Tubridgi gas field development

Doral Resources NL

Report and recommendations
of the
Environmental Protection Authority

Environmental Protection Authority
Bulletin No. 446
September 1990

Tubridgi gas field development

Doral Resources NL

Report and recommendations
of the
Environmental Protection Authority

ISSN 1030-0120
ISBN 0 7309 3512 4

Contents

Appendices

Figures

Summary and recommendations

Doral Resources NL propose to develop the Tubridgi Gas Field to supply natural gas to the existing Dampier to Perth pipeline. This would require the establishment of processing facilities on site near Onslow and an 85 kilometre connecting pipe to join into the main line.

The gas field is about 36 square kilometres in area and lies under Urala Station pastoral lease, about 25 km southwest of the town of Onslow. It is estimated that up to 30 terajoules of gas per day could be collected over a field life of approximately ten years.

Gas would flow in buried lines to a central treatment plant (see Figure 2) where it would be cleaned and compressed. It would then flow down a buried 150 mm to 200 mm diameter pipe to compressor station CS2 on the existing gas pipeline to Perth. The route has been chosen to avoid archaeological sites and the easement width would be kept to the minimum to reduce environmental impacts. After construction the pipeline route would be rehabilitated and regularly inspected.

The process operation and pipeline would be managed by two full-time personnel who would be accommodated on site near the process plant.

The gas field lies on a low-lying coastal plain characterised by sandy flats, bare claypans and circular grassy depressions. There are sand dunes along the route and tall stands of eucalypts along the Ashburton River, which the route crosses near its southern end.

The proposal would lead to short term environmental impacts such as noise, dust, disturbance to pastoral activities and loss of vegetative cover during the three month construction stage.

During the operating phase the pipeline route and work areas would be rehabilitated and any residual environmental concerns would be monitored and attended to as necessary, in consultation with the relevant authorities, the pastoralists and the company's environmental consultants.

At the end of the life of the field all process facilities would be removed, wells would be capped and sealed off below ground surface and all pipelines would be disconnected and purged of hydrocarbons. The process site would be restored to its original condition.

The proponent prepared a Consultative Environmental Review upon which the Environmental Protection Authority sought views from affected pastoralists, the Shire of Ashburton and government agencies. The proponent was asked to respond to the additional environmental issues raised and to modify the proposal and environmental management commitments as appropriate. However the Environmental Protection Authority has noted that the proposal as put forward initially included a comprehensive management plan.

The Environmental Protection Authority has concluded that this proposal is environmentally acceptable subject to the following recommendations:

Recommendation 1

The Environmental Protection Authority has concluded that the proposal to construct a gas collecting, processing system and connecting pipeline, as described in the proponent's Consultative Environmental Review (CER) and modified during the process of interaction between the proponent, the Environmental Protection Authority, the public and the government agencies that were consulted, is environmentally acceptable.

In reaching this conclusion, the Environmental Protection Authority identified the main environmental factors requiring detailed consideration as the potential for erosion where the line crosses sand dunes, mud flats and the Ashburton River, and the need for proper rehabilitation of the pipeline route. The Environmental Protection Authority notes that these and other issues have been addressed by either environmental management commitments given by the proponent or by the Environmental Protection Authority's recommendations in this report.

Accordingly the Environmental Protection Authority recommends that the proposal could proceed, subject to:

- **the proponent's commitments; and**
- **the Environmental Protection Authority's recommendations in this report.**

The Authority notes that during the detailed implementation of proposals, it is often necessary or desirable to make minor and non-substantial changes to the designs and specifications which have been examined as part of the Authority's assessment. The Authority believes that subsequent statutory approvals for this proposal could make provision for such changes, where it can be shown that the changes are not likely to have a significant effect on the environment.

Recommendation 2

The Environmental Protection Authority recommends that, subject to Recommendation 1, the manner of detailed implementation of the proposal should conform in substance with that set out in any designs, specifications, plans or other technical material submitted with the proposal by the proponent to the Environmental Protection Authority. Where, in the course of that detailed implementation, the proponent seeks to change those designs, specifications, plans or other technical material in any way that the Minister for the Environment determines, on the advice of the Environmental Protection Authority, is not substantial, those changes may be effected.

In response to concerns raised about the noise of the processing facilities and their potential for disruption to the nearby residences at Urala the proponent has indicated that generators on site will be housed in acoustic enclosures, and that noise levels under normal operating conditions will be limited to 70 dB(A) at 100 metres from the plant boundary. However the area is particularly quiet, especially at night, and the sound characteristics of the equipment are not precisely known yet.

Recommendation 3

The Environmental Protection Authority has reviewed the proponent's noise projections and the management proposal to mitigate noise levels for the Urala Station homestead. While the Authority considers that noise levels and tonal components should not result in unacceptable noise amenity at the homestead, in the event of a problem of this nature arising, the Environmental Protection Authority recommends that the proponent resolves the problem to the satisfaction of the Environmental Protection Authority.

Plans for rehabilitation and environmental management of disturbed areas are comprehensive. There is, however, the potential for disturbed ground to be compacted. Rehabilitation programmes should recognise that some compacted areas may be more difficult to rehabilitate without first being ripped, because water is unable to infiltrate. Disturbed ground is, however, more amenable to invasion from opportunistic weed species. The proponent should be aware that noxious weeds may establish along the easement, and advice from the appropriate authority should be sought to combat their spread.

Recommendation 4

The Environmental Protection Authority, noting that the objectives for rehabilitation of disturbed areas are to prevent erosion, avoid invasion of weed species and to leave the area in an environmentally stable condition with revegetation of indigenous species, recommends that the proponent should seek advice from the Agriculture Protection Board on the recognition and control of noxious weeds in areas disturbed by the project, carry out any procedures recommended by that Authority for the control of noxious weeds, and investigate the need for ripping compacted areas to assist rapid rehabilitation.

