Gas pipeline from Griffin oilfield to mainland facility, near Onslow

BHP Petroleum Pty Ltd and Doral Resources N. L.

Report and recommendations
of the Environmental Protection Authority

Environmental Protection Authority
Perth, Western Australia
Bulletin 674
January 1993

THE PURPOSE OF THIS REPORT

This report contains the Environmental Protection Authority's environmental assessment and recommendations to the Minister for the Environment on the environmental acceptability of the proposal.

Immediately following the release of the report there is a 14-day period when anyone may appeal to the Minister against the Environmental Protection Authority's report.

After the appeal period, and determination of any appeals, the Minister consults with the other relevant ministers and agencies and then issues his decision about whether the proposal may or may not proceed. The Minister also announces the legally binding environmental conditions which might apply to any approval.

APPEALS

If you disagree with any of the contents of the assessment report or recommendations you may appeal in writing to the Minister for the Environment outlining the environmental reasons for your concern and enclosing the appeal fee of $10.

It is important that you clearly indicate the part of the report you disagree with and the reasons for your concern so that the grounds of your appeal can be properly considered by the Minister for the Environment.

ADDRESS

Hon Minister for the Environment
12th Floor, Dumas House
2 Havelock Street
WEST PERTH WA 6005

CLOSING DATE

Your appeal (with the $10 fee) must reach the Minister's office no later than 5.00 pm on 5 February, 1993.

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Summary and recommendations

BHP Petroleum Pty Ltd, as operator for the Griffin Project Venturers, proposes to develop the Griffin oilfield which is located 68km offshore from Onslow. The oilfield will be developed using a floating production, storage and offloading facility and both oil and gas will be produced. The gas will be recovered and transported to the mainland via a submarine and onshore pipeline to a gas treatment plant and then on to the Dampier-Perth gas pipeline. This assessment comprises the portion of the offshore pipeline in State waters, bringing gas onshore to the processing plant on Urala Station and the overland portion of the pipe which joins the Dampier-Perth main gas pipe. Oil production is in Commonwealth waters and is not covered by this assessment.

BHP Petroleum is the proponent for the part of the proposal comprising the submarine gas pipeline, the onshore pipeline up to the gas treatment plant, the gas treatment plant and the LPG pipeline. Doral Resources is the proponent for the pipeline from the gas treatment plant to the Dampier-Perth gas pipeline. The proponents prepared a Consultative Environmental Review document which described the proposal, the existing environment, the environmental effects and the management of those effects.

The proponents have committed to carry out further detailed surveys during the construction phase to avoid disturbance to sensitive components of the environment, to monitor the effects of the proposal and to rehabilitate the disturbed areas of the environment.

The Environmental Protection Authority considers that the main environmental issues relating to the proposal were:

- the environmental sensitivity of the preferred route for the pipeline;
- impacts on the prawn fishery;
- rehabilitation of the coastal dunes; and
- impacts on existing land uses.

Preferred route

The preferred route for the pipeline was chosen following an evaluation of the marine environment along four possible routes from the Griffin oilfield so as to avoid sensitive areas such as coral reefs and islands and an evaluation of the terrestrial environments where the pipeline would be brought ashore through easily destabilised coastal sand dunes. The preferred destination of the new pipeline was the Tubridgi 5 gas production well so that the pipeline could then follow the existing pipeline easement.

The Environmental Protection Authority has concluded that the proponents have carried out adequate physical, biological, archaeological and other investigations of the environment which would be impacted by the proposal and that the construction of the pipeline along the preferred route should have an acceptably low environmental impact on the marine and terrestrial environments of the region.

Prawn fishery

The environmental implications of the offshore pipeline construction activities on the prawn fishery are related to the disturbance of the substrate, the prawn stock and the food chain components on which the prawns rely. The proponents propose to bury the pipeline through the fishing zone so that there would not be any long term alienation of the fishing grounds currently available to the fishing fleet. If burying the pipeline is not practicable, the proponents are committed to reaching an arrangement with the affected fishermen.

The Environmental Protection Authority concludes that there would be minimal environmental impact on the prawn fishery from construction activities and that the issue of possible alienation of fishing grounds has been adequately addressed by the proponents' environmental management commitment.

Coastal dunes

The coastal section of the preferred pipeline route crosses 1km of coastal dunes and 300m of salt flats before reaching the existing pipeline easement at Tubridgi 5. The vegetation of the dunes is fragile and the dunes are vulnerable to erosion. The rehabilitation of the dunes may require special measures. **The Environmental Protection Authority has concluded that the proposed onshore route minimises the disturbance to the coastal dunes and salt flats and has recommended that the rehabilitation of the coastal dunes be to the requirements of the Environmental Protection Authority.**

Existing land uses

The existing land uses of the area traversed by the pipeline includes four pastoral stations, though only Urala and Minderoo stations are substantially affected. There is some potential for disruptive impacts from the construction phase on stock and general management of Urala and Minderoo stations. Also, the potential effects on Urala station from dust and noise caused by construction activities, gaseous waste discharges and social impacts derived from the gas plant and permanent camp during the operational phase needed to be evaluated.

There is recognised potential for soil loss, erosion and spread of noxious weeds along parts of the pipeline route. Doral personnel, who would have responsibility for this section of the Griffin pipeline, regularly traverse the route as part of operational procedures for the Tubridgi field and any problems of this type should be quickly detected. The Environmental Protection Authority notes that there have been no reports that the construction and operation of the existing Tubridgi gas field has had environmentally significant impacts on Minderoo or Urala stations. **Nevertheless it believes that a report on the status of revegetation along the easement should be regularly compiled and submitted for the first few years of operation until the easement has fully rehabilitated.**

The Environmental Protection Authority considers that the environmental issues related to the proposal to pipe gas from the Griffin oilfield to the Dampier-Perth gas pipeline, via a gas treatment plant, are manageable. The Environmental Protection Authority has concluded that the proposal as described in the Consultative Environmental Review is environmentally acceptable and has made the following recommendations.

Recommendation 1

The Environmental Protection Authority concludes that the proposal to pipe gas ashore from the Griffin oilfield is environmentally acceptable subject to the proponents' environmental management commitments and the recommendations in this report. In reaching this conclusion, the Environmental Protection Authority identified the main environmental issues as:

- **environmental sensitivity of the preferred route for the pipeline;**
- **impacts on the prawn fishery;**
- **rehabilitation of the coastal dunes; and**
- **impacts on existing land uses.**

The Environmental Protection Authority considers that these and other issues have been adequately addressed by the proponents' environmental management commitments and the recommendations in this report. Accordingly, the Environmental Protection Authority recommends that the proposal could proceed subject to the proponents' commitments and the recommendations being applied.

Recommendation 2

The Environmental Protection Authority recommends that within three months of completion of construction of the pipeline, the proponents re-form and stabilise the coastal sand dunes to the satisfaction of the Environmental Protection Authority, in consultation with the Department of Minerals and Energy.

Recommendation 3

The Environmental Protection Authority recommends that the proponents prepare and submit an annual report for the first three years following startup to the Environmental Protection Authority on the status of revegetation of the coastal dunes and the pipeline easement, including control of noxious weeds on the pipeline easement, to the satisfaction of the Environmental Protection Authority.

1. Introduction

BHP Petroleum Pty Ltd, as operator for the Griffin Project Venturers, proposes to develop the Griffin oilfield, which is located 68km offshore from Onslow. The oilfield will be developed using a floating production, storage and offloading facility (FPSO) and both oil and gas will be produced. The gas will be recovered and transferred to the mainland via a submarine and onshore pipeline to a gas treatment plant and then on to the Dampier-Perth gas pipeline which is managed by the State Electricity Commission of Western Australia.

BHP Petroleum Pty Ltd and Doral Resources N.L., as operators for the Griffin Project Venturers and Tubridgi Project Venturers respectively, are co-proponents of the proposal. BHP Petroleum is the proponent for the part of the proposal comprising the submarine gas pipeline, the onshore pipeline up to the gas treatment plant, the gas treatment plant and the LPG pipeline. Doral Resources is the proponent for the pipeline from the gas treatment plant to the Dampier-Perth gas pipeline.

