk from the onshore facilities is associated with the DOMGAS debottlenecking component of the project (fuel and sales gas compressors). The proponent notes that the definition of the DOMGAS debottlenecking is not yet sufficient to enable preparation of a meaningful preliminary risk assessment (PRA) for this component of the proposal. However a PRA has been prepared for another project, the Liquids Expansion Project (LEP), which assumes an identical fractionation plant to the one proposed for the DOMGAS debottlenecking. The proponent states that, as the LEP facilities meet the EPA risk criteria there is good evidence to suggest compliance by the additional components of the DOMGAS debottlenecking project (fuel and sales gas compressors). Hazard identification processes will proceed throughout the plant design stage to check that acceptable risk levels are obtained.

A risk management strategy has been defined by the proponent which will set the processes to be followed in achieving safety and risk reduction goals.

Assessment

The area considered for assessment of this factor is the onshore project area.

The EPA's objective in regard to this environmental factor is to ensure that health and safety risks are managed consistent with current EPA policy as described in EPA draft policy number 2 (EPA, 1997c).

The EPA notes:

- risks to human health and safety will increase as a result of implementing the project.
- the preliminary quantitative risk assessment for the second trunkline TOT indicate acceptable levels of risk.
- the proponent has provided information to indicate that risk from the DOMGAS debottlenecking will also be at an acceptable level.

Having particular regard to:

(a) the risk assessment undertaken for this project that indicates that risk levels remain within EPA criteria; and

(b) the current acceptable management of risk for the present onshore treatment plant operations,

it is the EPA's opinion that the proposal can be managed to meet the EPA's objective for risk to human health and safety.

4. Conditions

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment on the environmental factors relevant to the proposal and on the conditions and procedures to which the proposal should be subject, if implemented. In addition, the EPA may make recommendations as it sees fit.

In developing recommended conditions for each project, the EPA's preferred course of action is to have the proponent provide commitments to ameliorate the impacts of the proposal on the environment. The commitments, modified if necessary to ensure enforceability, are considered by the EPA as part of its assessment of the proposal, and following discussion with the proponent, the EPA may seek additional commitments.

The EPA recognises that not all of the commitments are written in a form which makes them readily enforceable, but they do provide a clear statement of the action to be taken as part of the proponent's responsibility for and commitment to continuous improvement in environmental performance. The commitments, modified if necessary to ensure enforceability, then form part of the conditions to which the proposal should be subject if it is to be implemented.

The EPA may, of course, also recommend conditions additional to that relating to the proponent's commitments.

Having considered the proponent's commitments and the information provided in this report, the EPA has developed a set of conditions which the EPA recommends be imposed if the proposal by Woodside Offshore Petroleum Pty Ltd to install a second trunkline and debottleneck the onshore facilities, is approved for implementation. These conditions are presented in Appendix 3. Matters addressed in the conditions include the following:

(a) the proponent shall fulfil the commitments in the Consolidated Commitments statement set out as an attachment to the recommended conditions in Appendix 3; and

(b) in order to manage the relevant factors and EPA objectives contained in this bulletin, and subsequent conditions and procedures authorised by the Minister for the Environment, the proponent shall demonstrate that there is in place an environmental management system which includes the following elements:

- environmental policy and commitment;
- planning of environmental requirements;
- implementation and operation of environmental requirements;
- measurement and evaluation of environmental performance; and
- review and improvement of environmental outcomes.

(c) the proponent to prepare and implement and Environmental Management Plan (Load-Out Facilities) to the requirements of the EPA, on advice of the DEP.

5. Other advice

The revised Oil Spill Contingency Plan (OSCP) to be prepared by the proponent will require technical review and approval by the Department of Minerals and Energy on advice of the State Committee for Combating Marine Oil Pollution and the Department of Environmental Protection.

The EPA notes that Fisheries WA has made a submission expressing concerns about possible impacts of the offshore pipeline on trawling. The trawl ground in question is in Commonwealth waters and therefore outside the jurisdiction of the WA EPA. However, the EPA recommends that the proponent should liaise directly with Fisheries WA, the Department of Resources Development and Environment Australia to resolve the issue.

The EPA notes that the proposal is subject to review by Commonwealth authorities under the *Environment Protection (Impact of Proposals) Act 1974*. The issue of discharge of pipeline treatment chemicals offshore falls under Commonwealth jurisdiction and will be subject to environmental impact assessment by Commonwealth authorities.

Requirements for disposal of pickle liquors (cleaning reagents used for small diameter piping) in State Waters will be addressed by DEP licence conditions.

The EPA also notes that the proponent has made a specific commitment to prepare an EMP covering quarrying, crushing and grading. The EMP must be prepared to the requirements of the DEP and DME before quarrying can commence. The proponent has also made a commitment to carry out flora surveys over the proposed quarry areas to the requirements of CALM and to only destroy priority flora as permitted by CALM.

In addition, the dredging Environmental Management Plan (EMP) to be prepared by the proponent will require Commonwealth approval under the *Environment Protection (Sea Dumping) Act 1981*.

6. Conclusions

The EPA has considered the proposal by Woodside Offshore Petroleum Pty Ltd to install a second offshore trunkline and to debottleneck the onshore facilities.

The proposal can be managed to meet the EPA's objectives, provided the recommended conditions and the proponent's commitments are implemented in a satisfactory manner and the proponent meets the requirements of relevant DEP licence conditions.

The key environmental issues of the project should be managed primarily by the environmental controls and safeguards stipulated by the proponent in the Public Environmental Review/Environmental Report (PER). The proponent is committed to preparing Environmental Management Plans (EMPs) for activities such as dredging and quarrying. The project is an

extension to existing gas treatment facilities for which an Environmental Management System (EMS) is already in place. Continuing application of the EMS and incorporation of all environmental aspects of the project will be required to the satisfaction of the EPA on the advice of the DEP.