The proponent has committed to regular inspections of the pipeline easement to monitor environmental conditions. In order to assist the Environmental Protection Authority in its own follow up monitoring this work should be made available to the Authority on a regular basis.

Recommendation 5

The EPA recommends that the proponent should submit annual environmental reports, beginning no more than six months after the completion of the construction phase, which document the status of rehabilitation of the pipeline route, until it has regenerated to the satisfaction of the EPA.

At the end of the life of the field the proponent has committed to removing all installations and rehabilitating disturbed ground. At least six months prior to decommissioning Doral should prepare a decommissioning and rehabilitation plan to the satisfaction of the Environmental Protection Authority.

If the proponent has not substantially commenced the project within five years of the date of any approval of this proposal by the Minister for the Environment, then the approval to implement the proposal as granted should lapse.

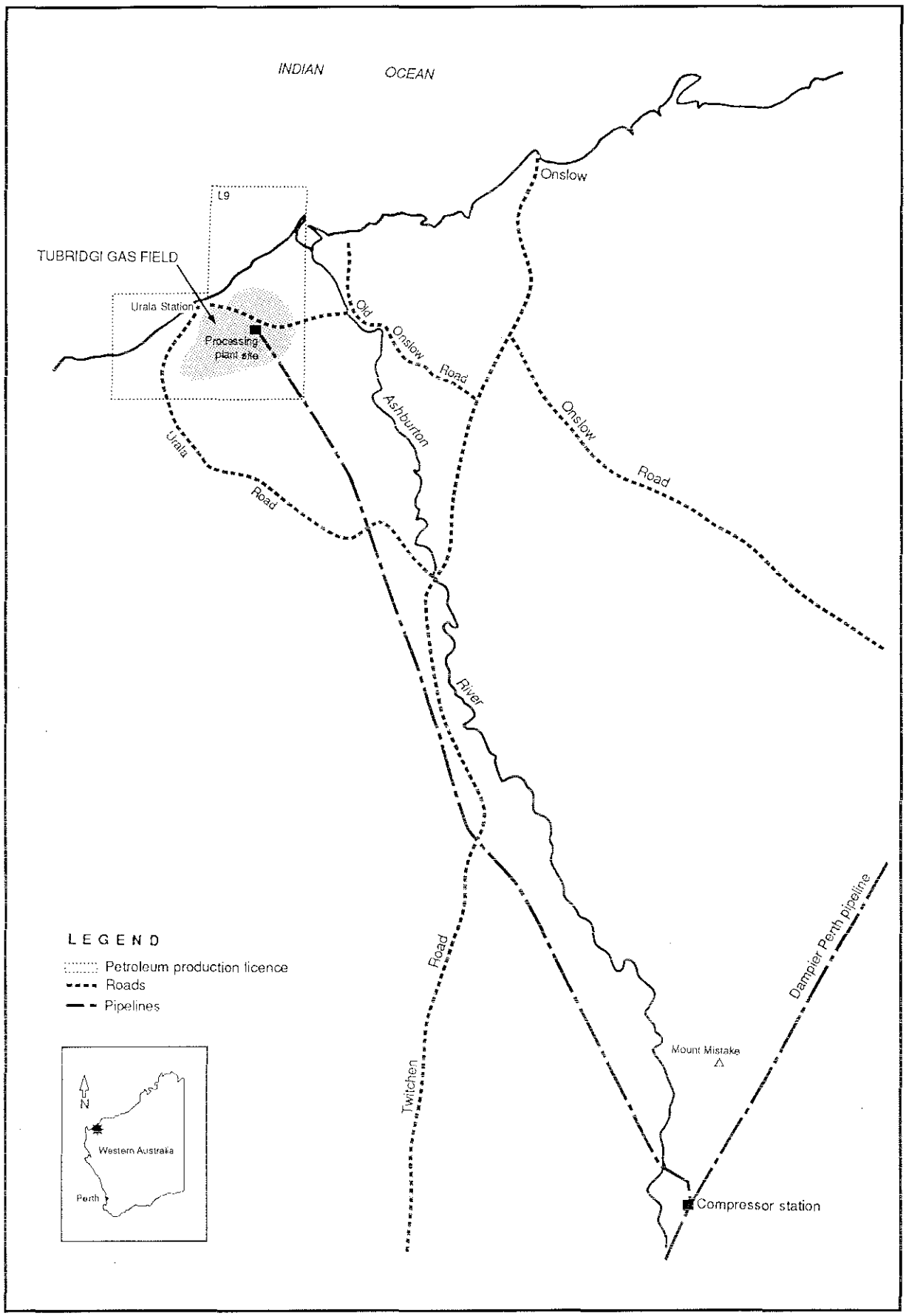

Figure 1: Location of gasfield and pipeline route

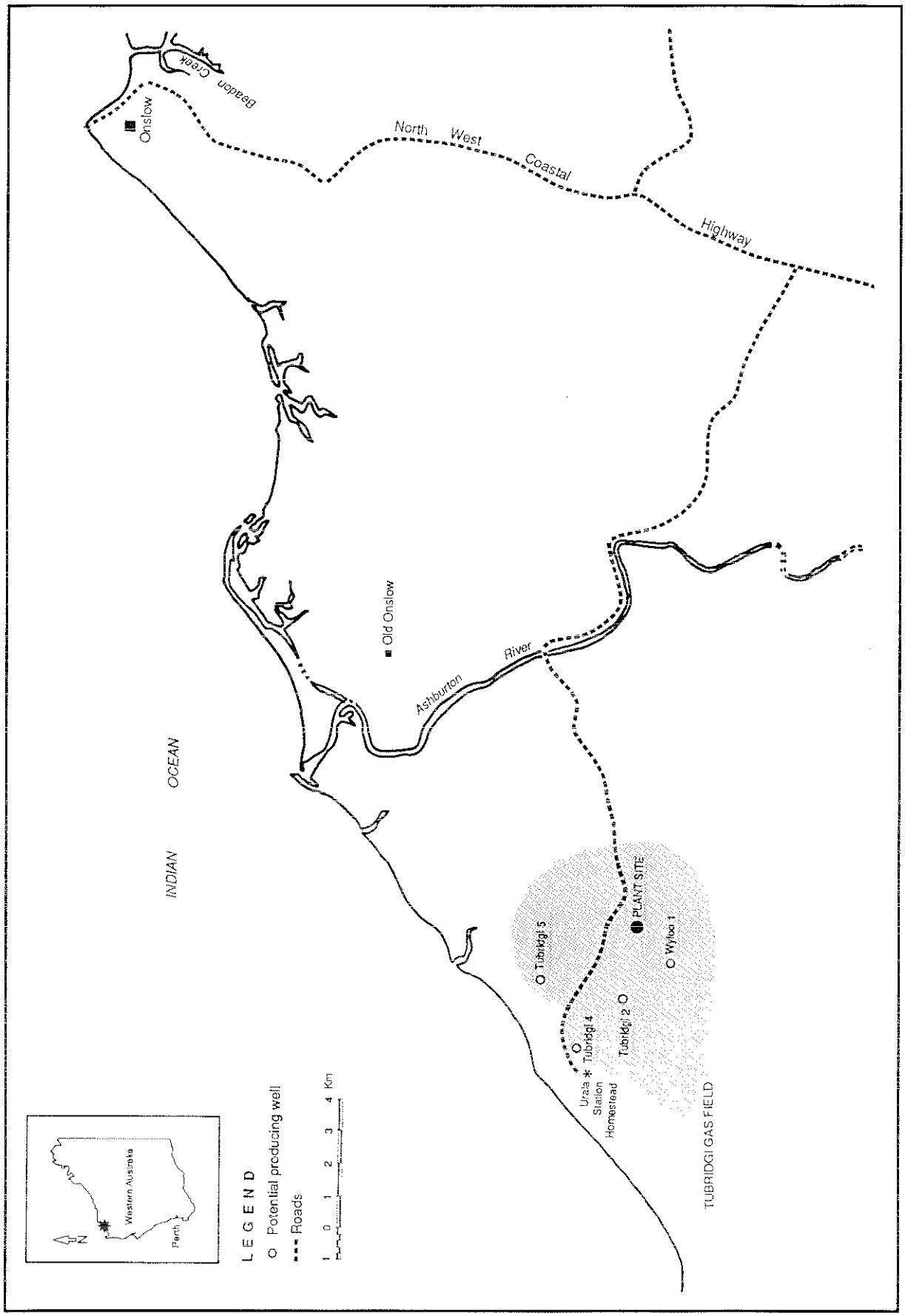

Figure 2: Layout of wells and processing facilities

1. Introduction

Doral Resources NL, are managers of a joint venture between Doral Resources NL (55.6%), Pan Pacific Petroleum NL (41.5%), and four other individual shareholders (2.9%). They have proposed to develop the Tubridgi gas field to supply natural gas to the existing Dampier to Perth pipeline. This requires the establishment of processing facilities on site at the gas field as well as an 85 km connecting pipe to join the main pipeline.

The proponents wish to begin construction as soon as approvals are obtained, in order to fulfil contractual obligations with the SECWA, which requires commissioning by July 1991.

The Tubridgi field was explored and partly developed in 1981 - 1982. The wells were capped in anticipation of a more favourable market. Recently, the State Energy Commission of Western Australia has advised that Tubridgi gas would be used for the generation of power, and could substitute for over 300,000 tonnes per year of coal which would otherwise be consumed.

2. Project description

The Tubridgi field lies on Urala Station pastoral property about 25 km south-west of the town of Onslow.

