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Proposed Caversham-East Perth Lateral Dampier-Perth Natural Gas Pipeline Project

State Energy Commission of Western Australia

Report and Recommendations
by the
Environmental Protection Authority



Department of Conservation and Environment
Perth, Western Australia
Bulletin 171 May 1984

PROPOSED CAVERSHAM-EAST PERTH LATERAL
DAMPIER-PERTH NATURAL GAS PIPELINE PROJECT
STATE ENERGY COMMISSION OF WESTERN AUSTRALIA

REPORT AND RECOMMENDATIONS
by the
ENVIRONMENTAL PROTECTION AUTHORITY

DEPARTMENT OF CONSERVATION AND ENVIRONMENT
WESTERN AUSTRALIA

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1. SUMMARY AND CONCLUSIONS

As part of the Dampier to Perth Natural Gas Pipeline Project, the State Energy Commission of Western Australia (SECWA) has proposed to construct and operate a gas lateral from the main pipeline at Caversham to gate stations at Bassendean, Bayswater and East Perth.

An Environmental Review and Management Programme (ERMP) was prepared by the SECWA at the request of the EPA. The document was released for six weeks for public comment, and submissions received have been included with the ERMP in the Authority's assessment of the environmental aspects of the proposal.

The EPA has concluded that, in general, the ERMP is an acceptable document and recommends that the project proceeds in accordance with the recommendations contained in this report and the provisions for environmental management in the ERMP and already determined for the Dampier-Perth Natural Gas Pipeline project.

2. BACKGROUND

As part of the SECWA's commitment to purchase and distribute natural gas from the North West Shelf joint venturers, a system of underground pipelines from Dampier to markets in the south-west of the State is being developed.

In 1979, the environmental aspects of the main Dampier-Wagerup pipeline were addressed in an ERMP. In 1983, an extension to Bunbury with associated laterals was the subject of a further ERMP.

A third ERMP was prepared by the SECWA in March 1984 which looked at the proposal to construct and operate a lateral from Caversham to East Perth. The ERMP was released for a six-week public review period concluding on 27 April 1984, and is the subject of this report.

3. THE PROPOSAL

The SECWA proposes to construct and operate a 17.4 km high pressure gas lateral of 250 mm diameter steel pipe buried to a minimum depth of 900 mm from a take-off point at Caversham to gate stations at Bayswater, Bassendean and East Perth. Gas would then be reticulated to domestic and industrial customers.

The pipeline itself would conform to design and safety specifications contained in the SAA Gas Pipeline Code AS 1697-1981. Its maximum operating pressure would be 6 895 kPa (1 000 psi).

The pipeline is planned to be buried within a 5 m easement although a 15 m right-of-way would be necessary for construction purposes.

Major permanent above ground facilities would be valves, and pressure reduction and metering facilities at the gate stations. Valves would be contained within an area of approximately 150 sq.m bounded by a security fence. Gate stations would require approximately 600 sq.m and be similarly fenced.

The route would be identified by markers at regular intervals above ground and at road, stream, rail and fence crossings. As well, a 150 mm wide marker tape would be placed above the pipeline but below ground level. The exact location of the route would be placed on plans, drawings and documents covering the area.

4. ALTERNATIVES

4.1 Alternatives to the Project

The SECWA argues that demand for natural gas is such that the current lateral to East Perth, operated by the West Australian Natural Gas (WANG) company would be overloaded by 1987 and therefore a replacement system is necessary. In addition the calorific value of gas from Dongara differs from North West Shelf gas and therefore it is desirable to avoid mixing the two.

By not constructing this lateral, the SECWA contends that additional and larger diameter, low pressure pipelines would need to be constructed in road reserves to supply the demand. This would be less safe, cause greater disruption, and be more expensive than the proposal.

4.2 Alternative Routes

The ERMP examined seven alternative pipeline routes plus a preferred route. Details are contained in the ERMP but in broad summary these are:

- (a) Preferred route. This route follows Benara Road, Devonshire Street, Beechboro-Gosnells Highway and the Swan River foreshore from Garratt Road to East Perth.
- (b) Alternative 1. This route angles through Pyrton, crosses Bennett Brook and parallels the existing WANG easement along the Westrail railway reserve to East Perth.

The route was rejected because of Aboriginal interests at Pyrton and the fact that Westrail's conditions for constructing a pipeline in the railway reserve could not be met from engineering and safety points of view.

- (c) Alternative 2. This route approximates the preferred route but crosses the river at Belmont Road, recrosses three times at Maylands Peninsula and Burswood Island and thence to East Perth.

It was rejected as being excessively indirect and expensive.