The proposal was assessed at the level of Consultative Environmental Review which the proponents prepared and released for a four week period for public and government agency comments which closed on 30th November 1992 (Griffin Gas Pipeline Development, 1992). Nine submissions were received and the issues and questions raised were summarised and submitted to the proponents for their response. The proponents subsequently provided a response to issues and a consolidated list of environmental management commitments (Appendices 1 and 2). A list of those who provided submissions is contained in Appendix 3.

The gas pipeline traverses Commonwealth and State waters and approvals from both Commonwealth and State agencies are required for the proposal to proceed. The Western Australian Environmental Protection Authority is assessing the part of the proposal in State waters and onshore.

Guidelines for a Consultative Environmental Review which covered the entire proposal were developed in consultation between the Commonwealth Environment Protection Agency and the Western Australian Environmental Protection Authority. The Commonwealth Department of Primary Industries and Energy declined to designate the part of the proposal in Commonwealth waters under the Commonwealth Environment Protection (Impact of Proposals) Act 1974.

2. The proposal

The objective of the proposal is to transport gas from the Griffin oilfield via a submarine and onshore pipeline to a gas treatment plant near to the existing Tubridgi gas field and then on to the State Electricity Commission of Western Australia's Dampier-Perth gas pipeline. The components of the proposal are a submarine pipeline, an onshore pipeline to the gas plant, the gas treatment plant and a pipeline from the plant to the Dampier-Perth gas pipeline. A small LPG pipeline to a loading facility near the Onslow main road is also part of the proposal.

The oil that will also be produced at sea will be stabilised and stored aboard the floating production, storage and offloading facility for periodic collection by tankers. This aspect of the proposed development does not form part of the assessment because it is situated outside State waters.

It is proposed that the submarine pipeline from the floating production, storage and offloading facility traverses the outer continental shelf to the coast, coming ashore just south of Rocky Point, west of the mouth of the Ashburton River (Figure 1). The pipeline would be stabilised on the sea floor by either burying it, weighing it down or by rock bolting it to the sea floor. The gas pipeline would have provision for two tie-ins for any future pipelines and these would be located near the floating production, storage and offloading facility and about 20km closer to shore, though still on the outer continental shelf.

The proposed onshore pipeline crosses the coastal dunes and salt flats along a new pipeline easement to the Tubridgi 5 gas well and then follows the existing easement to the proposed gas treatment plant near to where four Tubridgi gasfield pipelines converge (Figure 2). The pipeline would be buried to a depth of at least 1.2m.