Gas would be gathered from approximately six wells, of which four currently exist. These would be spread over an area of about 36 square kilometres. The closest would be 1 km from the nearest point of habitation, Urala homestead. It is anticipated that up to 30 terajoules of gas per day would be produced and that the field could have a life of about ten years.

Flowlines from these wells would be buried and converge on the central processing plant. Here, the gas would be treated and compressed.

Water collected with the gas would be diverted to a sealed concrete evaporation pond, which would be large enough to also accommodate storm water events. All work areas would drain to a sump from which water would be returned to the wastewater treatment plant, for recovery of any oil, before being discharged to the evaporation pond. The oil would be collected in drums and disposed of in an approved manner, as designated by the Shire authorities. The expected volume of produced oil is only of the order of 50 litres a week. Domestic wastes would be discharged into a septic system.

From the central processing plant the compressed gas would flow via a 150 mm to 200 mm diameter pipe in a south-south-westerly direction to compressor station CS2 on the main line to Perth. This connecting pipe would be 85 km long and buried along its entire length to a minimum depth of 750 mm in soil or 450 mm in rock.

The width of the easement would be restricted to 20 metres, and, where the route traverses sand dunes, they would be replaced as closely as possible to their original configuration and have their topsoil respread. Subsequent vehicle access over them would be prohibited to company personnel. Borrow pits would be established in locations acceptable to the pastoralist and rehabilitated to an appropriate standard.

The route would parallel the Ashburton River, running mainly to the west of it for most of its length before crossing about 6 kilometres before its union with the Dampier pipeline. Tree removal would be avoided as far as practicable and the point at which the pipe is to cross the Ashburton River has been selected for its thin margin of riverine vegetation and gentle slope. The pipeline would be diverted to avoid all known aboriginal sites, as outlined by archaeological surveys commissioned by the proponent.