- (d) Alternative 3. This route also approximates the preferred route but follows the railway reserve to East Perth, not the river foreshore.

It was rejected as per (b).

- (e) Alternative 4. The first section of this alternative is common with (c) and (d); however it proposes following Whatley Crescent instead of the railway reserve to East Perth.

The alternative was rejected on safety grounds.

- (f) Alternative 5. Similar to (e) except it proposes to follow Guildford Road, not Whatley Crescent and was rejected for similar reasons.

- (g) Alternative 6. This route follows most other alternatives except from Bassendean to East Perth it would cross the Swan River and follow Great Eastern Highway until it met the railway easement east of Burswood Island. It would then follow that easement to East Perth.

It was rejected on similar grounds to (e) and (f).

- (h) Alternative 7. This route is similar to the preferred route except it crosses the tip of Burswood Island rather than following the northerly foreshore to East Perth.

Although practical and viable, the impact of the alternative is comparable to the preferred route but the cost would be substantially higher and hence it was rejected.

4.3 Discussion of Alternatives

The EPA, in general terms, believes that the criteria used to select a route for the proposal were sound and balanced from the environmental point of view.

The Authority accepts the justification for the need for the lateral.

While the EPA endorses the preferred route, subject to recommendations in this report, it does not endorse the general principle of siting utilities on foreshores. It believes that the logical route should be parallel to the WANG line along the Westrail reserve but understands that engineering constraints and safety concerns, particularly at key points such as the Mount Lawley Subway preclude this option. However the Authority considers that the ERMP was deficient in not giving an adequate explanation of the reasons for rejecting this alternative. The EPA was able to reach this conclusion only after these constraints were explained further.

As experienced with the main pipeline and the Bunbury extension, the EPA anticipates that there may be some further problems which arise from determining the precise alignment of the pipeline, and reserves the right to comment on any deviations proposed to the preferred route.

5. ENVIRONMENTAL ASSESSMENT

5.1 Introduction

In calling for the preparation of this ERMP, the EPA took into account the two ERMP's already prepared, released for public comment and reported upon by the Authority. It saw no value in repeating general environmental management provisions contained in the ERMP's, and the EPA's reports of November 1979 and September 1983 (Department of Conservation and Environment Bulletins Nos 72 and 148 respectively). Therefore the ERMP and this report are concerned mainly with particular environmental aspects related to the lateral.

Recommendation 1. The EPA recommends that the general provisions for environmental management contained in the two previous ERMP's and the two EPA reports associated with the Dampier-Perth Natural Gas Pipeline project be adhered to in the construction and operation of the Caversham-East Perth lateral.

5.2 Pipeline Route

The section of the preferred pipeline route from Caversham to the Garratt Road Bridge presents no environmental concerns beyond those addressed adequately in the ERMP. However the EPA notes the area of Aboriginal interest at Bennett Brook and that the SECWA is committed to complying with the provisions of the Aboriginal Heritage Act.

The section from the Garratt Road Bridge to the SECWA's land at East Perth follows the foreshore of the Swan River and as such raises philosophical as well as practical environmental concerns.

As noted in Section 4 of this report, the EPA believes that, in the absence of realistic alternatives, the preferred route is acceptable. However the Authority repeats that it does not endorse the general principle of siting utilities along foreshores.

Recommendation 2. In accepting the preferred route, the EPA nevertheless recommends that river foreshores should not in general be used for siting utilities and that this proposal should not be used as a precedent.

5.3 Hydrogeology

Considerable concern has been expressed in public submissions for the stability of land in the vicinity of Joel Terrace, along the East Perth-Mount Lawley foreshore. Appendix A of the ERMP contains the results of some detailed investigations into potential environmental and engineering problems which may result from excavating and burying the pipeline in this area. The ERMP concluded that, provided the lateral was constructed in accordance with the provisions delineated in the ERMP, no particular problems should be encountered.

The Geological Survey of WA was asked to comment specifically on these provisions in the ERMP, and its response is at Appendix 2 of this report. It raised some additional points but concluded that, provided the outlined procedures were followed, construction of the lateral should be successful. The EPA has accepted this advice.

Recommendation 3. The EPA recommends that the SECWA takes into account additional comments made by the Geological Survey of WA and included as Appendix 2 of this report, in construction of the lateral in the area of concern at East Perth. The Authority recommends further, that in view of the public concern raised in this matter, that the SECWA supervises very closely, operations in this area and makes a commitment to restore or rehabilitate any land stability problems which can be directly attributable to construction of the pipeline.

5.4 River foreshore

The EPA endorses in general terms, the rehabilitation proposals contained in the ERMP for the river foreshore.