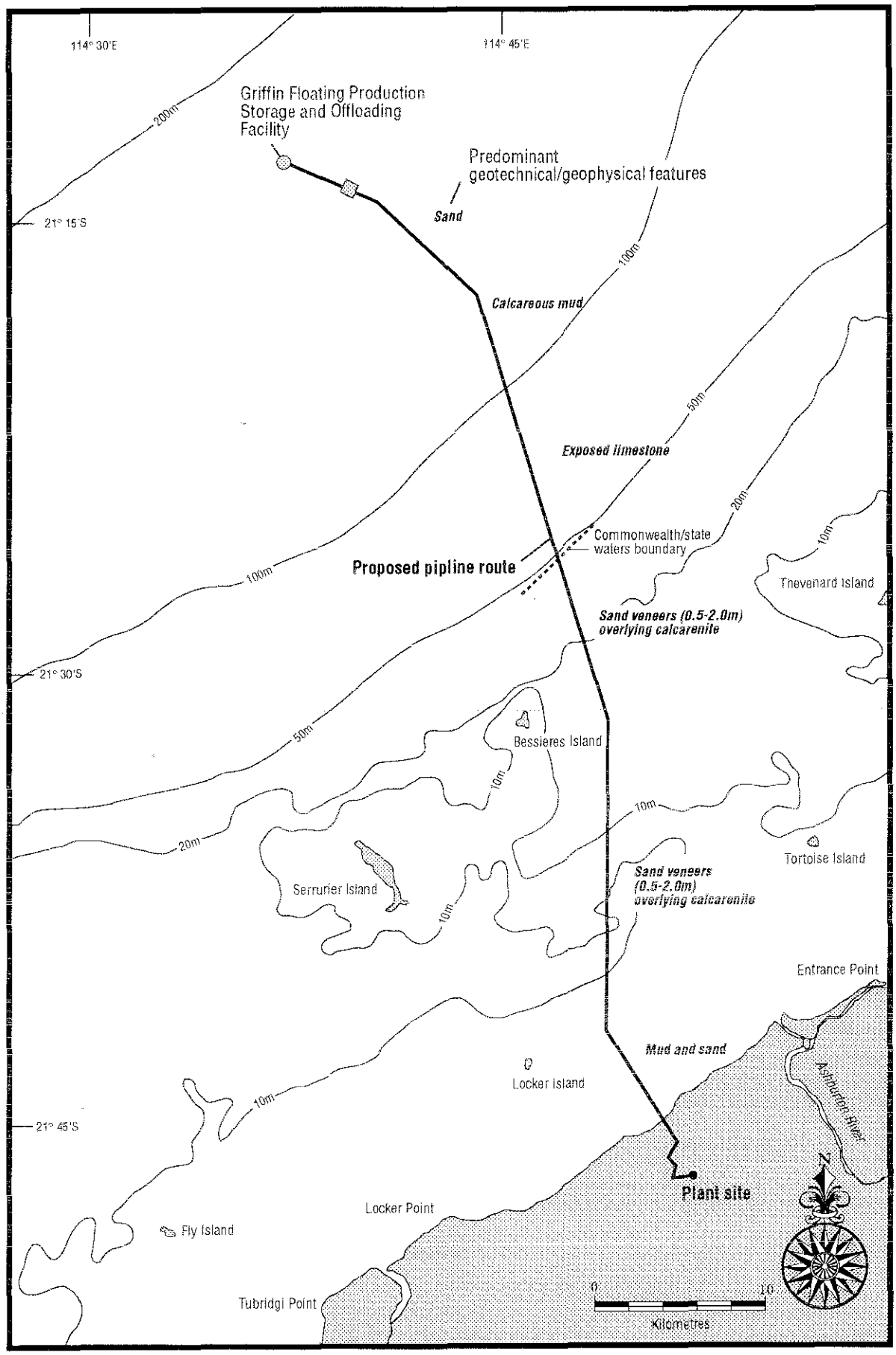

Figure 1: Proposed pipeline route offshore

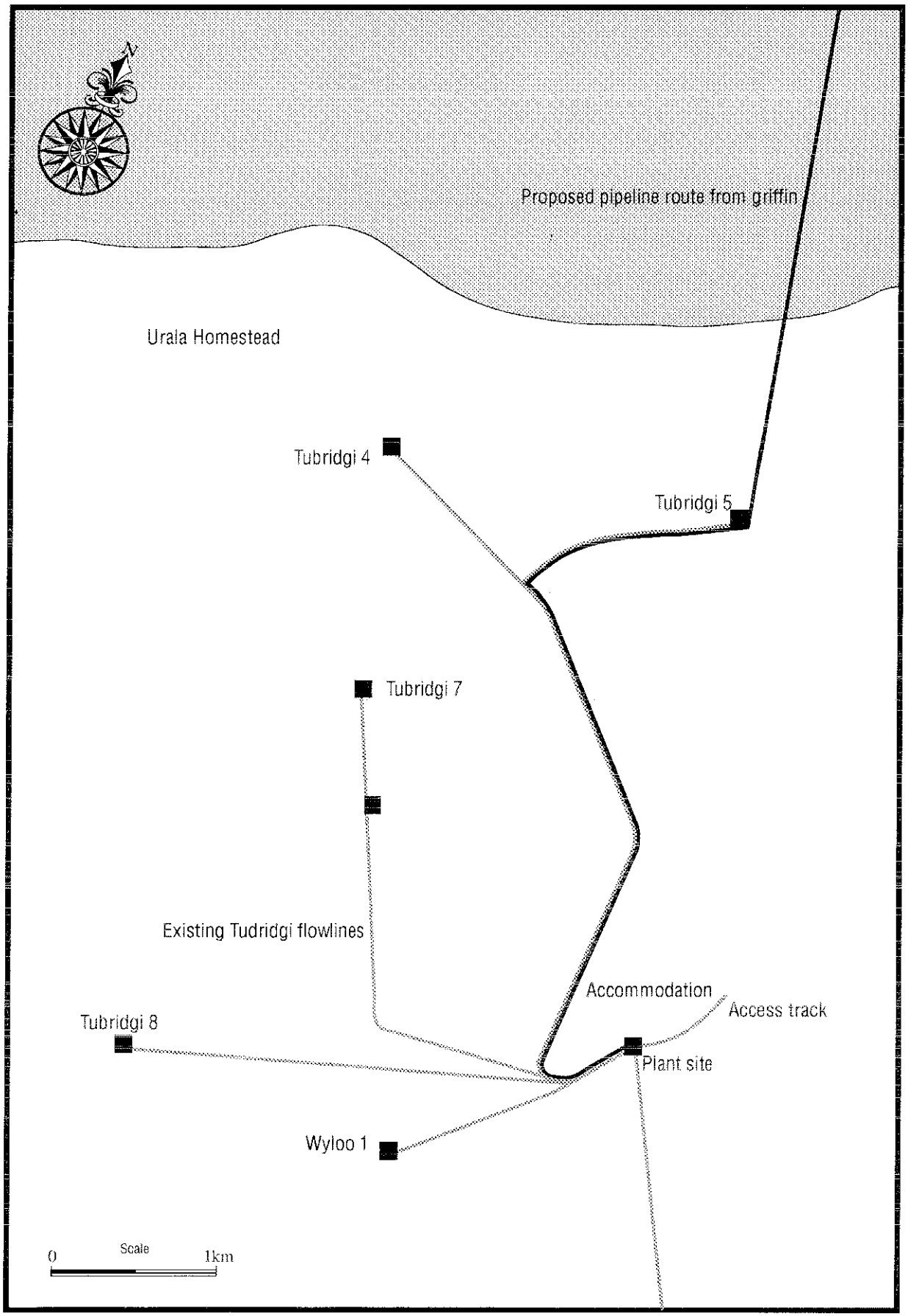

Figure 2: Onshore pipeline route

The proposed gas treatment plant covers 2.4ha in the vicinity of the existing Tubridgi gas plant, which is unable to treat the Griffin gas. A permanent camp for the operators of the gas treatment plant would be established near to the treatment plant. This would accommodate approximately five workers normally but up to 20 for shut down and maintenance operations. A small pipeline of about 8cm diameter would be constructed for the transport of LPG to a loading facility near to the Onslow Road about 20km away.

The above components of the proposal are the responsibility of BHP Petroleum. Doral Resources is responsible for the construction and operation of a pipeline from the gas treatment plant to the Dampier-Perth gas pipeline. This pipeline would be alongside the existing Tubridgi gas pipeline and involve the disturbance of an additional 5m of land outside of the existing easement (Figure 3). The new pipeline would be about 87km long and the construction would be carried out between July and October 1993 in an attempt to minimise disruption to the mustering season and to avoid wet weather as much as possible.

A more complete description of the proposal is contained in the Consultative Environmental Review.

3. Existing environment

The Griffin oilfields are located on the outer continental shelf where the seabed consists of a relatively thick blanket of carbonate sediments composed mainly of the skeletal debris of marine invertebrates, such as foraminifers, molluscs, bryozoans and corals. Water depths are greater than 30m and the benthic biota are not well described but are generally regarded as being relatively depauperate in diversity and abundance compared with the benthic biota of the inner continental shelf.

A substantial amount of information about the marine environment of the inner continental shelf (Rowley Shelf) has been accumulated in recent years because of oil industry activity in the area. The principal habitats through which the pipeline would run consist of islands, coral reefs, sand cays, limestone outcrops, sandy pavements, intertidal sand and mud flats and subtidal gravel, sand and silt sheets originating from the Ashburton River.

The nearshore islands and coral reefs of the Rowley Shelf are important habitats which are listed on the National Estate register. Many of the islands are reserves for the conservation of flora and fauna and the others are recommended for reservation (Recommendation 9.7, Environmental Protection Authority 1975). Most of the islands are encircled by coral reefs and other coral reefs occur across the Rowley Shelf.

The environments of the preferred submarine pipeline route consist mainly of the flatter pavements which are covered to various depths with a number of sediment types. These are described in the Consultative Environmental Review. The preferred route avoids the coral reefs.

The terrestrial environments of the onshore pipeline route consist of coastal dunes, salt flats, sand plains, alluvial plains, river, grasslands and inland dunes. The existing Tubridgi pipeline easement, along which most of the Griffin pipeline would run, traverses all these habitats except for the coastal dunes and salt flats.

The coastal dunes are dominated by *Acacia coriacea*, over a hummock grassland mainly of *Spinifex longifolius* and *Triodia pungens*. Shifting sands on the fore and secondary dunes have resulted in sporadic distribution of these species, however they are found in abundance in the stable, interdunal swales. A new species, *Stemodia sp. "Onslow"*, was discovered during botanical surveys for the pipeline route. It occurs in the interdunal swales and is regarded as rare until the extent of its distribution is known.

The salt flats are generally bare but where there is vegetation it is dominated by the salt tolerant *Halosarcia* species. The grass cover throughout the rest of the terrestrial environment consists mainly of *Triodia* species and there is an abundance of the introduced fodder grass *Cenchrus ciliaris*.