7. Recommendations

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment on the environmental factors relevant to the proposal and on the conditions and procedures to which the proposal should be subject, if implemented. In addition, the EPA may make recommendations as it sees fit.

The EPA submits the following recommendations to the Minister for the Environment:

1. That the Minister considers the report on the relevant environmental factors of Endangered and specially protected (threatened) species, Load-out facilities (jetty and wharf extension), Greenhouse gases, Air emissions - NO_x, Marine water quality, Aboriginal culture and heritage, and Risk - human health and safety, as set out in Section 3;
2. That the Minister notes that the EPA has concluded that the proposal is capable of being be managed to meet the EPA's objectives, and thus not impose an unacceptable impact on the environment, provided there is satisfactory implementation by the proponent of the recommended conditions set out in Section 4;
3. That the Minister imposes the conditions and procedures recommended in Appendix 3.

Appendix 1

List of submitters

Organisations:

Commonwealth Government Agencies

- Environment Australia
- Australian Maritime Safety Authority

State Government Agencies

- Department of Minerals and Energy
- Fisheries WA

Local Government Agencies

- Shire of Roebourne

Appendix 2

References

Burrup Peninsula Management Advisory Board (1996) Burrup land use plan and management strategy.

EPA (1993) Draft Western Australian water quality guidelines for fresh and marine waters. Environmental Protection Authority Bulletin 711, October 1993.

EPA (1997a) *Wonnich gas development, south west of the Montebello Islands.* Environmental Protection Authority Bulletin 856, June 1997.

EPA (1997b) *Risk assessment and management: offsite individual risk from industrial plant.* EPA draft policy no. 2, August 1997.

EPA (1997c) *Reducing greenhouse gases.* Draft policy no. 12. Environmental Protection Authority, August 1997.

Standards Australia (1996) AS/NZS ISO 14001-12 (Set) *Environmental Standards* Standards Australia, Homebush Bay NSW.

Woodside Offshore Petroleum (1997) *North West Shelf Gas Project DOMGAS Debottlenecking and 2nd Trunkline Installation Project* Public Environmental Review/Public Environment Report (PER) Woodside Offshore Petroleum Pty Ltd, October 1997.

Woodside Petroleum Ltd (1997) *Greenhouse challenge cooperative agreement with Australian Commonwealth Government* November 1997 (Agreement No. 100) 007.16/R/RWCOPO.DOC

Appendix 3

List of recommended Ministerial Conditions and proponent's consolidated commitments

Statement No. XXX

STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED (PURSUANT TO THE PROVISIONS OF THE ENVIRONMENTAL PROTECTION ACT 1986)

Second offshore trunkline and DOMGAS debottlenecking North West Shelf

Proposal: The construction and installation of a second trunkline approximately 150 km in length to carry gas/condensate from the existing offshore production platforms (situated in offshore Commonwealth waters) to the existing processing facilities on the Burrup Peninsula.

Quarrying of rock to armour the pipeline and construction of rock load-out facilities. Quarrying will be carried out on the Burrup Peninsula, inland from the existing Woodside plant.

In addition, debottlenecking of the existing onshore facilities on the Burrup Peninsula will be carried out to facilitate increased domestic gas production.

See Schedule 1 for key characteristics and other details of the proposal.

Proponent: Woodside Offshore Petroleum Pty Ltd

Proponent Address: 1 Adelaide Terrace, Perth, Western Australia 6000

Assessment Number: 1105

Report of the Environmental Protection Authority: Bulletin 893

The proposal to which the above report of the Environmental Protection Authority relates may be implemented subject to the following conditions and procedures:

1 Implementation

1-1 Subject to these conditions and procedures, the proponent shall implement the proposal as documented in schedule 1 of this statement.

1-2 Where, in the course of implementing the proposal, the proponent seeks to change any aspect of the proposal as documented in schedule 1 of this statement in any way that the Minister for the Environment determines, on advice of the Environmental Protection Authority, is not substantial, those changes may be effected.

2 Proponent Commitments

2-1 The proponent shall implement the consolidated environmental management commitments documented in schedule 2 of this statement.

2-2 The proponent shall implement subsequent environmental management commitments which the proponent makes as part of the fulfilment of conditions and procedures in this statement.

3 Environmental Management System

3-1 In order to manage the environmental impacts of the project, and to fulfil the requirements of the conditions and procedures in this statement, prior to ground-disturbing activities, the proponent shall demonstrate to the requirements of the Environmental Protection Authority on advice of the Department of Environmental Protection that there is in place an environmental management system which includes the following elements:

1. environmental policy and commitment;
2. planning of environmental requirements;
3. implementation and operation of environmental requirements;
4. measurement and evaluation of environmental performance; and
5. review and improvement of environmental outcomes.

3-2 The proponent shall implement the environmental management system referred to in Condition 3-1.

4 Environmental Management Plan for Load-Out Facilities

4-1 Prior to finalisation of the design for the trestle jetty and wharf extension, the proponent shall prepare an Environmental Management Plan for Load-Out Facilities to the requirements of the Environmental Protection Authority on advice of the Department of Environmental Protection.

This plan shall address:

1. the design, construction, dimensions and location of the jetty;
2. the design, construction, dimensions and location of the wharf extension;
3. the predicted effects of these structures (if any) on long shore currents, coastal processes, shore line profile and mangrove ecology; and
4. methods of managing and mitigating effects on long-shore currents, coastal processes, shore line profile and mangrove ecology.

4-2 The proponent shall implement the Environmental Management Plan for Load-Out Facilities required by Condition 4-1.