It has noted the points raised in public submissions, particularly those relating to historic trees and utilization of the grounds of St Anne's Hospital at Mount Lawley.

The Authority is aware too, of the progressive implementation of the West Bank Scheme at East Perth, prepared and approved by the Perth Waters and Burswood Island Foreshore Advisory Committee, by the MRPA with the assistance of funding under the Wage Pause Scheme and the Community Employment Programme.

The SECWA has undertaken to rehabilitate private property to the owners requirements and also to avoid wherever possible stands of native vegetation and trees. However care should be taken to avoid the spread of exotic and introduced flora along the pipeline route where it does not already exist.

Recommendation 4. With respect to river foreshore regimes, the EPA recommends:

- (a) particular care be taken to avoid the stands of vegetation identified as being historic in public submissions;*
- (b) the SECWA liaises closely with the MRPA for the land subject to the West Bank Scheme and in particular meets the rehabilitation requirements of the MRPA;*
- (c) particular care be taken to avoid the spread of exotic and introduced plant species along the pipeline route.*

- 5.5 Test waters. Disposal of pipeline test waters containing low levels of additives has caused some problems during construction of the main Dampier-Perth gas pipeline.

Quantities involved in hydrostatically testing the lateral will be smaller, but nevertheless disposal may present some environmental problems.

While the Public Works Department administers licensing of disposal of test waters, the Department of Conservation and Environment and the Swan River Management Authority should be consulted before disposal of test waters from the lateral is effected.

- 5.6 Aboriginal and ethnographic aspects. The principal site of interest is Bennett Brook. One of the alternative

routes for the pipeline was rejected because it would have a major impact on this site.

The EPA notes that a survey for Aboriginal sites has been carried out and that the SECWA undertakes to comply with the provisions of the Aboriginal Heritage Act.

5.7 Environmental management and monitoring

The EPA endorses the general principles described for environmental management and monitoring in the ERMP. However monitoring results should include reporting back to the EPA at suitable intervals. The Authority is particularly interested in examining the results of rehabilitation of the land in the vicinity of Joel Terrace, East Perth.

Recommendation 5. The EPA recommends that the SECWA reports back to the Authority six months, twelve months and eighteen months after completion of construction of the pipeline with an assessment of the results of rehabilitation and environmental management.

6. PUBLIC SUBMISSIONS

6.1 Introduction

The Department of Conservation and Environment received 10 submissions during the public review period. Six were from Government agencies and four were private (see Appendix 1).

The EPA considered all submissions as part of its assessment, and all submissions were referred to the SECWA for response.

Recommendation 6. The EPA recommends that the SECWA considers, and where appropriate, acts accordingly on points raised in the public submissions and not already specifically covered in Section 5 of this report.

6.2 Summary of submissions from Government agencies

- . No major problems. Three submissions saw no major problems or conflicts with their respective responsibilities.
- . Disposal of pipeline test waters. The Public Works Department pointed out that some problems were experienced with disposal of test waters for the main Dampier-Perth pipeline and noted that conformity with conditions of licences for disposing of test waters from this project is required. The

need for proper disposal of test waters was also noted by the Geological Survey of WA.

- . Hydrogeology. Both the Swan River Management Authority and the Geological Survey of WA commented on the hydrogeological aspects of constructing the pipeline on the river foreshore. The Geological Survey was asked to examine specifically these aspects in the ERMP and its comments have been incorporated in Section 5 of this report.
- . Noise and Vibration. The Geological Survey of WA pointed out that vibration from construction activity may be severe in clayey soils along the river foreshore, particularly if compacting machinery is used.
- . River foreshore environment. The Swan River Management Authority provided detailed comments on aspects of the foreshore environment and in particular on the section subject to a development and beautification plan prepared and approved by the Perth Waters, Burswood Island Foreshore Advisory Committee. These comments have been incorporated also in Section 5 of this report.

6.3 Summary of private submissions

- . Hydrogeological aspects (East Perth end). Three private submissions were concerned that interference with groundwater flows by burying the pipeline could result in erosion, slumping and property damage. It was pointed out that problems of this nature have been experienced in the past in the Joel Terrace area. One submission provided photographic evidence and reports from consulting engineers on the potential problems. (See Section 5.3 and Recommendation 3).
- . River foreshore environment. Three submissions expressed concern for the river foreshore environment through which the proposed pipeline would be constructed. The existence of native trees of historical value was pointed out. St Anne's Hospital emphasised the use patients made of the lower terraces of the foreshore and was concerned with any reduction in amenity value.
- . Public access to private property. Three submissions were concerned with the concept of access along the pipeline route allowing the public to enter private property where this adjoins the foreshore.