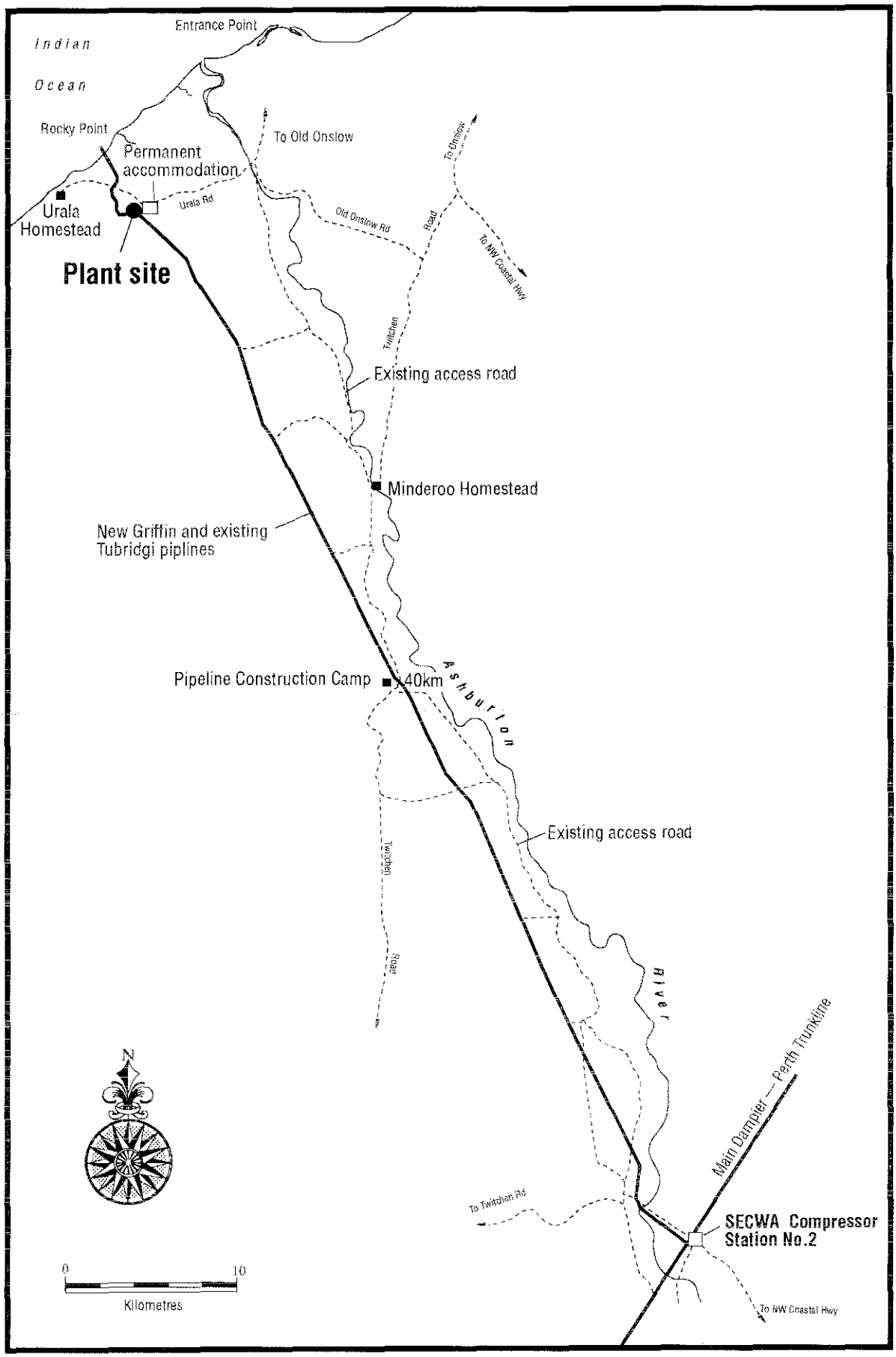

Figure 3: Proposed pipeline easement from gas plant to SECWA gas pipeline

When the vegetation survey was carried out for the Tubridgi pipeline easement an *Acacia* species described as *Acacia victoriae* was found to be common. Since then further research has subdivided this species into five new species. One species is classified as a Priority Species, *Acacia glaucocaesia* and further botanical surveys have been carried out by the proponents to determine its extent so that it can be protected during the construction of the pipeline.

The presence of both common and rare fauna along the onshore pipeline route was evaluated by the proponent and it was concluded that no species of fauna was known to be restricted to the pipeline route. The proponents report that there have been recent recordings of the rare Pebble-mound Mouse in the vicinity of the southern portion of the pipeline route.

The proponents have identified the existing human uses of the marine and terrestrial environments which potentially would be impacted by the proposal. The existing human uses in the vicinity of the offshore pipeline route are commercial fishing, recreation and oil exploration. Currently human uses along the onshore pipeline route centre around pastoral activities. Four pastoral stations are affected. They are Urala, Minderoo, Yanrey and Nanutarra, though only Urala and Minderoo are affected to any significant extent.

The proponents also carried out archaeological and ethnographic investigations, discussed the conservation values of the area, identified the noxious weeds and provided information on the socio-economic environment of the region. A description of these and all the above aspects of the existing environment is contained in the Consultative Environmental Review.

The proponents have committed to carry out further detailed surveys during the construction phase, to avoid disturbance to sensitive components of the environment, to monitor the effects of the proposal and to rehabilitate the disturbed areas of the environment.

4. Environmental issues and management

Public and government agency submissions on the proposal were generally satisfied with the information presented in the Consultative Environmental Review. A few submissions raised some environmental issues and points of clarification to which the proponent responded (Appendix 2). The Environmental Protection Authority considers that the main environmental issues relating to the proposal were:

- environmental sensitivity of the preferred route for the pipeline;
- impacts on the prawn fishery;
- rehabilitation of the coastal dunes; and
- impacts on existing land uses.

4.1 Preferred route for the pipeline

The preferred route for the pipeline was chosen by the proponent following an evaluation of the marine environment along four possible routes from the Griffin oilfield and an evaluation of the terrestrial environments where the pipeline would be brought ashore. Environmental considerations dictated that the obvious destination of the new pipeline was the Tubridgi 5 gas production well so that the pipeline could then follow the existing pipeline easement.

The marine environments of the outer continental shelf (deeper than 30m) were not examined in detail because they are known to be relatively depauperate in biological terms and the impacts of laying a pipeline on the deep seafloor are considered environmentally insignificant. The marine environments of the inner continental shelf are designated a Special Protection Locality based on the sensitivity of the marine resources of the area to oil spills (DCE Bulletin 104, 1984). The proponents examined the environments of the Rowley Shelf and provided detailed information in the Consultative Environmental Review.

The nearshore islands and coral reefs of the Rowley Shelf are an important habitat which is listed on the National Estate register. Many of the islands are reserves for the conservation of flora and fauna and for recreation. The other islands are recommended for reservation (Recommendation 9.7, EPA, 1975). The coral reefs of the area have been mapped previously, when it was found that no major coral reefs occur off the mainland coast between Tubridgi Point and Onslow. However, isolated outcrops of limestone platforms with some coral cover

are present close to the mainland offshore from Urala Station. The pipeline route was chosen to avoid the islands and the coral reefs.

The marine environments of the inner continental shelf (30m isobath to the coast) which would be impacted by the pipeline were examined by the proponents' environmental consultants. It was concluded that the two most sensitive environments are the sand veneered or bare limestone pavement which support the greatest abundance and variety of macroflora and the sheets of white, carbonate sands which support sparse, though extensive, seagrass meadows.

The preferred route was chosen to avoid the biggest and biologically richest tracts of limestone pavement and also proposes the shortest route across the sand sheets to minimise the impact on the sparse seagrass meadows. The meadows consist of *Halophila* and *Halodule* species which readily colonise disturbed areas and the impact of placing the pipe would only be short-lived.

The terrestrial environments of the coastal region where the pipeline would come ashore consist of coastal sand dunes backed by bare salt flats. The preferred route traverses 1.3km of these two environments and has been chosen to avoid Aboriginal archaeological sites, rare flora species and possible disturbance to pastoral activities. Both the coastal dune and salt flat environments are extensively represented along the Pilbara coast.

A point raised in submissions related to the treatment of rare and priority flora which might be encountered along the proposed route. In response, the proponents have surveyed the entire pipeline route for *Acacia glaucocaesia* and it appears that no specimens were identified. The 'rare and poorly known' species *Stemodia* has been shown to occur frequently in the coastal portion of the pipeline route. The proponents have said they would avoid dense stands of it wherever possible and regeneration trials would be conducted so as to be able to replant any areas which have to be removed during the pipelaying operation.

The Environmental Protection Authority has concluded that the proponents have carried out adequate physical, biological, archaeological and other investigations of the environment which would be impacted by the proposal and has concluded that the construction of the pipeline along the preferred route would have an acceptably low environmental impact on the marine and terrestrial environments of the region. The Environmental Protection Authority notes that minor deviations of the route may be necessary during construction to avoid sensitive environmental components based on further site specific information which will be collected during the detailed survey of the route.

4.2 Impacts on the prawn fishery

The prawn fishing season is between April and mid-November and the planned construction period is from August to October to avoid the cyclone season and the coral spawning season. Hence, there would potentially be some disturbance to the fishing industry though at any time the area affected by construction activities is small compared to the area of the fishery. The environmental implications of the construction activities are related to the disturbance of the substrate, the prawn stock and the food chain components which the prawns rely on.

The area of substrate which would be disturbed during construction is about 0.5km^2, which is about 0.05% the area of the Onslow prawn fishery. The effect would be temporary because the pipeline would be buried and the Environmental Protection Authority considers that the impact would be environmentally insignificant.

The effects on the prawn stock and the food chain components from the turbidity and other disturbance during pipeline construction would be similar to the impacts from the existing prawn trawling operations and natural events such as floods and cyclones. Because of the temporary nature and limited extent of the pipeline construction activities, the Environmental Protection Authority considers that the impact would be environmentally insignificant.

The proponents propose to bury the pipeline through the fishing zone so that there would not be any long term alienation of the fishing grounds currently available to the fishing fleet. The Western Australian Fishing Industry Council, on behalf of the Onslow and Exmouth Gulf Prawn Fisheries, has had discussions with the proponents which resulted in a commitment by the proponent that if burial is not practical, arrangements will be made with any affected fishermen for a 500m exclusion zone. These arrangements would be to the requirements of the

Minister for the Environment and should possibly include appropriate compensation if it is reasonably shown that the exclusion zone has had an adverse impact on prawn catches.

The Environmental Protection Authority has concluded that there would be an insignificant environmental impact on the prawn fishery from the construction activities and that the issue of possible alienation of fishing grounds has been adequately addressed by the proponents' environmental management commitment.

4.3 Rehabilitation of the coastal dunes

The coastal section of the pipeline crosses 1km of coastal dunes and 300m of salt flats before reaching the existing easement at Tubridgi 5. The vegetation of the dunes is fragile and the dunes are vulnerable to erosion. A new flora species, *Stemodia sp. "Onslow"*, was discovered during surveys for the pipeline route and although locally abundant, it is being considered rare until further research is done on its distribution. Also, the Department of Conservation and Land Management indicated that further surveys for a Priority Species, *Acacia glaucocaesia*, possibly mis-identified during route surveys as *A. victoriae*, should be conducted. The proponent has previously attempted to carry out further surveys but was unable to because of wet weather. The proponent has since conducted the surveys and will use the results to plan the route and the rehabilitation to protect the species.