4-3 The proponent shall make the Environmental Management Plan for Load-Out Facilities required by Condition 4-1 publicly available, to the requirements of the Environmental Protection Authority.

5 Performance Review

5-1 Each six years following the commencement of construction, the proponent shall submit a Performance Review to evaluate the environmental performance relevant to:

1 environmental objectives reported on in Environmental Protection Authority Bulletin 893;

2 proponent's consolidated environmental management commitments documented in schedule 2 of this statement and those arising from the fulfilment of conditions and procedures in this statement;

3 environmental management system environmental management targets;

4 Environmental Management Programs and Plans; and

5 environmental performance indicators;

to the requirements of the Environmental Protection Authority on advice of the Department of Environmental Protection.

Note: The Environmental Protection Authority may recommend changes and actions to the Minister for the Environment following consideration of the Performance Review.

6 Proponent

6-1 The proponent for the time being nominated by the Minister for the Environment under section 38(6) or (7) of the Environmental Protection Act is responsible for the implementation of the proposal until such time as the Minister for the Environment has exercised the Minister's power under section 38(7) of the Act to revoke the nomination of that proponent and nominate another person in respect of the proposal.

6-2 Any request for the exercise of that power of the Minister referred to in condition 6-1 shall be accompanied by a copy of this statement endorsed with an undertaking by the proposed replacement proponent to carry out the proposal in accordance with the conditions and procedures set out in the statement.

6-3 The proponent shall notify the Minister for the Environment of any change of proponent contact name and address within 30 days of such change.

7 Commencement

7-1 The proponent shall provide evidence to the Minister for the Environment within five years of the date of this statement that the proposal has been substantially commenced.

7-2 Where the proposal has not been substantially commenced within five years of the date of this statement, the approval to implement the proposal as granted in this statement shall lapse and be void. The Minister for the Environment will determine any question as to whether the proposal has been substantially commenced.

7-3 The proponent shall make application to the Minister for the Environment for any extension of approval for the substantial commencement of the proposal beyond five years from the date of this statement.

7-4 Where the proponent demonstrates to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority that the environmental parameters of the proposal have not changed significantly, then the Minister may grant an extension not exceeding five years for the substantial commencement of the proposal.

8 Compliance Auditing

8-1 The proponent shall submit periodic Performance and Compliance Reports, in accordance with an audit program prepared in consultation between the proponent and the Department of Environmental Protection.

8-2 Unless otherwise specified, the Department of Environmental Protection is responsible for assessing compliance with the conditions contained in this statement and for issuing formal clearance of conditions.

8-3 Where compliance with any condition or procedure is in dispute, the matter will be determined by the Minister for the Environment.

Note

1. The proponent is required to apply for a Works Approval and Licence for this project under the provisions of Part V of the Environmental Protection Act.

Schedule 1

Proposal:

The construction and installation of a second trunkline approximately 150 km in length to carry gas/condensate from the existing offshore production platforms (located in offshore Commonwealth waters) to the existing processing facilities on the Burrup Peninsula.

Quarrying of rock will be required to armour the pipeline. The total quantity of rock required has not yet been accurately assessed, but studies to date have shown that the requirements are likely to be of the order of 0.8 to 2 million cubic metres requiring a total of up to 3 million cubic metres of rock to be quarried. To provide this volume of rock a new quarry (or quarries) is required.

Load-out of 50,000 to 80,000 tonnes of rock per week is anticipated. To support this, a large stockpile area will be required as quarrying rates will occasionally exceed demand. The location of the stockpile area has yet to be finalised but is likely to be at Holden Point.

The existing King Bay wharf will be extended using sheeting and rock back-fill. A trestle jetty and conveyor belt will be required for smaller rock. The location of the trestle load-out facilities has yet to be finalised.

In addition, debottlenecking of the existing onshore facilities will be carried out to facilitate increased domestic gas production.

Summary of key proposal characteristics

Proposal Characteristic	Description
Construction of second trunkline	A second trunkline will be installed on the seabed between the Goodwyn/North Rankin production platforms on the North West Shelf and the existing gas treatment plant on Burrup Peninsula.
Length of trunkline	148 to 159 km (depending on final route selected)
Location and depth	Aligned with existing trunkline but offset up to 15 km to the North East. Pipeline installed to a depth of 30 to 130 metres in deeper waters and 0 to 30 metres inshore.
Trunkline connections	Risers at offshore platforms and new trunkline onshore terminal (TOT) at gas treatment facilities.
Preparation of pipelengths	The pipe sections will be corrosion-treated, weighted with concrete, and stockpiled prior to pipelaying. The preferred site for these activities is the rehabilitated (previously disturbed) Hearson's Village Construction Camp.
Stabilisation and protection	Ploughed into seabed or in trench and covered with rock material as required.