The route would be identified with appropriate markers along its length at a spacing of approximately 1.5 km, and the pipe itself would be cathodically protected to prevent corrosion.

The operation would be managed by two full-time personnel who would be accommodated on site.

3. Existing environment

The gas field lies on coastal plain of low relief. It is characterised by extensive sandy plains, bare claypans and circular grassy depressions. There are areas of vegetated sand dunes and, along the Ashburton River, tall and dense stands of Coolibah, Cadjebut and River Red Gum trees. Elsewhere, vegetation is sparse, reflecting the arid environment, and consists of mainly Spinifex and introduced Buffel grass on raised areas and salt-tolerant Samphire species in the depressions.

A number of archaeological sites exist in the general area of the pipeline route. These comprise a quarry and several artefact scatters of varying size.

The area typically enjoys warm dry winters and is subject to irregular cyclonic rains over the very hot summer months. Sheet flooding is a major feature of this region.

4. Issues raised in submissions

Altogether seven submissions were received, two from affected pastoralists and the rest from government agencies. Issues relating to the construction phase include on and off-road access, dust, noise, disturbance to aboriginal sites and disruption to pastoral activities. Concerns about the operating phase pointed to the potential hazards of the operation, possible ongoing disruption to the pastoral lifestyle and rubbish disposal.

The submissions were summarised and forwarded to the proponent to clarify points raised. Questions raised and their responses are summarised below and presented in detail in Appendix 2.

Several submissions considered it important that environmental consultants were involved in the preparation of specifications for contracts for construction, for on-site advice regarding siting and construction of tracks, borrow pits and camp sites, and for subsequent environmental monitoring. Doral have given commitments to comply with these requests.

Several questions related to specifics of the construction and gas-producing process, especially gaseous and liquid discharges, their nature, frequency, quantity and how they would be managed. These were answered in detail.

Aspects of safety were raised with regard to the flammability of the gas and the pressure under which it would be collected and transported. A multi-pronged approach has been proposed by the company. Pressure testing to 1.5 times the maximum allowable working pressure; the provision of pressure relief valves; gas detectors for the detection of leaks at valves, flanges and connection points; and fire detectors and automatic emergency shutdown mechanisms are incorporated in the design.

The issue of ultimate responsibility for the project was raised, as the point was made that the activities of the company as well as its contractors had to be controlled. Doral has acknowledged full responsibility for any damage done on and off the easements by all project personnel and has negotiated agreements with affected pastoralists. All personnel will be given an induction programme at the start of their on-site work. This course is expected to create an awareness of the environmental and cultural aspects of the area.

Water supply and waste solids and oil disposal requirements have been discussed, and appropriate practices have been agreed between the proponent and the Shire authorities.

Direct impacts such as noise, erosion and disturbance to significant sites were discussed and the company has agreed to implement a comprehensive management and monitoring plan in association with its environmental consultants.

Aspects of road upgrading, maintenance and access have been addressed with pastoralists and the Shire.

5. Environmental impacts

The proposed pipelines cross a variety of terrain. Most of these areas are sparsely to moderately vegetated. Areas of dense vegetation occur only around permanent water and would be avoided except where the pipe crosses the Ashburton River. The major environmental issue is the potential for erosion where the line crosses sand dunes and mud flats. Other areas of concern are drainage lines, borrow pits, camp sites, river crossings, noise and discharge pollution.

Impacts associated with the proposal would be minimised under a comprehensive environmental management plan which would include lectures and the publication of a user-friendly pamphlet on operational practices, for distribution to all construction (approximately 50) and operations personnel. This would incorporate advice from pastoralists and be prepared by environmental consultants.

Pressure testing of the pipelines would recycle the test fluid (water with a biodegradable corrosion inhibitor) as each section of the line is tested. Eventually this fluid would be discharged into a bare sandy depression which is isolated from drainage lines.

The area required to be cleared for the processing facilities is about 0.5ha. Noxious emissions would be minimal as produced gas would be used to power most equipment. Analyses of the gas indicate that it contains no hydrogen sulphide. The power generators would be housed in acoustic enclosures behind a sand dune so that, while audible, they are not expected to present a noise problem to Urala homestead residents who live 5 km away.

Along tracks erosion and dust would be minimised by spreading gravel and rocks, and by watering, using supplies approved by the pastoralists.

The pipeline installation proposal would require in total for its 85 km length, the clearing of up to 170 ha of vegetation. However only about 10 ha (the minimum required to allow for burial of the pipe) would have the topsoil and the rootstock removed. Cleared vegetation and topsoil would be respread over the easement. This and other compacted areas may be ripped if necessary to encourage regrowth during rehabilitation. There is, however, potential for weeds, including noxious species such as mesquite, to colonise newly disturbed areas and it would be important to recognise that ripping might not be appropriate in some circumstances.

River and creek crossings are potentially sensitive areas. Banks would be reinstated to original contours and, if regular checks show that erosion could become a problem, effective methods of stabilisation would be used.

Camp sites would be located a minimum of 500 m from waterholes and the sites and waterholes would be checked for litter.

None of the flora and fauna listed for the area or identified in the commissioned survey is known to be rare or endangered.

6. Conclusion and recommendations

Recommendation 1

The Environmental Protection Authority has concluded that the proposal to construct a gas collecting, processing system and connecting pipeline, as described in the proponent's Consultative Environmental Review (CER) and modified during the process of interaction between the proponent, the Environmental Protection Authority, the public and the government agencies that were consulted, is environmentally acceptable.