A cleared width of up to 60m may be required through the coastal dunes because of the need to stabilise the sides of the cutting through the dunes. The proponents would attempt to minimise the width of the clearing and have developed a generalised rehabilitation plan but have indicated that site specific techniques would need to be developed during the construction phase. The proponents have committed to carrying out further investigations and surveys during the construction phase which would assist in refining the rehabilitation techniques.

Rehabilitation of parts of the coastal dunes was carried out during the development of the Tubridgi gas field with good initial results. However, this rehabilitation did not involve the foredunes area which is exposed to greater erosive forces and the Environmental Protection Authority considers that special measures may be required to ensure the long term success of the rehabilitation of the foredunes. These could include the stockpiling of brush during initial clearing along the length of the route to provide sufficient material to stabilise the re-formed dune sand by brush matting. Hardy pioneer species which readily colonise bare sand are typical of this area and should re-establish rapidly provided the sand is stabilised. The preferred pipeline route is about the shortest possible route from the coast to Tubridgi 5 well.

The Environmental Protection Authority has concluded that the proposed onshore route minimises the disturbance to the coastal dunes and salt flats and has recommended that the rehabilitation of the coastal dunes be to the requirements of the Environmental Protection Authority in consultation with the Department of Minerals and Energy.

4.4 Impacts on existing land uses

The proposed pipeline traverses four pastoral stations, though only Urala and Minderoo stations are substantially affected. There is some potential for disruptive impacts from the construction phase on stock and general management of Urala and Minderoo stations. Also, the potential effects on Urala station from dust and noise caused by construction activities, gaseous waste discharges and social impacts derived from the gas plant and permanent camp during the operational phase are evaluated below.

The construction of the new pipeline along an easement of 1.3km and the disturbance of the existing pipeline easement from Tubridgi 5 to the Dampier-Perth pipeline (a total distance of 91.7km) would involve a restriction of access for the pastoralists, the temporary loss of fodder for stock and some restriction of land use over the pipeline easement for the life of the pipeline.

During construction, up to 5km of trench would remain open for up to two weeks at a time, thereby restricting access for the pastoralists. The proponents would provide strategically located cross-overs and breaks in the line of strung pipe which should ensure access is not unduly restricted. The proponents have committed to discussing these measures and any others considered necessary by the pastoralists during the construction programme.

The Environmental Protection Authority considers that the temporary, disruptive impacts during the construction phase can be managed to an acceptably low level of impact on pastoral activities.

The temporary loss of fodder grasses to the clearing of the pipeline easement would, for example, involve an area of 0.05% of Minderoo station which is the station most affected. Considering that the loss of fodder grass would be only temporary and that it covers such a small proportion of the stations, the Environmental Protection Authority considers that the impact is environmentally insignificant.

As with the original pipeline easement for the Tubridgi gas there is some potential for soil loss and erosion along parts of the route unless proper attention and prompt remediation occurs, particularly after heavy rains. Also, the route could become a vector for the spread of noxious weeds, particularly *Mesquite*. As the easement is regularly traversed by the pipeline operators as part of operational procedures, any problems of this type should be quickly recognised and fixed.

The Environmental Protection Authority believes that a report on the status of revegetation along the easement should be regularly compiled and submitted to the Environmental Protection Authority and that the proponents should liaise with the Agricultural Protection Board to determine the most effective way to deal with *Mesquite*.

The restriction of land use over the pipeline easement relates to the prohibition of any activities which may damage the pipeline and applies for the life of the pipeline. Because of the negligible proportion of the stations to which the restriction applies (less than 0.05% of Minderoo station), the Environmental Protection Authority considers that the impact is environmentally insignificant.

The proposed gas treatment plant is about 5km from Urala Station homestead. At that distance the Environmental Protection Authority considers that the potential effects on Urala station of dust and noise caused by construction activities and noise and gaseous waste discharges from the gas treatment plant could be managed to be environmentally insignificant. The Environmental Protection Authority would not be licensing the gas treatment plant under Part V of the Environmental Protection Act because it is not a prescribed premise. At the request of the Environmental Protection Authority the Department of Minerals and Energy will require an annual report from the proponent to record the annual quantity of waste gases emitted if the proposal is approved.

The social impacts on Urala station from the permanent camp relate mainly to the possible off-duty activities of the workers. The proponents have indicated that the workers at the permanent camp would have limited free time, would be provided with on-site activities and would be restricted in their access around the station according to the landowner's requirements. Under these circumstances the potential social impacts appear to be minor.

The Environmental Protection Authority notes that there have been no reports that the construction and operation of the Tubridgi gas field has had environmentally significant impacts on Minderoo or Urala stations. **The Environmental Protection Authority concludes that the construction and operation of the Griffin onshore gas pipeline and gas treatment plant should be able to be managed to have an acceptably low environmental impact.**

4.5 Other issues

Other issues raised in submissions or arising during the assessment process related to protection of Aboriginal archaeological sites, use of *Cenchrus ciliaris* in rehabilitation, impact of pipeline construction on seagrass meadows, applicability of Australian Quarantine and Inspection Service guidelines on tanker ballasting and the preferred option for the transport of LPG from the gas treatment plant to market.

The proponents have consulted extensively with the Aboriginal community to ensure the pipeline route avoids sensitive archaeological sites and the proponents are also committed to complying with the Aboriginal Heritage Act 1972.

With regard to the use of *Cenchrus ciliaris* in rehabilitation, the proponents have indicated that the area where they propose to use the grass for rehabilitation is already extensively vegetated with the grass. Under these circumstances there is no point in attempting to use native grasses because they would be outcompeted by the surrounding grasses. Earlier pipeline emplacement work in the area saw the development of bulldust patches. Rapid and complete rehabilitation in these areas is important so as to effectively stabilise disturbed areas to prevent erosion and soil loss (see 2.2 in Appendix 2). *Cenchrus ciliaris* offers the best prospect for rapid rehabilitation.

The proponents have reported that the main species of seagrasses in the meadows affected by pipelaying are *Halophila* and *Halodule* which have the ability to colonise new or disturbed areas. Hence, it is expected that disturbance of the sparse seagrass meadows will be only temporary and minor in impact and scale compared to events such as cyclones and regular prawn trawling. The proponents estimated that less than 0.17km^2 would be disturbed by the pipelaying out of a total of 130km^2 in the vicinity or 0.13% of the total.

With regard to the use of Australian Quarantine and Inspection Service guidelines on control of exotic organisms, the proponents have indicated that they would use these guidelines as appropriate within the 12 nautical mile limit. Otherwise the International Maritime Organisation guidelines are applicable.

The proponents indicated that the option of a small LPG pipeline from the gas treatment plant to a loading facility near the main Onslow Road is being investigated and that details of the construction and operation programme would be provided shortly. Details would include an environmental management programme based on an assessment of the impacts of the construction of the pipeline on the environment of the preferred route. The Environmental Protection Authority will assess the environmental significance of the detailed proposal at that time.

5. Conclusions and recommendations

The Environmental Protection Authority considers that the environmental issues related to the proposal to pipe gas from the Griffin oilfield to the Dampier-Perth gas pipeline via a gas treatment plant are manageable and has concluded that the proposal as described in the Consultative Environmental Review is environmentally acceptable.

The issues which were raised in the nine submissions and during the Environmental Protection Authority's assessment of the proposal have been adequately addressed by the proponents' response to issues and their environmental management commitments. Accordingly, the Environmental Protection Authority considers that the proposal could proceed if the following recommendations were applied:

Recommendation 1

The Environmental Protection Authority concludes that the proposal to pipe gas ashore from the Griffin oilfield is environmentally acceptable subject to the proponents' environmental management commitments and the recommendations in this report. In reaching this conclusion, the Environmental Protection Authority identified the main environmental issues as:

- **environmental sensitivity of the preferred route for the pipeline;**

- **impacts on the prawn fishery;**
- **rehabilitation of the coastal dunes; and**
- **impacts on existing land uses.**

The Environmental Protection Authority considers that these and other issues have been adequately addressed by the proponents' environmental management commitments and the recommendations in this report. Accordingly, the Environmental Protection Authority recommends that the proposal could proceed subject to the proponents' commitments and the recommendations being applied.