Proposal Characteristic	Description
Land requirements	The rock storage area, load-out and new haul road will require about 5.5 hectares of "new" (previously undisturbed) land. An additional 20-30 hectares of previously undisturbed land will be required for the two quarries.
Quarries	Quarrying of rock will be required to armour the pipeline. The proponent states that the total quantity of rock required has not yet been accurately assessed, but studies to date have shown that the requirements are likely to be of the order of 0.8 to 2 million cubic metres requiring a total of up to 3 million cubic metres of rock to be quarried. The existing quarry behind Holden Point will be extended further south. This would be supplemented by an area further inland in an area proposed for inclusion in Woodside's new lease for future onshore treatment plant expansion. The total area to be quarried (from both areas) will be 20 to 30 hectares.
Rock stockpile	Load-out of 50,000 to 80,000 tonnes of rock a week is anticipated. To support this, a large stockpile area will be required as quarrying rates will occasionally outstrip demand. The location of the rock stockpile has yet to be confirmed but is likely to be at Holden Point.
Rock load-out	Load-out facilities will be required for supplies of rock for armouring the subsea trunkline. Crushed rock will be transported by haulpak-type trucks to a stockpile area and thence loaded onto specialist rock-dumping vessels. A load-out platform for large rock will be constructed by building an extension to King Bay wharf using sheeting and rock back-fill. A trestle jetty/conveyor belt for smaller rock will also be required (location yet to be confirmed). The proponent has made a commitment to remove the trestle structures at completion of the project.
Hydrostatic pressure tests	Constructed trunkline pressure tested and hydrotest water containing corrosion inhibitors and biocides released into ocean at platforms, and, inshore, into impervious (clay lined) evaporation ponds situated within the Woodside lease area. The total volume of hydrotest water to be released into the evaporation ponds will be about 300 cubic metres. Trunkline may also be treated with glycol which would be recovered and recycled. Pickle liquors (cleaning reagents for small diameter piping) will be recycled or disposed of in a manner to be approved by the Department of Environmental Protection.
Debottlenecking onshore plant	Existing DOMGAS plant will be modified to increase design capacity by 65%. Proposal comprises piping modification, installation of metering units, a mercury absorption bed, sales gas compressors and possibly a fractionation unit as proposed in the Liquid Expansion Project (LEP). There will be no additional gas turbines required (waste heat recovery units will be installed on existing turbines).
Greenhouse gas emissions	Woodside's onshore treatment plant (OTP) currently produces approx 5 million tonnes of greenhouse gas equivalents per annum. With use of heat recovery units, the project will result in a 65% increase in plant production, but an estimated increase in annual greenhouse gas emissions of the order of 2%.

Proposal Characteristic	Description
NOx emissions	Current OTP operations produce approx 6,000 tonnes of NOx per annum. The proposal is predicted to increase annual NOx emissions by less than 4%.
Operation of pig receiver	Depressurised gas either vented, flared or recovered depending upon frequency of operation.
Operational discharges	No additional produced formation water will be generated as a result of the current proposal. Waste heat will be utilised through heat exchangers. There will be no emissions of waste heat to coastal waters.

Maps and plans

The location/layout of the proposed project are shown in figures 1 to 5 (see main text).
Figure 1 is a location map.
Figure 2 shows the offshore trunkline route locations.
Figure 3 shows the trunkline route locations inshore.
Figure 4 shows the quarry locations and land requirements.
Figure 5 shows the onshore gas treatment plant layout.

APPENDIX 3

Schedule 2. Proponent's Environmental Management Commitments

TOPIC	COMMITMENT	OBJECTIVE	ACTION	TIMING	WHOSE ADVICE	MEASUREMENT/ COMPLIANCE CRITERIA
Pipeline Route Selection	1. Selection of trunkline route to minimise disturbance to coral reefs.	To protect existing coral reefs during trunkline installation.	Selected route to be as direct as practicable within engineering and technical restraints.	Before the start of the construction phase.	Department of Environment Protection (DEP)	Letter to DEP confirming selection of trunkline route 1 or 1A in PER.
	2. Selection of trunkline route to minimise disruption to fishery.	To protect fishery areas during trunkline installation.	Consult with Fisheries WA, DRD, Environment Australia .	Before start of construction phase.	Fisheries WA, DRD	Not audited by DEP (outside EPA jurisdiction)
	3. Selection of trunkline route to avoid crossing any listed historic shipwrecks.	To protect historic shipwrecks during trunkline installation.	Liaise with WA Maritime Museum to ensure historic wrecks are identified and avoided.	Before start of construction phase	WA Museum	Letter from WA Museum confirming consultation re route selection.
	4. Selection of route to avoid disturbance to vegetation, landscape and Aboriginal heritage sites.	To protect terrestrial environment and Aboriginal heritage areas from significant impacts.	Trunkline route to enter OTP lease directly from Mermaid Sound.	Before start of construction phase.	DEP	Letter to DEP confirming selection of trunkline route 1 or 1A in PER.
Pipeline Installation - Dredging	5. Dredging and trenching undertaken where ploughing is not feasible or cost effective.	To protect nearby corals during trunkline installation from increased turbidity.	Dredging operations in areas where ploughing is not feasible.	Before and during installation of second trunkline.	DEP	Included in dredging Environmental Management Plan (EMP) and letter of acceptance of EMP by DEP.
	6. A substantial buffer between pipe-laying operations and significant coral areas maintained.	To protect nearby corals during trunkline installation.	Buffer zones instituted where practicable to protect significant communities.	Before and during installation of second trunkline.	DEP	Included in dredging EMP and letter of acceptance of EMP by DEP.

Schedule 2. Proponent's Environmental Management Commitments

TOPIC	COMMITMENT	OBJECTIVE	ACTION	TIMING	WHOSE ADVICE	MEASUREMENT/ COMPLIANCE CRITERIA
	7. Spoil not used for backfill removed from environmentally sensitive areas.	To protect in-situ sensitive benthic communities.	Spoil to previously used spoil ground.	Before and during installation of second trunkline.	Environment Australia and DEP	Letter of acceptance of Dredging EMP by DEP; approval from Environment Australia under Commonwealth sea dumping legislation
	8. Clamshell dredging used in King Bay Supply Base wharf extension.	To protect in-situ sensitive benthic communities.	Clamshell dredging may be used to utilise some dredged material for wharf backfill without excess turbidity.	Before and during installation of second pipeline.	Environment Australia and DEP	Letter of acceptance of Dredging EMP by DEP; approval from Environment Australia under Commonwealth sea dumping legislation
	9. Dredging Environmental Management Plan (EMP).	To protect in-situ sensitive benthic communities.	EMP prepared for dredging operations, spoil disposal and monitoring programmes.	Before start of construction phase	Environment Australia and DEP	Letter of acceptance of Dredging EMP by DEP; approval from Environment Australia under Commonwealth sea dumping legislation.
	10. Dredging operations avoided during coral spawning.	To protect in-situ sensitive benthic communities.	Dredging operations within 1000 m of corals will be avoided for a 10 day period during the coral spawning period (nominally March/April).	During installation of the second pipeline.	Environment Australia and DEP	Letter of acceptance of Dredging EMP by DEP; approval from Environment Australia under Commonwealth sea dumping legislation