In reaching this conclusion, the Environmental Protection Authority identified the main environmental factors requiring detailed consideration as the potential for erosion where the line crosses sand dunes, mud flats and the Ashburton River, and the need for proper rehabilitation of the pipeline route. The Environmental

Protection Authority notes that these and other issues have been addressed by either environmental management commitments given by the proponent or by the Environmental Protection Authority's recommendations in this report.

Accordingly the Environmental Protection Authority recommends that the proposal could proceed, subject to :

- **the proponent's commitments; and**
- **the Environmental Protection Authority's recommendations in this report.**

The proponent has a comprehensive management plan which addresses environmental requirements. The process is environmentally clean and, provided the engineering and rehabilitation works are carried out correctly the effects of ground disturbance should be relatively short-lived.

Recommendation 2

The Environmental Protection Authority recommends that, subject to Recommendation 1, the manner of detailed implementation of the proposal should conform in substance with that set out in any designs, specifications, plans or other technical material submitted with the proposal by the proponent to the Environmental Protection Authority. Where, in the course of that detailed implementation, the proponent seeks to change those designs, specifications, plans or other technical material in any way that the Minister for the Environment determines, on the advice of the Environmental Protection Authority, is not substantial, those changes may be effected.

The Authority notes that during the detailed implementation of proposals, it is often necessary or desirable to make minor and non-substantial changes to the designs and specifications which have been examined as part of the Authority's assessment. The Authority believes that subsequent statutory approvals for this proposal could make provision for such changes, where it can be shown that the changes are not likely to have a significant effect on the environment.

Recommendation 3

The Environmental Protection Authority has reviewed the proponent's noise projections and the management proposal to mitigate noise levels for the Urala Station homestead. While the Authority considers that noise levels and tonal components should not result in unacceptable noise amenity at the homestead, in the event of a problem of this nature arising, the Environmental Protection Authority recommends that the proponent resolves the problem to the satisfaction of the Environmental Protection Authority.

In response to concerns raised about the noise of the processing facilities and their potential for disruption to the nearby residences at Urala the proponent has indicated that generators on site will be housed in acoustic enclosures, and that noise levels under normal operating conditions will be limited to 70 dB(A) at 100 m from the plant boundary. However the area is particularly quiet, especially at night, and the sound characteristics of the equipment are not precisely known yet.

Plans for rehabilitation and environmental management of disturbed areas are comprehensive. There is, however, the potential for disturbed ground to be compacted. Rehabilitation programmes should recognise that some compacted areas may be more difficult to rehabilitate without first being ripped, because water is unable to infiltrate. Disturbed ground is, however, more amenable to invasion from opportunistic weed species. The proponent should be aware that noxious weeds may establish along the easement, and advice from the appropriate authority should be sought to combat their spread.

Recommendation 4

The Environmental Protection Authority, noting that the objectives for rehabilitation of disturbed areas are to prevent erosion, avoid invasion of weed species and to leave the area in an environmentally stable condition with revegetation of indigenous species, recommends that the proponent should seek advice from the Agriculture Protection Board on the recognition and control of noxious weeds in areas disturbed by the project, carry out any procedures recommended by that Authority for the control of noxious weeds, and investigate the need for ripping compacted areas to assist rapid rehabilitation.

Recommendation 5

The Environmental Protection Authority recommends that the proponent should submit annual environmental reports, beginning no more than six months after the completion of the construction phase, which document the status of rehabilitation of the pipeline route, until it has regenerated to the satisfaction of the Environmental Protection Authority.

The proponent has committed to regular inspections of the pipeline easement to monitor environmental conditions. In order to assist the Environmental Protection Authority in its own follow up monitoring this work should be made available to the Authority on a regular basis.

At the end of the life of the field the proponent has committed to removing all installations and rehabilitating disturbed ground. At least six months prior to decommissioning Doral should prepare a decommissioning and rehabilitation plan to the satisfaction of the Environmental Protection Authority.

If the proponent has not substantially commenced the project within five years of the date of any approval of this proposal by the Minister for the Environment, then the approval to implement the proposal as granted should lapse.

Appendix 1

Commitments by the proponent

The following is a summary of the commitments made by the Joint Venturers to be undertaken during the project design, construction and operation:

1. The pipeline, flowlines and processing plant site will not be constructed through significant archaeological and environmentally sensitive sites. A minimum buffer of 200 m will be provided at these sites.
2. Pets and firearms will be banned from site during construction and operation.
3. Fire fighting facilities will be available during construction and operation on access roads and tracks within the plant boundary.
4. Construction and operation will be monitored by the Operator to ensure compliance with environmental obligations.
5. All personnel employed on the project will be trained in the environmental management methods made in this statement.
6. Penalties for breaking environmental regulations will be included in contracts.
7. Any Aboriginal relics discovered during the work will be treated in accordance with the Aboriginal Heritage Act.
8. Camps will not be sited within 500 m of water holes.
9. Approval of the pastoralists and advice from environmental consultants will be sought for obtaining water from surface water sources.
10. Hydrotest water will contain a biodegradable inhibitor and will be disposed of in dry, sandy depressions, so that it will not enter the surface drainage system.
11. Domestic wastes will be deposited at the Onslow tip.
12. Industrial wastes will be deposited in a manner consistent with Ashburton Shire policy.
13. Sewage will be treated in septic tanks.
14. Treated and brackish water will be discharged to an impervious evaporation pond.
15. Power will be generated using production gas, other than in emergencies when diesel will be used.
16. Noise attenuation will be provided to limit noise levels under normal operating conditions to 70dB(A) at 100 m from the plant boundary.
17. Topsoil will be reserved and re-spread over backfilled excavations.
18. Backfilled excavations will be graded to ensure natural drainage is maintained.
19. Excavations and damaged land will be restored to acceptable ground conditions.
20. Cleared vegetation will be re-spread over the pipeline easement.
21. Imported materials for construction activity will be removed from the site and disposed of according for Ashburton Shire policy after construction is complete.
22. Regular inspections of the pipeline easement will be carried out and also after periods of heavy rain to monitor environmental conditions and to effect repairs where necessary.
23. Abandonment of the gas gathering system will include purging and sealing of pipelines, and removal of equipment at the processing plant followed by ground restoration.