Recommendation 2

The Environmental Protection Authority recommends that within three months of completion of construction of the pipeline, the proponents re-form and stabilise the coastal sand dunes to the satisfaction of the Environmental Protection Authority in consultation with the Department of Minerals and Energy.

Recommendation 3

The Environmental Protection Authority recommends that the proponents prepare and submit an annual report for the first three years following startup to the Environmental Protection Authority on the status of revegetation of the coastal dunes and the pipeline easement, including control of noxious weeds on the pipeline easement, to the satisfaction of the Environmental Protection Authority.

The Environmental Protection Authority's experience is that it is common for details of a proposal to be refined or to change during the detailed design and construction phases. In many cases the alterations are not environmentally significant or actually have positive effects on the environmental management of the project. The Environmental Protection Authority considers that such non-substantial changes should be provided for in the environmental conditions issued by the Minister for the Environment.

The Environmental Protection Authority also considers that any approval for the proposal based on this assessment should be limited to five years. Therefore, if the proposal has not been substantially commenced within five years of the date when the Environmental Conditions are issued, then such approval should lapse. After that time, further consideration of the proposal should only occur following a new referral to the Environmental Protection Authority.

References

Conservation Reserves for Western Australia, as recommended by the Environmental Protection Authority, 1975. Systems 4, 8, 9, 10, 11, 12.

Department of Conservation and Environment, 1984. Bulletin 104. Procedures for the Protection of the Western Australian Marine Environment from Oil Spills. Griffin Gas Pipeline Development, Consultative Environmental Review, 1992. BHP Petroleum Pty Ltd and Doral Resources N. L. Volumes 1 and 2.

Appendix 1

BHP Petroleum Pty Ltd and Doral Resources N. L.

Environmental management commitments

SUMMARY OF COMMITMENTS

Overview

The Griffin gas pipeline development will be undertaken by the proponents (i.e. BHP Petroleum Pty Ltd and Tubridgi Project Venturers) using the design criteria, construction methods and management actions as described in the Consultative Environmental Review (LeProvost Environmental Consultants and Astron Engineering, 1992) and summarised below. The proponents are committed to undertaking the project in a manner that will maximise the safety of operations, the health of the workforce, and the protection of the environment.

Offshore Pipeline - BHP Petroleum Pty. Ltd.

1. The offshore pipeline will be installed along the preferred route, and therefore no pipe-laying activities will be carried out within 1.2 km of islands and major coral reef areas.

2. The offshore pipeline will avoid traversing isolated limestone platform reefs near the mainland coastline.

3. An Emergency Response Plan (incorporating a cyclone contingency plan as appropriate) will be implemented for the pipelay fleet and for normal operations.

4. An Oil Spill Contingency Plan for the Griffin oil fields development will be submitted to Government for approval. The Emergency Response Plan for the construction phase will address oil spills.

5. The beach site used to pull the offshore pipeline on to the mainland shore will not exceed an area of 150 m x 150 m on the toe of the foredune.

6. Prior to, and during, offshore construction activities liaison will be undertaken with local fishermen. Reasonable efforts will be made to bury the pipeline where it crosses the Onslow Area 1 fishing grounds, so that present prawn trawling activities can continue. Should burial not be practical for environmental or technical reasons, discussions will be held with potentially affected fishermen to determine arrangements for a 500 m exclusion zone.

7. It is intended that seawater used to hydrotest the offshore pipeline will be discharged in deep water, i.e. at the FPSO end of the pipeline.

8. A marine monitoring programme (covering routine operational procedures, sediment plume monitoring, and corals colonising nearshore limestone reefs near the mainland coast) will be designed in consultation with and implemented to the requirements of the EPA prior to the start of offshore construction activities. Results from the marine monitoring programme will be made available to the EPA and any interested members of the public at the end of the construction period.

9. When the Griffin development is finally complete, operations finished and abandoned, in accordance with the requirements of WADME and the gas pipeline is no longer required it will be flooded with seawater, plugged and abandoned.

Onshore Pipeline - BHP Petroleum (Shoreline to gas treatment plant)
Tubridgi Project Venturers NL (Export pipeline)

10. Disturbance to flora, fauna and landform will be minimised by utilising previously disturbed areas wherever practical, and by ensuring easement widths are kept as small as is practically, and safely, possible.

11. A set of environmental rules and regulations will be established for education of all those involved on site including the onshore construction workforce (penalties will be applied to any contractor who breaks these regulations).

12. The entire onshore pipeline route will be rehabilitated using the methods as detailed in Section 8.3 of the Consultative Environmental Review.

13. Dune disturbance and erosion will be minimised by (a) allowing the pipeline to follow the existing topography, (b) erecting temporary fences to keep vehicles, equipment and workforce within 60 m of the centreline of the pipeline corridor, and (c) rehabilitating the pipeline corridor to its original condition or better, wherever possible.

14. The pipeline trench across the dunes will not be allowed to intersect known freshwater aquifers that are used for pastoral operations. If an accidental breach occurs, it will be isolated from the excavation and water purity monitored.

15. The onshore gas pipeline will be installed along existing easements between Tubridgi gas well No. 5 and the proposed gas plant, and between the gas plant and SECWA's Dampier-Perth gas pipeline.

16. Clearing of vegetation and disturbance to landforms will be done such that adequate drainage remains available to the remaining vegetation and rehabilitated areas during both the construction and operational phases.

17. Prior to construction, a survey of the existing onshore pipeline easement will be undertaken to identify any erosion areas that may have occurred, and measures will be implemented to prevent their re-occurrence.

18. Erosion and rutting of soils along vehicular tracks during the construction phase will be minimised by undertaking regular track inspections and maintenance.

19. Pipeline route inspections by operators will occur at approximately two-monthly intervals.

20. Erosion will be managed by spreading gravel, constructing furrows and placing rocks and rip-rap as required.

21. Erosion of new work (e.g. unvegetated areas) by natural flood events will be made good, and improved drainage provided. This includes the repair of any rain-induced erosion during the construction or operational phases, which will be undertaken as soon as possible after it occurs.

22. Areas where soil compaction has occurred will be ripped at the end of the construction phase to promote re-vegetation.

23. The river bank at the pipeline crossing will be reinstated to its original contour, and erosion prevented by moonscaping, rock gabions, sheet piling or seeded mesh mattresses. River banks will be seeded with *Cenchrus ciliaris*.

24. Clearing of dense stands of *Eucalyptus coolabah* and *Grevillea* spp. will be avoided.

25. Any accidental fuel or lubricating oil spillage causing soil pollution will be treated by removing the contaminated soil for burial at an approved land fill site.

26. Naked flames will be banned during periods of high fire risk, and the importance of fire prevention will be incorporated into the environmental education of the construction workforce.

27. Fire-fighting equipment will be available during construction.

28. Surface waters will be monitored for any undesirable effects, and if surface water supplies are used during the construction period, any accidental damage to the banks of rivers or pools will be rectified, if necessary by hand.

29. Any aboriginal relics discovered during the work will be treated in accordance with the *Aboriginal Heritage Act* 1972. Potential accidental damage to known or unknown Aboriginal sites will be minimised by secrecy and workforce education.

30. If a borrow pit is required, it will be located at a site agreed to by local pastoralists after appropriate Government approval has been obtained, and the borrow pit will be managed.

31. Construction and operations activities relevant to the use of the land as a pastoral lease will be discussed with the leaseholder. In particular, approval from the landholder and advice from environmental consultants will be sought if any water from bores is required in the onshore section of the pipeline.

32. Any accidental damage to pastoral station property (e.g. fences, wells, outbuildings) will be rectified and appropriate compensation paid.

33. Hydrotest water requiring disposal near the gas plant site will be allowed to evaporate within a suitable low lying area.

34. The onshore pipeline will be not be exhumed as part of normal operations (routine maintenance is not required and inspections will be internal.

35. Firearms and pets will be banned from all construction camps.

36. At the end of the project the pipeline will be left in situ to minimise disturbance. All surface facilities will be removed.