Schedule 2. Proponent's Environmental Management Commitments

TOPIC	COMMITMENT	OBJECTIVE	ACTION	TIMING	WHOSE ADVICE	MEASUREMENT/ COMPLIANCE CRITERIA
	11. Shipping and Fishing operations notified during pipelaying.	To avoid disruption to shipping and fishing operations on North West Shelf.	Close liaison will be maintained with AMSA, Professional Fishermen's Association (PFA) and WA Fishing Industry Council (WAFIC).	Before and during installation of second pipeline.	Department of Transport requirement. Not audited by DEP	Not formally audited by DEP
Pipeline Installation - Spoil Disposal	12. Permit sought to utilise dedicated spoil grounds.	To protect in -situ benthic communities	A Sea Dumping Permit will be sought to utilise spoil grounds A & B for spoil disposal.	Before and during construction phase.	Environment Australia	Issue of Permit by Environment Australia and compliance with conditions during operations.
Pipeline Installation - Blasting	13. Blasting kept to a minimum.	To protect marine fauna close to detonation point.	Routes requiring blasting will be minimised.	Before and during construction phase.	DEP and CALM	Acceptance of blasting EMP
	14. Watch for marine mammals (cetaceans, dugong) and turtles.	To protect marine fauna close to detonation point.	Procedures will be developed to ensure a marine mammal (cetaceans, dugong) and turtle watch is maintained.	Before start of construction and during installation of pipeline.	DEP, CALM, Environment Australia	Acceptance of blasting EMP
	15. Safe distances between aquatic fauna and detonation areas.	To protect marine fauna close to detonation point.	Consultation with regulatory agencies on prescribed distances	Before start of construction and during installation of pipeline.	DEP, CALM, Environment Australia	Letters from CALM and Environment Australia confirming safe distance required.
	16. Strategy to minimise the release of plastic coatings after each charge	To protect seabirds and prevent pollution.	Investigate alternatives to buoyant or persistent plastic coating on explosive charges.	Before start of construction phase.	DEP and CALM	Acceptance of blasting EMP
	17. Dead fish removed after each blast, if required.	To prevent marine fauna close to detonation point.	Organise collection of dead fish.	During installation of second pipeline.	DEP and CALM	Acceptance of blasting EMP

Schedule 2. Proponent's Environmental Management Commitments

TOPIC	COMMITMENT	OBJECTIVE	ACTION	TIMING	WHOSE ADVICE	MEASUREMENT/ COMPLIANCE CRITERIA
	18. Control of charge structure for blasting.	To protect marine fauna close to detonation point.	Overpressure effects on marine life will be minimised by optimising the charge structure for blasting.	During installation of second pipeline.	DEP and DME	Acceptance of blasting EMP
Pipeline Installation - Hydrotesting of pipeline.	19. Hydrotest chemicals selection based upon environmental properties.	To protect marine and terrestrial environment.	Chemicals will be used in minimum quantities and will be screened for environmental properties.	Before start of and during precommissioning phase of second pipeline.	DEP	Confirm in annual report.
	20. Target set levels of biocides and corrosion inhibitors in discharge water.	To protect marine water quality.	Target <10% LC_{50} for contaminant concentration value at point of discharge.	Before start of precommissioning phase of second pipeline.	DEP	Confirm in annual report
	21 Maximising dilution and aeration of contaminants.	To protect marine water quality and marine sensitive environments.	Design discharge for maximum dilution and aeration treatment at point of discharge. Appropriate modelling undertaken .	Before start of precommissioning phase of second pipeline.	DEP	Confirm in annual report
	22 Onshore discharges contained.	To protect terrestrial environment.	Any discharge to onshore will be to evaporation ponds.	Before start of and during precommissioning phase of second pipeline.	DEP	Confirm in annual report

Schedule 2. Proponent's Environmental Management Commitments

TOPIC	COMMITMENT	OBJECTIVE	ACTION	TIMING	WHOSE ADVICE	MEASUREMENT/ COMPLIANCE CRITERIA
Pipeline Installation - Line-pipe coating and pipe storage	23. Pipe storage and line pipe coating onshore with plan developed for rehabilitation and reinstatement of site.	To protect the terrestrial environment.	A previously disturbed area will preferentially be used for line-pipe coating and pipe storage. A rehabilitation plan will be developed and consideration given to the use of native species in rehabilitation.	Before disturbance of onshore area and second pipeline construction phase.	DEP	Rehabilitation plan prepared for site
	24. Coating and storage site contained and drained with proper collection and recycling/disposal of contaminated waste water.	To protect the terrestrial environment.	Chemical residues will be disposed using existing Chemical Hazard Management System (CHMS) procedures. Area with the potential for chemical spillage will be bunded and drained to ensure proper collection and recycling /disposal of waste water.	Before and during installation of second pipeline.	DEP	Confirm in annual report