Appendix 2

Summary of submissions and proponent's response

a) Expert environmental advice

The use of environmental consultants for siting of laydown areas and camp-sites is necessary. The consultants should also be involved in providing on-site advice for siting and construction of tracks, borrow pits, monitoring of erosion, etc. Unless this is done, there is always a significant risk of the best intentions coming undone.

Environmental and archaeological consultants would be available to provide on-site advice during construction for siting of plant, equipment and other related construction activities.

Specifications for contractors should be drafted in consultation with environmental consultants. This is especially necessary for design and rehabilitation of borrow pits, roads, etc.

The environmental consultants were involved in drafting specifications for contracts.

b) Aspects of the process

Is it possible to obtain an estimate of:

- **the frequency of use of the gas vent;**
- **the total predicted volume of emissions over, say, a 12 month period?**

The gas vent will only be used in exceptional circumstances such as an emergency shutdown or process blowdown where the volume of gas (1500 m^3 at atmospheric conditions) in the major plant facilities is exhausted through it. It is difficult to quote frequency for such usage, although such events should not occur more than two or three times annually after plant commissioning.

Gas venting - What is the expected frequency of emergency venting? What are 'small' volumes?

Gas venting is likely to occur during commissioning and decommissioning operations and, in the event of mechanical failure which would result in plant and/or pipeline blowdown. In the latter cases, volumes involved would depend upon the location of the mechanical failure. For commissioning purposes small volumes of gas may be vented for equipment testing and, in the case of pipeline commissioning, a very small quantity may be vented until 100% gas-in-air content is verified within the pipeline.

Have the designers of the plant sited the 'gas vent' (Section 5.4.1 of the CER) away from ignition sources to:

- **eliminate explosion risks;**
- **eliminate NO_x emissions?**

The gas vent will be sited at an elevated position away from all potential ignition sources and will exist at a high velocity to promote dispersion. The vent site is determined by the more stringent criteria of radiation (should the vent be accidentally lit by an extraordinary event such as lightning strike) or dispersion (concentration of the gas in the atmosphere).

Will a reverse osmosis unit be required for water?

Use of rainwater and borewater may eliminate the need for a reverse osmosis unit which is the source of the brackish water. The final selection will be made during detail design. However, if an RO unit is selected, it will be similar in capacity to a domestic unit and, as such, brackish water production will be minimal.

What is the expected gas composition, and how is it likely to vary over the life of the wells? The following details are also sought:

i fuel usage (type and quantity, including standby)

ii waste generation and disposal and other chemical wastes (glycol waste, oily waste, quantity and disposal methods need to be established)

- **Gas Composition**

The following is the assumed plant input composition based upon an average of Amdel analyses of wellstream numbers 2, 4 and 6 dated 5 June 1990.

	Mol %
N_2	5.3
O_2	0.00
CO_2	1.06
CH_4	93.75
C_2H_6	0.06
C_{3+}	0.00
	100.00

- **Fuel Usage**

The primary fuel used for running the compressors, generators, reboiler and air compressors is dried and scrubbed fuel gas. In the event of maintenance of generators and air compressors, diesel fuel shall be used in standby units. The quantity of fuel gas used per day is expected to be approximately 1,500 m^3 (at standard conditions).

- **Waste Disposal**

Oily waste will occur primarily from spent lubricants and will be stored in drums for disposal at the Onslow tip. Glycol is not expected to be directly 'wasted'.

The small volume of hydrocarbon liquids collected will be burnt on an irregular basis using a burn-pit located remotely from the processing facilities. Initial well tests indicate this volume to be approximately 45 litres/day.

- **Will the proponent elaborate on details of waste water treatment, such as the type of oily water separator, its efficiency, effluent concentration and the size of evaporation pits?**

Produced water and oily water from washdown activities will be piped to an evaporation pond complete with weir. Oily scum will be skimmed or cleared off the pond walls as accumulation requires. The water will be allowed to evaporate. An oil trap and overflow gully will be provided in the event of sudden rains or high water production rates. The pond will be emptied and cleaned as part of the plant operating procedures when tropical cyclone warnings or heavy rainfalls are forecast.

- **Water production/disposal towards end of well life**

Water production/disposal towards the end of well life will be treated in the same manner as for the duration of the project. Oily water will be fed to a wastewater treatment tank for oil removal; the treated water will then be discharged to an impervious concrete evaporation pit. Water quantities involved will not be known until the results of the reservoir engineering become available.

- **What is the proposed size of the evaporation pit?**

The size of the pit will depend upon the volume of water produced from the gas wells, but it should be sufficient to accommodate maximum expected rainfall for the area at any one time.

c) Construction phase

Supply of materials by ship through Onslow needs to take account of Beadon Creek sensitivity.

Materials supply is likely to be provided via overland transportation, such as by road train.

What is the method of disposal of pipeline hydrotest water?

Hydrotest water will be disposed of in dry sandy depressions so that it will not enter the surface drainage system (ref: Section 5.4.2 CER) as per the recommendations of our environmental consultants.

What is the type of corrosion inhibitor that will be used? As it is being disposed of in 'dry sandy depressions so that it will not enter the surface drainage system', it is important to determine exactly what it is and the extent to which it biodegrades.

The following biodegradable inhibitors are intended to be used for the hydrostatic pressure testing of the pipeline. These inhibitors are commonly used in cross country pipelines.