37. A monitoring program will be implemented for construction and operations. It will involve compliance monitoring to ensure that environmental requirements are adhered to and biological monitoring to determine the success of rehabilitation.

Gas Plant - BHP Petroleum Pty. Ltd.

38. Destruction of flora, fauna and landform will be minimised by ensuring the gas plant site is kept as small as is practically, and safely, possible. As far as practical it will be located to minimise impact on significant archaeological and environmentally sensitive areas. Any aboriginal relics discovered during the work will be treated in accordance with the *Aboriginal Heritage Act* 1972.

39. Apart from domestic greywater and sewage, all liquid and solid wastes produced at the gas plant will be transported by road for disposal at approved land-fill sites or for recycling.

40. The sewage treatment facility and septic tank at the gas plant site will be sufficiently big enough to cope with domestic wastes produced during both the construction and operation periods.

41. Flaring at the gas plant will be minimised by efficient plant design and by ensuring that operational and maintenance procedures are maintained at a high standard.

42. Noise levels will be kept below 85 dB(A) at 1 m from all ground level equipment, and below 75 dB(A) at 100 m from the plant boundary. Noise monitoring will be undertaken prior to construction, during construction and during operation of the gas plant.

43. All wastes and discharges will be managed as detailed in the Consultative Environmental Review.

44. All tanks and vessels that contain liquids will be bunded.

45. At the end of the project the gas plant will be decommissioned, dismantled, and demobilised.

46. Construction and operations will be monitored by the Operator to ensure compliance with environmental obligations.

47. All personnel employed on the project will be educated about the environmental management requirements for the operation.

48. Firefighting facilities will be available during construction and within the plant boundary during operation.

49. Construction work on Urala station will be scheduled to minimise the impact on station activities as far as possible.

Appendix 2

BHP Petroleum Pty Ltd and Doral Resources N. L.

Response to issues raised in submissions

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Telex AA37958
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30th December, 1992

BHP Petroleum

Mr R.A.D. Sippe
Director Evaluation Division
Environment Protection Authority
38 Mounts Bay Road
Westralia Square
PERTH W.A. 6000

Dear Mr Sippe,

GAS PIPELINE GRIFFIN OILFIELD TO MAINLAND FACILITY NEAR ONSLOW (734)

Further to previous discussions and your letter of 7th December 1992 listing questions for our response, I enclose:

- BHP Petroleum's response to these questions for inclusion in your assessment report; and
- a modified list of commitments.

Should you have any queries please contact Jane Cutler on (03) 652 6271.

Yours sincerely,

KEITH HUNTER
MANAGER MAJOR PROJECTS

Encs.

0584.jc.sk

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RESPONSES TO ISSUES RAISED IN SUBMISSIONS

1. Rare and Priority Flora

What further surveys and specific protection measures for the identified rare and priority flora species would be necessary? The Department of Conservation and Land Management considers that further surveys of the distribution of *Acacia glaucocaesia* (and its related species) would need to be done.

A survey of the entire pipeline route has now been made for *Acacia glaucocaesia*. Its related species, namely *Acacia synchronicia* was found along the route, but no *Acacia glaucocaesia* was found. The survey involved driving the length of the route, stopping to identify the species and taking random collections for confirmation of the identification. This is currently being done by Bruce Maslin at the W.A. Herbarium. The final confirmation of the identification is not yet available but the botanist is confident that none of the specimens are *Acacia glaucocaesia*.

The 'rare and poorly known' *Stemodia* species occurs frequently in the coastal portion of the pipeline route. Dense stands of it will be avoided where ever possible. If it occurs in areas in close proximity to the construction work, it will be fenced off with star-pickets and flagging in order that vehicles and machinery do not inadvertently destroy it.

It will be trialled for regeneration success and if it is removed, the area will be revegetated (seeded or with young plants). It has appeared on the Tubridgi Gas Pipeline ROW of its own accord, however, indicating that it does successfully regenerate and therefore its population status should not be threatened.

2. Rehabilitation

2.1 What is meant by the statement that overburden in the salt flat areas will be allowed to self-stabilise?

The salt flat areas crossed by the pipeline are not generally subject to tidal flooding and algal mats are not present. Self-stabilisation refers to the backfilling of the trench which will not be compacted. A mound will be left on the surface, with occasional breaks to allow for water movement. This is not anticipated to have a significant effect on the hydrology of the salt flat areas.

2.2 The use of *Cenchrus ciliaris* is not recommended by either the Agriculture Protection Board of Western Australia or the Australian Heritage Commission; what endemic, fodder grass species are available for use on rehabilitated sites?

Generally, the use of *Cenchrus ciliaris*, being an introduced species to the area, is not recommended. In the case of the river crossing, however, seeding of that species is recommended to assist in stabilisation of bulldust. *Cenchrus ciliaris* was chosen for the following reasons:

i. It already dominates the banks on both sides of the river for kilometres in either direction from the river crossing. It is the sole grass species along the banks in the immediate vicinity and its surrounds;

ii. Bulldust which occurred during the Tubridgi gas pipeline in that area was extreme. Within 12 months, however the *Cenchrus ciliaris* had completely stabilised the entire area. It serves the purpose of both stabilising the soil, and providing fodder. A priority has to be established as to whether erosion of topsoil, is more important than seeding with an 'introduced' grass species, which already is well established and dominates the area already. Our priority is to prevent the loss of solid, nutrients and eventually landscape;

iii. Along the pipeline route there are a variety of native fodder species. However, except for the *Triodia* species, and ribbon grass, *Chrysopogon fallax*, it is doubtful that any would successfully grow on the disturbed river banks. The *Eragrostis* and *Eriachne* species that dominate the claypans along the route do not regenerate well - none have yet appeared on the disturbed ROW in those areas. The relevant *Triodia* species growing in the area, *T. lanigera* and *T. angusta* could be seeded, or runners planted but the success of these as stabilisers is doubtful. Triodia species do not seed well, their growth is rain dependent, and if runners were planted out they would rely on regular watering until they became well established. This is impractical and would result in no stabilisation at all; and

iv. When the consultants visited the Tubridgi gas pipeline river crossing at the end of construction with an EPA officer, (5 July 1991) he recommended that the area be seeded with *C. ciliaris* in order to stabilise the bulldust. The abundant *C. ciliaris* was in seed and the job could be easily done by the contractor.

In view of the above, seeding with *C. ciliaris* is the only practical solution if stabilisation is to occur. The ideal is to seed with local native grasses, but the reality is that the job of stabilising would not be accomplished if those species were chosen.

2.3 **What is the extent of any seagrass meadows which may be disturbed by the construction of the pipeline, and what special construction methods would be proposed to minimise damage?**

The patchy meadows of minor seagrass species (mainly *Halopihila ovalis*, with some *Halophila spinulosa* and occasional *Halodule uninervis*) occur on the white sandy areas which occur in the outer portion of the inner Rowley Shelf and where depths range between 7 and 16 m (refer Appendix 3 of CER, Vol 2). Where the pipeline is layed across these areas, the preferred method for pipeline stabilisation is trenching followed by natural re-burial due to rapid sediment winnowing during spring tidal currents and storms. The proposed route crosses a total of 8.2km of this habitat, and since the disturbance width of the pipelay corridor will average less that 20 m (p. 58 of CER. Vol 1), the total area that will be disturbed and temporarily disturbed will be less than 0.17 km. The pipeline route survey has

shown that, in the immediate local region (i.e. between Serrurier and Thevenard Islands), the total area where these patchy seagrass meadows occur exceeds 130 km (refer Figs 4.1 and 4.4 in Vol. 1 and Appendix 3 in Vol. 2 of CER). Thus the temporary loss in the immediate region amounts to considerably less than 0.13% of this habitat. The loss is temporary, since the seagrasses involved are termed 'pioneering species' and, unlike *Amphibilis* or *Posidonia* spp., are capable of re-colonising areas without assistance (refer p. 58 of Vol. 1 and p. 19 of Appendix 3, Vol 2 of CER). Hence no special rehabilitation measures are required or planned, and there is no need for special modification to the proposed trenching technique.

3. Workforce impact

How many personnel would be at the permanent camp at the gas plant and what social and other impacts would the camp have in the long term?