Schedule 2. Proponent's Environmental Management Commitments

TOPIC	COMMITMENT	OBJECTIVE	ACTION	TIMING	WHOSE ADVICE	MEASUREMENT/ COMPLIANCE CRITERIA
Vessel operations - waste management aboard vessels	25. Wastes to be disposed of into marine waters in accordance with MARPOL Annex IV or onshore according to Woodside's Waste Management System.	To protect the marine and terrestrial environment and maximise opportunity for waste minimisation.	The disposal of grey water, sewage and solid waste will not be permitted inshore or offshore unless treated in accordance with the requirements of MARPOL Annex IV. All other wastes will be brought ashore and managed through Woodside's Waste Management System.	During operation of pipe-laying vessels, support vessels and dredges within the waters of the Dampier Archipelago and offshore.	DEP	Confirm in annual report
Vessel operations - quarantine	26. Quarantine inspection of vessels entering project waters.	To protect the marine environment.	A quarantine inspection and report will be prepared to ensure vessels have a current De-ratting Exemption Certificate, are free of exotic propagules and that there is minimal residual sediment contamination from previous dredging operations.	Prior to any dredge and other project support vessels entering Pilbara marine waters.	DEP	Quarantine inspection reports for vessels included in project documentation. Confirm in annual report.

Schedule 2. Proponent's Environmental Management Commitments

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	27. Ballast waters controlled according to relevant AQIS Notice.	To protect the marine environment.	Subject to transit safety risks, vessels arriving from overseas will be required to comply with AQIS Notice 92/2 Controls on the discharge of ballast water and sediment from ships entering Australia from overseas.	Prior to any dredge or pipe-laying vessels entering Pilbara marine waters.	DEP	Confirm in annual report
Vessel operations - oil spill	28 Cyclone procedures apply for dredging and pipelaying operations.	To protect the marine environment.	Appropriate measures will be introduced to prevent oil spills from vessels during cyclones.	During construction of second pipeline.	Not audited by DEP. DME requirement.	No formal audit by DEP
	29. Vessels will carry oil spill equipment and interface required between MARPOL requirements and Woodside's oil spill response plans.	To protect the marine environment.	Vessel will be required to carry oil spill equipment on board, appropriate for minor spills. Ship board Oil Spill Response Plans (SOSRP) as required by MARPOL will be required to interface with the Woodside's Oil Spill Contingency Plan.	During construction of second pipeline.	DME and DOT	Updated oil spill contingency plan accepted by DOT and DME.

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	30. All oil spills >20L to be reported and corrective actions taken.	To protect the marine environment.	Vessel Masters will be required to report spills >20L and corrective actions taken to Woodside.	During construction of second pipeline.	DEP	Confirm in annual report
	31. Procedures prepared for oil spills during re-fuelling of vessels.	To protect the marine environment.	Refuelling procedures will be prepared for all vessels involved in pipelaying operations.	During construction of second pipeline.	DEP and DOT	Updated oil contingency plan (including refuelling procedures) accepted by DME and DOT.
Aboriginal heritage sites and cultural associations.	32 Aboriginal culture and heritage.	To protect Aboriginal heritage sites and cultural associations wherever reasonably practical.	Assessments of sites will be carried out as required by the Aboriginal Heritage Act (Section 18). The Aboriginal Affairs Dept will be consulted about cultural associations.	Prior to the start of ground disturbing activities.	Aboriginal Affairs Department (AAD)	Letter from AAD confirming acceptance of planned activities.

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Quarrying and Associated Activities.	33. Potential quarry sites south of OTP plant with existing site preferred.	To protect onshore priority flora and fauna, Aboriginal heritage and landscape amenities.	Two potential sites identified within area designated for industrial development with the existing quarry site to be used preferentially.	Prior to the start up of quarrying and installation of second pipeline.	Aboriginal Affairs Department (AAD), CALM.	Letter to DEP confirming location of quarry area as proposed in PER. Clearance letters from AAD, CALM
	34. Vegetation survey undertaken over quarry sites and destruction of any priority flora only as permitted under WA legislation.	To protect onshore priority flora.	Surveys undertaken of vegetation over prospective quarry sites. Liaison between Woodside and CALM prior to the destruction of any Priority Flora.	Prior to the start up of quarrying and installation of second pipeline.	CALM	Letter from CALM confirming acceptance of planned quarrying activities.

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	35. Quarrying designed to reduce impact on landscape values.	To protect landscape amenities.	Quarrying activities will be designed to reduce the impact on landscape amenities.	Prior to the start up of quarrying and installation of second pipeline.	DEP	Acceptance of quarrying EMP.
	36. EMP prepared for quarrying activities.	To maintain airborne dust, noise, vibration and other environmental impacts at an acceptable level.	A quarrying activity EMP will be developed.	Prior to the commence of quarrying operations.	DME	Acceptance of quarrying EMP by DME and DEP..
	37. Exclusion zone during blasting	To meet OH&S duty of care requirements	The project will impose the required exclusion zone under the Mines Act during the blasting phase of quarrying activities.	Prior to the start up of quarrying and installation of second pipeline.	DME	Acceptance of quarrying EMP by DME.
Quarrying and Associated Activities - Crushing and grading.	38. Implementation of dust control procedures.	To meet hygiene requirements and maintain acceptable environmental standards for dust.	Dust levels will be monitored and control measures will be implemented, if required.	During quarrying, crushing and grading operations.	DME	Acceptance of quarrying EMP by DME and DEP.
	39. Preparation of EMP for crushing and grading.	To maintain acceptable environmental standards.	A comprehensive EMP will be prepared in consultation with WA DME.	Prior to the commencement of grading and crushing activities.	DME	Acceptance of quarrying EMP (which includes crushing and grading) by DEP and DME.