		PPM
Oxygen Scavenger	Liquid Catalised Sodium Sulphide	200
Scale Inhibitor	Aceto Diphosphonic Acid	25
Biocide	Quaternary Ammonium Based Biocide	25

What is the size of the fuel tanks and how will they be bunded?

Fuel oil (diesel) will be stored in a 5000 litre elevated tank. The base beneath the drum supports will be bunded and impermeable to cover the unlikely event of a major tank leak.

Hydrocarbon liquids collected during processing will be stored in an atmospheric vessel prior to being disposed of in a burn pit. The vessel will also be elevated with an impermeable, bunded vase.

What steps are being taken by the proponent to ensure that borrow pits, if outside of the surveyed zone, will not impact on unsurveyed aboriginal sites?

Contractors will be requested to only use existing or approved borrow pits outside the easement if required. Contracts between Doral and construction contractors will state that borrow pits in other than existing or approved areas must first be cleared with the proper authorities to ensure that possible aboriginal sites are not impacted.

Will Doral give an undertaking to assume full responsibility for damage done on and outside of the gas gathering easements by both contract personnel and its own staff who are engaged during both construction and operational phases of the project?

Yes. This has been conveyed to the Pastoral Leaseholders and is addressed in compensation agreements executed with each of the station owners.

d) Operational phase

What will be the distance between pipeline markers?

Pipeline identification markers will be installed at fences, road and river crossings, at changes in direction of the pipeline and at regular intervals along straight sections sufficient to enable ground and aerial patrols to easily identify the pipeline route, typically not more than 1.5 km.

Any gas under pressure is dangerous, and is of concern. What safeguards will there be to ensure that pressurised pipelines will not burst or leak?

All pressurised vessels are pressure tested to 50% above the maximum allowable working pressure (MAWP) in accordance with AS 1210. All pressurised vessels (including those containing hydrocarbon gas) are protected against overpressure by pressure relief valving. The pressure relief valves are set to open at MAWP of the vessel in accordance with API 521 Guide for Pressure Relieving and Depressuring Systems.

The possibility always exists that flanges, valving and other connection points will leak in service. Prior to commissioning of the plant, the system will be leak tested. Gas detectors are provided on the facilities containing hydrocarbon gas and if a gas leak is detected, the facilities will be shut down.

Fire detectors will be placed at all key process areas which will automatically initiate an emergency shutdown should ignition be detected.

Blowdown valves are provided on all isolated sections of piping and equipment to enable the facilities to be depressured to a remote vent. Blowdown will be initiated either manually or on fire detection.

One gas well is situated at the end of an airstrip on Urala Station. Will this compromise:

- **aircraft safety or aviation department regulations;**
- **the integrity or safety zone requirements for the well and pipeline installation?**

If so, how is the company prepared to handle this situation?

The gas well - Tubridgi 4 - was installed in 1981 and is sited approximately 150 m from the end of the airstrip. The area between the well and airstrip comprises 1 m high sand dunes. The well will be utilised for the first two years of the field life, after which it will be abandoned, which will entail removal of the above ground well-head.

The airstrip usage is confined to light aircraft with fixed undercarriage, with larger aircraft using the main strip on Urala Station.

The well-head location and height complies with Department of Civil Aviation regulations which are concerned with angles of approach.

There is a concern about the stability of the pipelines under conditions of severe flooding bringing about scouring, waterlogging and changes to the structural strength and consistency of the soils in which the pipelines are buried. Under such conditions, what is the potential for the pipelines to become exposed or 'float' upwards to the surface?

Doral's pipeline design consultants are designing the buried pipeline to cater for the various environmental conditions that will be faced.

The 'Rain shadow' effect of tracks can be significant in this country - environmental consultants should be used for on-site advice.

(Note: This refers to the channelling and attendant effects of rainwater diversion caused by wind-rows along the edges of graded tracks. This leads to a reduction in wetting of the soil on the downhill side of the wind-row, which compromises vegetation).

Environmental and archaeological consultants would be available to provide on-site advice during construction for siting of plant, equipment and other related construction activities.

The reinstatement of claypans should be such that the extremely flat surfaces are retained and so that no new drainage regimes are established. This is difficult to do and will need to be watched carefully. The same goes for samphire communities.

Environmental and archaeological consultants would be available to provide on-site advice during construction for siting of plant, equipment and other related construction activities.

What is the expected noise impact from the gas turbines and pumps at the processing site on Urala homestead under worst case wind conditions from the SE or SSE? How will this be minimised?

The proposed plant site is some 5 km from Urala Homestead and sited behind a ridge which will eliminate line-of-sight exposure from noise and the SE or SSE concerns stated in the submission.

How does Doral intend to control the behaviour of its operations personnel, who will be expected to man the plant 24 hours a day, in order to minimise conflict with the affected pastoralists?

Operations personnel will be fully trained in the environmental and cultural features of the area and will be expected, under their terms of engagement, to respect the pastoralist's operations.

Doral management will invite any comments or concerns from the pastoralists if they arise.

Operations personnel will be expected to confine their activities and movements to the wells, plant site, pipeline and metering station.

If the company's water requirements are to be met from a bore, how is it intended to minimise the impact on the shallow and restricted freshwater aquifer? How much water will be required and what will the zone of influence of the bore(s) be? (There is a potential conflict with stock watering requirements unless water is to be drawn from a deeper aquifer).

During construction, contractors will source water from the Ashburton River or by arrangement with the pastoralists.

During operations, potable and plant water requirements will be confined to that for two to four people, plant wash-down and make up water for gas engines.

Use of the shallow and restricted freshwater aquifer may not be required if Doral elects to use a combination of rainwater and carted water for operations. The water source is still subject to study, but people and process water demand will not impact the aquifer limits or conflict with stock requirements. Preliminary engineering estimates indicate water requirements of 0 to 200 litres/day.