It is presently anticipated that there will be approximately five personnel at the permanent camp at the gas plant. During shut down and maintenance it is likely that numbers may reach 20 for short periods.

During working hours personnel will generally be in the vicinity of the processing facilities thus minimising disturbance to adjacent pastoral activities.

4. Location

Where is the boundary of State and Commonwealth waters in relation to the pipeline?

The State/Federal Government 'administrative boundary' comprises the outer limit of the Inner Territorial Sea, and parallels the Inner Limit of the Territorial Sea (which was enacted by Commonwealth Government in 1973) at a distance of 3 nautical miles (5.556 km). Both boundaries are shown in figure 1.

5. Other issues

A number of issues were raised which relate to the part of the pipeline and the production facility in Commonwealth waters. The Western Australian Environmental Protection Act does not apply to this part of the project and the proponent is not obliged to respond to the issues. However, the Environmental Protection Authority considers that the proponent should take the issues into account in developing its environmental management strategy for the entire project, and provide an appropriate response.

5.1 Are proposed International Maritime Organisation guidelines on discharge of ballast waters in accord with the Australian Quarantine and Inspection Service guidelines, which have been in place since February 1990, and would the proponent be utilising the AQIS guidelines?

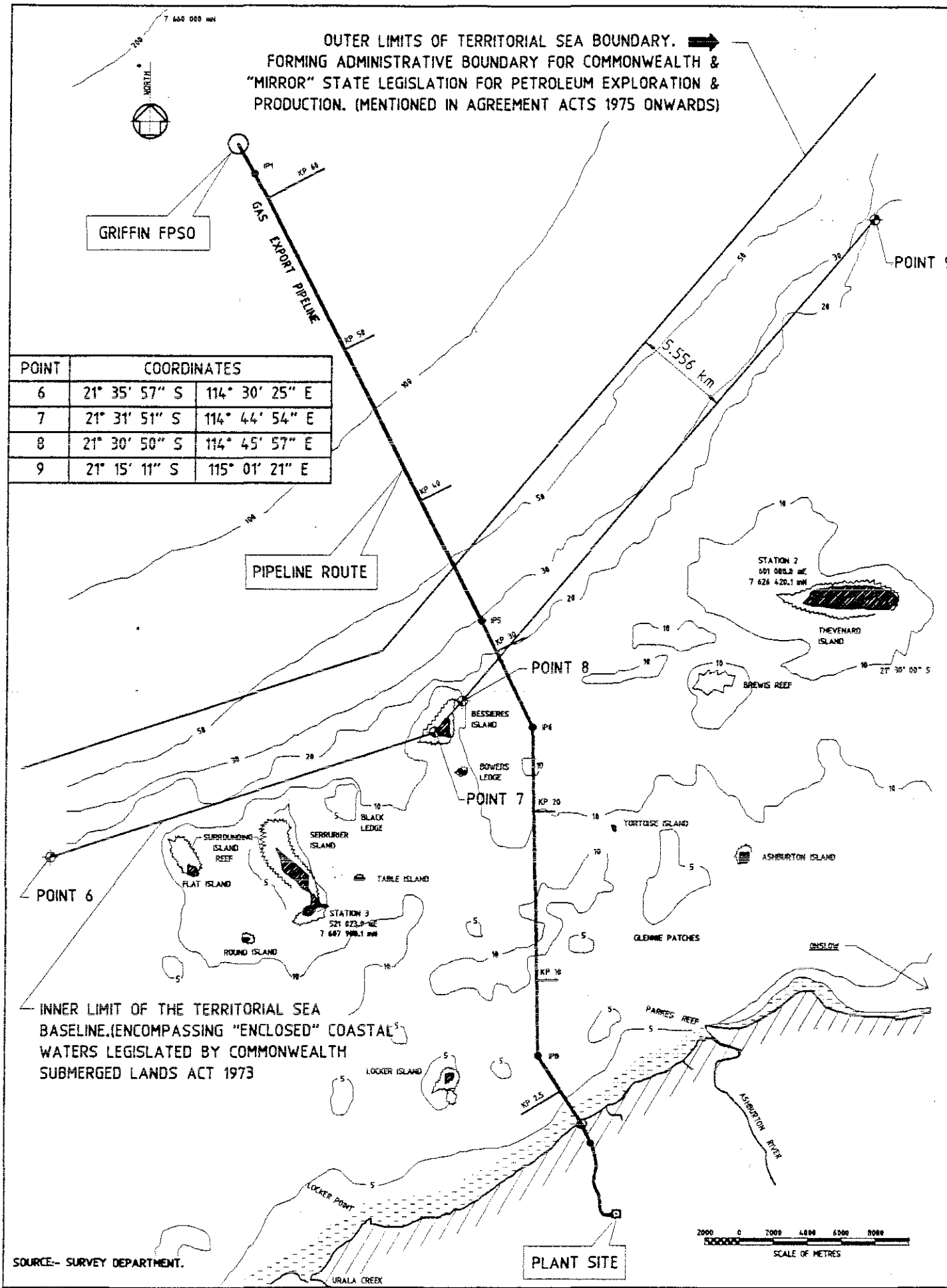
As indicated in Section 3, Appendix 2 of the Consultative Environmental Review ballast water discharges are unlikely to be a problem in the vicinity of the Griffin development. The Griffin facilties are outside the 12 nautical mile limit covered by AQIS guidelines. As a matter of course, BHP Petroleum will adopt relevent international measures which might be adopted by the International Maritime Organisation (IMO) to manage ballast water.

5.2 Is the proponent proposing to collect biological and oceanographic information to confirm its view that no significant difference in biological habitat would develop between the floating production, storage and offloading facility (FPSO) and a fixed platform?

The proponent has not expressed a view *"that no significant difference in biological habitat would develop between the floating production, storage and offloading facility (FPSO) and a fixed platform"* as implied by question 5.2 (see appendix 1 in Vol. 2 of CER), and the proponent has no plan to confirm that certain biological habitat parameters will differ significantly between the two types of facility. Clearly it would be easy to demonstrate several, if not many, statistically significant differences among parameters for a FPSO and fixed platform. One obvious source of these differences arises from the fact that, in the 20 - 100 m depth range, a fixed platform would provide considerably more surface area that would become colonised by fouling organisms. Nevertheless, both types of facility produce artificial reef habitats (including the attraction of fish) due to the amount of seafloor structure at the 120-130 m depth range (refer figure 1.2 of FPSO in Vol of CER), and both types of facility will provide 'haven' areas for commercially fished pelagic and benthic biota owing to the marine safety zone.

5.3 Has the proponent evaluated the potential impacts of an oil spill in offshore areas on feeding seabirds and turtles as well as any potential effects on egg larvae populations of fish and crustacean? These factors relating to offshore biological communities should be considered by an oil spill contingency plan.

The potential impacts of an oil spill on offshore biological communities (including seabirds, turtles and zooplankton) will be considered during the development of the Oil Spill Contingency Plan for the Griffin oil fields.



POINT	COORDINATES	
6	21° 35' 57" S	114° 30' 25" E
7	21° 31' 51" S	114° 44' 54" E
8	21° 30' 50" S	114° 45' 57" E
9	21° 15' 11" S	115° 01' 21" E

BHP Petroleum

GRIFFIN DEVELOPMENT

FIG 1

STATUTORY & ADMINISTRATIVE FEDERAL/STATE BOUNDARIES

Appendix 3

List of submittors

List of submittors

1. Agriculture Protection Board of WA, Baron-Hay Court, South Perth, WA 6151
2. Commonwealth Department of Primary Industries and Energy, GPO Box 858, Canberra, ACT 2601
3. Project Development Division, Department of State Development, 170 St George's Terrace, Perth, WA 6000
4. Petroleum Division, Department of Minerals and Energy, 100 Plain Street, East Perth WA 6004
5. Western Australian Fishing Industry Council Inc., PO Box 55, Mt Hawthorn, WA 6016
6. Commonwealth Environment Protection Agency, PO Box E305, Queen Victoria Terrace, Canberra, ACT 2600
7. Department of the Arts, Sport, the Environment and Territories, Canberra, ACT 2601
8. Australian Heritage Commission, GPO Box 1567, Canberra, ACT 2601
9. Department of Conservation and Land Management, Hackett Drive, Crawley