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TOPIC	COMMITMENT	OBJECTIVE	ACTION	TIMING	WHOSE ADVICE	MEASUREMENT/ COMPLIANCE CRITERIA
Quarry and Associated Activities - Haul Road	40. Aboriginal site clearance in accordance with legislation.	To protect Aboriginal sites on Burrup Peninsula.	Aboriginal site clearance will be undertaken in accordance with the Aboriginal Heritage Act (1972) and in particular Section 18.	Prior to the commencement of haul road operations and installation of second pipeline.	DEP AAD ACMC	Letter from AAD confirming acceptance of haul road extensions location.
	41. Disturbance to priority flora along extension to haul road will be minimised.	To protect onshore priority flora.	Vegetation survey has been done over route extension Disturbance to priority flora will be minimised	Prior to the commencement of haul road operations and installation of second pipeline.	DEP CALM	Letter from CALM confirming acceptance of haul road extension location.
	42. Crossings of the Public Wharf Road and Kings Bay Roads will be designed to operate in a safe manner.	To provide public and community safety at an acceptable level.	Crossings will be conducted in a safe manner with the approval of the appropriate authorities. The haul road will separate , as far as possible, haulage from general traffic.	Prior to the commencement of haul road operations and installation of second pipeline	DEP Main Roads WA	Letter from Main Roads WA confirming acceptance of haul road crossings.
	43. Traffic hazards on haul road will be managed.	To provide public and community safety at an acceptable level.	Procedures of total exclusion of non-essential traffic, radio control of haul traffic movements and visibility devices mounted on all vehicles using the roads,	During the operation of the haul road and installation of the second pipeline.	DME safety requirements	No formal audit by DEP

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Quarry and Associated Activities - Storage and Loadout of Rock Material	44a. EMP for rock stockpiling and load-out.	To minimise environmental impacts from rock stockpiling and load-out.	An environmental management plan (EMP) will be prepared for rock stock-pile and load-out facilities	Prior to the construction of stockpile/load-out facilities.	DEP	Submission of EMP to DEP.
	44b Use of existing storage and loadout areas will be maximised.	To minimise disturbance to terrestrial environment.	Maximum use will be made of the previously disturbed ground adjacent to the KBSB for rock storage and loadout.	Prior to start up of the rock storage and loadout area and installation of the second pipeline.	DEP	Confirm in annual report
	45. Appropriate rehabilitation procedures applied to facility for rock storage at Holden Point.	To minimise environmental disturbance site.	Top soil will be removed and stockpiled for use in rehabilitation if required. Area will be rehabilitated consistent with subsequent land use and/or adjacent land conditions. Appropriate weed control practices will be instituted.	During the operation of the rock storage area and installation of the second pipeline.	DEP	Confirm in annual report
	46. Construction of trestle jetty.	To protect inshore marine environment.	Trestle jetty may be constructed from Holden point.	Prior to the commencement of loadout operations.	DEP	Confirm in annual report

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TOPIC	COMMITMENT	OBJECTIVE	ACTION	TIMING	WHOSE ADVICE	MEASUREMENT/ COMPLIANCE CRITERIA
Quarry and Associated Activities - Decommissioning	47. Quarry to be made safe at completion of works.	To provide public and community safety at an acceptable level	Work area cleared and loose material barred off, access to quarry sealed with large boulders and access limitation berm constructed on top of quarry in consultation with WA DME	At completion of works for the supply of rock material for the second pipeline installation. .	DEP DME	Letter from DME confirming protocols and procedures for decommissioning the quarry.
	48. Trestle jetty to be decommissioned after operations cease.	To minimise inshore environmental impact.	Trestle piles sheared at seabed and top infrastructure removed from site.	At completion of works for the supply of rock material for the second pipeline installation.	DEP	Close out report
Plant Expansion - Infrastructure Layout	49. Infrastructure will be within existing plant.	To minimise terrestrial environmental impacts.	All new infrastructure will be contained within existing plant boundary.	Before start up and during plant expansion works.	DEP	Confirm in annual report.
(Commitment deleted)	50. Commitment deleted.					
Construction Issues - Laydown areas	51. Laydown area within existing plant.	To minimise terrestrial environmental impacts.	Existing plant laydown areas will be used to support plant expansion.	During plant expansion works.	DEP	Confirm in annual report

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TOPIC	COMMITMENT	OBJECTIVE	ACTION	TIMING	WHOSE ADVICE	MEASUREMENT/ COMPLIANCE CRITERIA
Construction Issues - Waste Disposal	52. Waste management will comply with the Woodside waste management system.	To protect the terrestrial environment and maximise opportunity for waste minimisation.	No waste will be disposed of on Burrup Peninsula. Wastes will be disposed of in accordance with the Woodside waste management system and to Shire of Roebourne requirements.	During construction of plant expansion .	DEP Shire of Roebourne.	Compliance reporting for DEP licence on waste discharges.
	53. Existing sewage system used with portable units, if necessary.	To minimise impact on the terrestrial environment.	The capacity of the existing OTP sewage system will be assessed to service the construction workforce. Portable sanitation units will be provided if required.	Prior to start up of plant expansion and ongoing during works.	DEP	Compliance reporting on DEP licence on waste discharges.
Construction Issues - Workforce	54. Existing facilities used to accommodate workforce with limited increase in operational workforce expected.	To minimise impact on the terrestrial environment.	Accommodation requirement of construction workforce under investigation.	Prior to start up and ongoing during works.	DEP	Confirm in annual report
Construction Issues - Pickle liquor	55. Pickle liquor recycled or disposed of in an acceptable manner.	To maximise recycling and minimise pollution impacts on the environment.	Pickle liquor will be recycled, or disposed of in an approved manner.	Prior to start up and ongoing during works.	DEP	Compliance reporting on DEP licence on waste discharges.