All waste disposal should be by arrangement and prior agreement with the Shire of Ashburton.

Doral has contacted the Shire authorities to clarify what arrangements would be appropriate.

e) Roads and access

Would Doral please clarify the purpose for which the four wheel drive track along the pipeline will be used? Is it to provide access to the compressor station at the Dampier/Perth pipeline connecting point or to enable inspections of the line to be made? How frequently will this be necessary?

There is a concern that once it becomes clearly defined, this route will be used by casual four wheel drive owners to gain access to pastoral property and possibly jeopardise environmentally sensitive areas along or near the route. How does Doral intend to manage these potential issues?

The purpose of the four wheel drive track is for easement and pipeline inspection as well as to access the Doral metering station adjacent to the Dampier/Perth pipeline. Initially a weekly inspection of the pipeline is anticipated, but this may be extended to monthly after sufficient operations data is established.

The metering station may warrant an ongoing weekly visit, in which case alternative access via Twitchin Road may be used.

The potential for casual four wheel drive owners to use the track has been discussed with the pastoralists and Doral agrees with their suggestion that earth bunds be suitably sited to prevent access to the pipeline access track from other tracks. This would best be worked out with the individual pastoralists to satisfy their access requirements whilst reducing any other access.

Would the company please indicate what arrangements have been made with the Shire for the maintenance and upgrading of the existing public road system during the construction and operational phases? The roads specifically referred to are Twitchen Road, Old Onslow Road and Urala Road, including the river crossing.

Doral has had discussions and made detailed site visits with Ashburton Shire officers to advise on the traffic levels anticipated during construction and operations. Doral has indicated a willingness to rectify any impacts on roads from such traffic and will negotiate the details of scope, construction and timing with the Shire of Ashburton.

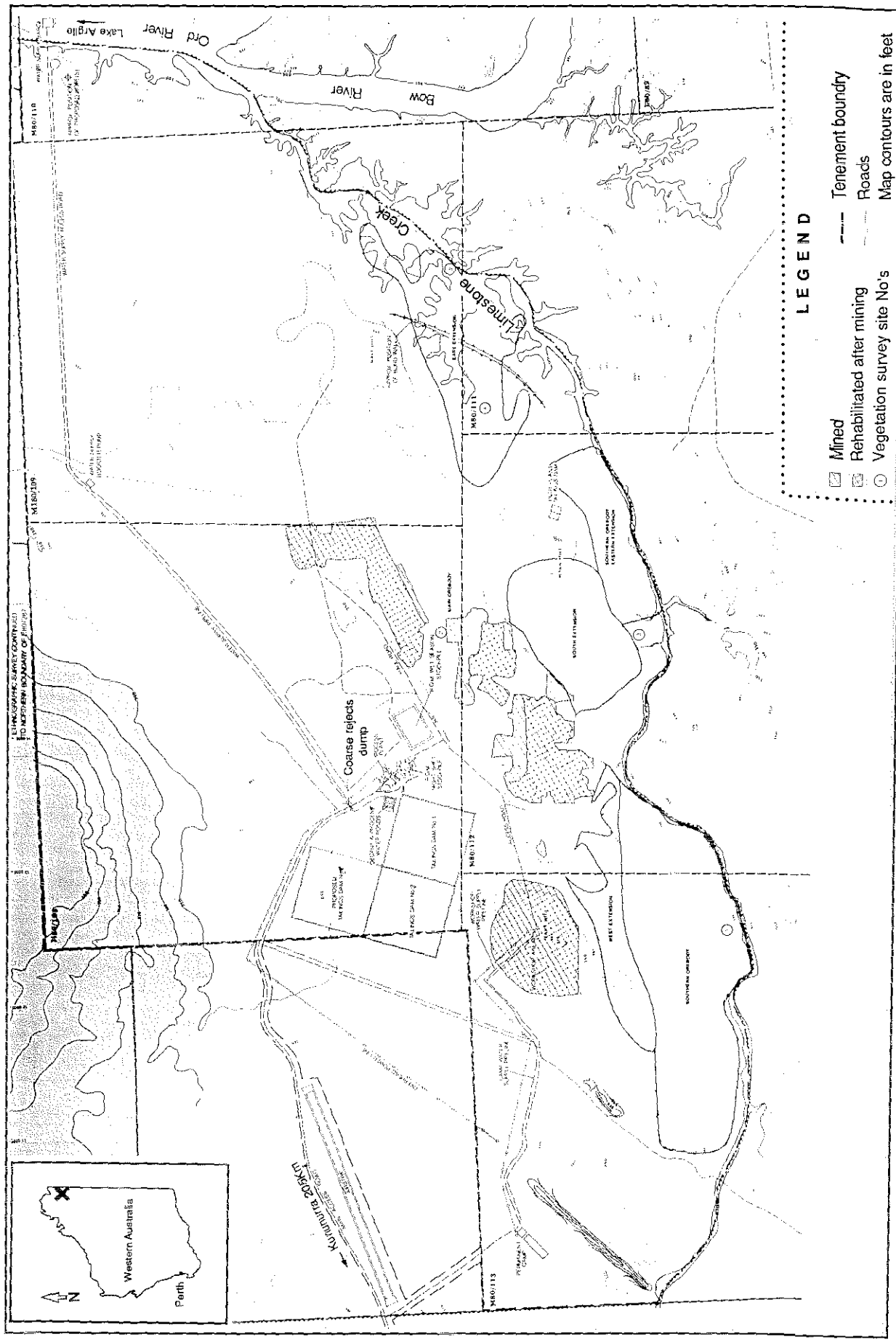

Figure 1: Location and features of area