One submission emphasised reduced security and privacy.

- . Safety. One submission was concerned with safety of urban areas should the pipeline rupture.
- . Need for project. One submission believed that the need for the project was not adequately justified in the ERMP.
- . Interference with private property. All four private submissions were concerned with interference with private property, in particular: compensation, interfering with current land-use (market gardening), may preclude subdivision or development potential and problems with landfilling certain lots.

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LIST OF SUBMISSIONS

APPENDIX 1

Government Agencies:

Department of Lands and Surveys
Department of Resources Development
Geological Survey of Western Australia
Public Works Department
Swan River Management Authority
Western Australian Museum

Private:

Mr I G D'Orazio
Bayswater

Mr A D Gratton Wilson
Mount Lawley

Panorp Pty Ltd
Welshpool

St Anne's Hospital Inc
Mount Lawley

(Note: Other Submissions were received too late for inclusion in this report)

GEOLOGICAL SURVEY OF WESTERN AUSTRALIA

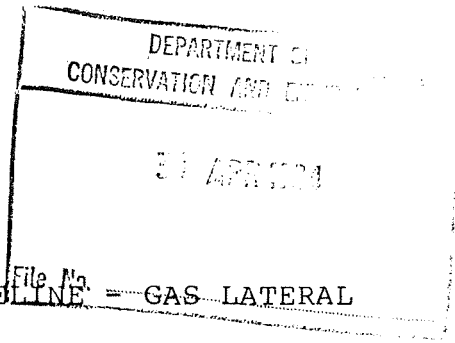
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(Attention: Mr R Sippe)

DAMPIER TO PERTH NATURAL GAS PIPELINE FACILITIES EAST PERTH LATERAL

ENVIRONMENTAL REVIEW AND MANAGEMENT PROGRAMME

The Environmental Review and Management Programme (ERMP) for the proposed Caversham - East Perth lateral of the Dampier - Perth natural-gas pipeline has been reviewed as requested. The following comments are provided for your consideration and for inclusion as an appendix to the Environmental Protection Authority (EPA) report.

The ERMP deals with the need for, the location of, and the possible environmental impact of proposed gas lateral facilities between Caversham and East Perth.

The need for gas lateral facilities and the criteria used in route selection of the pipeline are comprehensively documented. The constraints used for final route selection are mainly socio-economic rather than environmental. They are, however, logical and well-founded and it is agreed by the geological survey that the preferred route is the best selection.

The possible environmental impact of a gas pipeline following the preferred route is well documented. On the basis of the information provided in the ERMP, it is clear that the impact on the environment will be of short duration. It is stated in the ERMP that every reasonable effort will be made to rehabilitate the environment.

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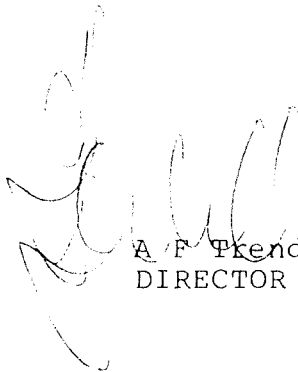


The preferred route is located entirely on the north side of the Swan River and for part of its route it mostly follows the flood plain from Bayswater to East Perth. The ERMP describes in detail the hydrogeological problems likely to be encountered in sinking a pipeline along the flood plain. Standard engineering methods for dealing with these problems are briefly discussed. It should be emphasized that, while groundwater seepage into a pipeline trench along the river flats can be expected to be slow, in local areas of lensing permeable sand seepage rates could be comparatively fast. In areas where the pipeline traverses the old sandy levee slopes of the Swan River the trench may intersect the water table and significant flows may be encountered. Slightly increasing hydraulic heads with depth can be expected in these areas which are usually identifiable by springs or groundwater seepage at the surface. In all cases of groundwater discharge the water should be disposed of correctly as is recommended by the ERMP. The use and disposal of installation water containing chemical additives is addressed by the ERMP and should be emphasized in the final report by the EPA.

The problems of noise and vibration are discussed in the ERMP. In clayey areas, such as along the river foreshore, vibrations during construction may be severely felt in nearby dwellings, particularly if compacting machinery is used.

The preferred pipeline route should be shown on a Department of Lands and Surveys tenure map and included in the ERMP. This would permit an easy check on whether or not the pipeline route crosses privately owned land; and also give credence to the ERMP's statement that: *social impact would be limited to the areas currently used for recreational purposes.*

Providing the points raised in this review are followed, there appears to be no geological or hydrogeological reason why construction of the gas pipeline - as set out in the ERMP - should not be successful.



A. F. Kendall
DIRECTOR

19 April, 1984
GE454PSU135,9/17