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Operational Issues - Atmospheric emissions	56. Energy recovery systems installed and atmospheric emissions quantified and reported. Increase in emissions of approximately 5%.	To minimise Greenhouse gas emissions.	Waste heat recovery will be installed in the new power generation units to increase energy efficiency. Atmospheric emissions will be reported as per existing OTP licence requirements.	During plant expansion works and ongoing for plant operation.	DEP	Compliance reporting on DEP licence on air emissions.
	57. Low emission burners specified for gas burners. NO_x emissions expected to increase by 4-5%.	To minimise Greenhouse gas emissions and photochemical smog.	Best practicable low emission burners will be specified in gas turbines during detailed design stage.	During design stage and operation of plant.	DEP	Compliance monitoring on DEP licence for air emissions.
	58. Seal systems specified with lowest practicable hydrocarbon emissions.	To minimise Greenhouse gas emissions.	To minimise fugitive gas emissions seal systems with lowest leakage of gas will be specified for the DOMGAS compressors.	During design stage of plant expansion.	DEP	Confirm in annual report
	59. Depressurised gas will be re-directed to process or flared.	To minimise Greenhouse gas emissions.	Gas from the de-pressuring of the pig receiver will be re-directed to the process or sent to flare.	During plant design and ongoing during operation.	DEP	Confirm in annual report

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	60. Participation in joint DEP/industry air quality study for Burrup Peninsula.	To characterise atmospheric processes in region.	Woodside will participate in the atmospheric study to better characterise air quality meteorology on the Burrup Peninsula.	Ongoing independently of project.	DEP	Confirm in annual report
Operational Issues - Effluents	61. No new liquid wastes expected to be produced from proposed expansion.	To minimise pollution streams requiring disposal.	Contaminant concentrations and loads will be reported as per the existing operating plant licence.	Ongoing during operation of new plant.	DEP	Compliance reporting of DEP licence for effluents.
Operational Issues - Contaminated drainage	62. New infrastructure will be bunded to contain hydrocarbon spills.	To minimise potential for uncontrolled drainage.	Bunding will be emplaced around new infrastructure where potentially spills could occur. Drainage will be directed to existing oily contaminated water (OCW) system.	During plant design and ongoing during plant operation.	DEP	Approval under licensing/Works Approval requirements.
Operational Issues - Risk	63. Risks from storms capable of moving and rupturing trunkline will be investigated.	To determine level of risk of trunkline failure and stabilisation requirements.	Risks from cyclone damage will be investigated over trunkline length and design stabilisation methods to ALARP principles.	Prior to detailed design of trunkline stabilisation methods.	DME requirement.	No formal audit by DEP

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	64 Risks posed by plant expansion to human life has been assessed and will be utilised during the updating of the Safety Cases.	To determine level of risks to human life and management strategy requirements.	Preliminary hazard assessments have been undertaken for the new plant. This assessment will be expanded during the updating of the facility Safety Cases and Management System.	Prior to construction of new plant and ongoing.	DME	Acceptance of updated Safety Cases and Management System by DME.
	65. Hazard identification during plant design.	To ensure risk levels for the workforce and community are acceptable.	Hazard identification activities will proceed throughout detailed design to ensure acceptable risk levels from process facilities.	During detailed plant design stage of project.	DME	Acceptance of updated Safety Cases and Management System by DME.
Operational Issues - Oil spill contingency	66. Risk posed by second pipeline will be assessed and existing oil spill contingency plan (OSCP) reviewed and updated.	To ensure an adequate response capability is maintained.	An assessment will be taken of the additional risk associated with the second pipeline. The design integrity of the trunkline will be assessed during the detailed design phase.	During detailed design phase and prior to construction of trunkline.	DME and DOT	Acceptance of updated OSCP by DME and DOT
Operational Issues - Increased shipping frequency	67.Existing monitoring programme will assess impact of increased shipping movements on coral in vicinity of product loading jetties.	To assess impacts associated with increased shipping	The existing ChEMMS monitoring programme will continue to monitor for effects on corals in the vicinity of the product loadout jetties.	Ongoing during construction and operation of expanded facilities.	DEP	Performance and compliance reporting of ChEMMS

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	68. Monitoring for TBT loads in sediments.	To assess impacts associated with increased shipping	TBT sediment and biota loads will continue to be monitored in Mermaid Sound.	Ongoing during construction and operation of expanded facilities.	DEP	Performance and compliance reporting of ChEMMS
	69. Investigate occurrence and frequency of imposex.	To assess impacts associated with increased shipping	Study to determine the occurrence and frequency of imposex in a suitable marine gastropod has commenced.	Ongoing during construction and operation of expanded facilities.	DEP	Performance and compliance reporting of ChEMMS
	70. Annual auditing of cargo offtake vessel compliance against AQIS notice 92/2.	To assess impacts associated with increased shipping	Audit of compliance against Controls on the Discharges of Ballast Water and Sediment from Ships Entering Australia from Overseas.	Ongoing annually.	DEP	Annual audit reporting for vessels.
Operational Issues Decommissioning and Abandonment.	71. Trunkline will be cleared of hydrocarbons and either filled with inert gas or flooded with sea water.	To minimise adverse environmental impacts on marine environment.	Trunkline will be cleared of residual hydrocarbons. If intended for further use it will be pressurised with inert gas. If no further use then it will be flooded with sea water and left in-situ.	At end of trunkline operation.	DEP DME	Decommissioning plan prepared to requirements of DEP and DME
	72. Facilities decommissioned as per existing plant.	To minimise adverse environmental impacts on terrestrial environment.	Decommissioning plans will be developed.	At least 3 years prior to plant closure.	DEP	Acceptance of decommissioning plan by DEP and DME and rehabilitation according to agreed criteria.