APPENDIX B

Depreciated Optimised Replacement Cost

(DORC) Valuation

for the

TUBRIDGI PIPELINE SYSTEM
(WA PL16 & PL 19)

CONTENTS

Depreciated Optimised Replacement Cost (DORC) Summary

1. INTRODUCTION

1.1. Background

The Tubridgi Parties, members of the unincorporated Tubridgi Joint Venture, which owns and operates the Tubridgi Pipeline System, have prepared this depreciated optimised replacement cost (DORC) valuation of the Tubridgi Pipeline System. It has been prepared as part of the Access Arrangement documentation for consideration by the Gas Access Regulator of the Western Australian Office of Gas Access Regulation (the Regulator).

The requirement to prepare an Access Arrangement, and to consider the DORC valuation of a pipeline when establishing the pipeline's Initial Capital Base, is provided for in section 8 of the National Third Party Access Code for Natural Gas Pipeline Systems.

The DORC process involves three steps:

1. Optimising the existing system such that the optimised system represents a reconfigured system using modern technology designed to provide the existing service potential with current technology, and making allowances for growth;
2. Valuing the optimised asset base in replacement cost terms; and
3. Depreciating the optimised replacement cost of the asset base.

The Tubridgi Pipeline System is comprised of two transmission pipelines, the Tubridgi Pipeline (WA PL16) and the Griffin Pipeline (WA PL19). The Transmission Receipt Point for both pipelines is located adjacent to the Tubridgi Gas Processing Plant, 25 kilometres south of Onslow in WA. Both pipelines run parallel to each other in the same easement for approximately 87 kilometres where they connect to Epic Energy's Dampier to Bunbury Natural Gas Pipeline (DBNGP) at Compressor Station No.2 (CS2).

The Tubridgi Pipeline, built in 1991 and fully operational in 1992, has a diameter of 150 millimetres and a nominal maximum wall thickness of 4.7 millimetres. This pipeline currently transports gas produced from the Tubridgi gas field and processed at the Tubridgi Gas Processing Plant to the DBNGP where the gas is sold to AlintaGas. Tubridgi gas has a high inerts content and therefore practical and legal requirements restrict the Tubridgi Parties to delivering a maximum of 23 TJ/day, although the nominal capacity of the Tubridgi Pipeline is approximately 30 TJ/day.

The Griffin Pipeline was constructed in 1993 and became operational in 1994. It has a diameter of 250 millimetres and a nominal maximum wall thickness of 6.2 millimetres. This pipeline has a nominal capacity of 90 TJ/day. Therefore, the Tubridgi Pipeline System has a total maximum nominal capacity of 120 TJ/day.

A route map of the Pipeline is contained at the back of this document.

The Tubridgi Pipeline System encompasses:

- a gas gathering system manifold

- gas export facilities
- custody transfer metering
- A DN150 pipeline (the Tubridgi Pipeline (WA PL16))
- A DN250 pipeline (the Griffin Pipeline (WA PL19))
    - Both pipelines include pig launching and pig receiving facilities, and a 120 metre river crossing of the Ashburton River.
    - The Tubridgi Pipeline has interconnection points with the Tubridgi Gas Processing Plant, the Griffin Pipeline and Western Power's Onslow gas pipeline.
    - The Griffin Pipeline has interconnection points with the Tubridgi Gas Processing Plant, the adjacent Griffin Gas Plant, the export gas pipeline from Thevenard Island and the Onslow Pipeline. The delivery points for both the Tubridgi and the Griffin Pipelines are at CS2 on the DBNGP.

A list of the Pipeline assets is contained at the back of this report.

1.2. Valuation Summary

The DORC value for the Tubridgi Pipeline System, as at 1 July 1999, is $23.76 million. This valuation, as explained below, is based on optimising the separate Tubridgi and Griffin Pipelines into a single pipeline with the same capacity as the combined existing pipelines.

The DORC valuation has been reviewed by an independent third party, consulting engineers Gutteridge Haskins and Davey Pty Ltd.

2. SYSTEM OPTIMISATION

A key issue with optimisation is the amount of unused capacity that should be permitted to be included in the optimised asset base. There is currently a relatively high level of unused capacity in the Tubridgi Pipeline System, which is forecast to increase over the short-term.

However, as outlined below, the Tubridgi Parties acknowledge the market's perception that in the medium term there is substantial potential for growth in usage of the Tubridgi Pipeline System such that its full capacity may be utilised. This view has the support of the National Competition Council (NCC) and the WA Minister for Resources Development, Energy and Education.

Accordingly, and in line with well accepted approaches to optimisation, the Tubridgi Parties believe that the optimised system capacity should be the existing system capacity on the basis that it represents the long term, most efficient method of providing capacity.

2.1. Current Capacity Usage

Under current operating conditions, the Tubridgi Pipeline carries gas sourced from the Tubridgi gas field and processed through the Tubridgi Gas Processing Plant. All current proven natural gas reserves in the Tubridgi gas field are dedicated to AlintaGas. The contract with AlintaGas expires in late 2001 at which time it is expected the Tubridgi gas field will be fully depleted of economically recoverable reserves.

There are two sources of gas transported by the Griffin Pipeline. Firstly, gas produced by the Griffin Joint Venture (BHP Petroleum Pty Ltd (BHP), Mobil Exploration and Producing Pty Ltd (Mobil) and Inpex Alpha Ltd). Gas produced from the Griffin offshore natural gas field is processed at the Griffin Gas Processing Plant, which is adjacent to the Tubridgi Gas Processing Plant. Griffin Gas is purchased by the Tubridgi Parties at its entry into the Griffin Pipeline and is then on-sold to Alcoa of Australia Limited at CS2 on the DBNGP.

The other current source of gas for the Griffin Pipeline is from the offshore gas fields which surround Thevenard Island. This gas is processed on Thevenard Island and then is exported to the Transmission Receipt Point at the entry of the Griffin Pipeline, where it is transported on behalf of CMS Gas Transmission of Australia (CMS) as the Producers' Representative for the Thevenard Island Producers.

Gas transportation agreements cover the contractual arrangements of transporting Thevenard Island gas. Griffin Gas is owned by the Tubridgi Parties and is transported on their own behalf.

As previously mentioned, the Tubridgi Pipeline has a nominal capacity of 30 TJ/day and the Griffin Pipeline has a nominal capacity of 90 TJ/day. Due to the inert content of Tubridgi reservoir gas, the flow of gas through the Tubridgi Pipeline is limited to 23 TJ/day, although the current daily quantities are in the order of 15 TJ. The Griffin Pipeline is also currently transporting approximately 15 TJ/day.

2.2. Forecast Capacity Usage

The Tubridgi Pipeline System is expected to carry a total of more than 10 PJ in each of the next two years. In the remaining three years of the initial Access Arrangement Period, demand is expected to decline to a low of just 1PJ in 2003/04. Whilst there are no definite forecasts of usage beyond the short term, the recent public process regarding the application for revocation of coverage of the Tubridgi Pipeline indicated a future requirement for the usage of both the Tubridgi Pipeline and the Griffin Pipeline, even though they are currently significantly underutilised.

Both the NCC and the WA Minister for Resources Development, Energy and Education (the Minister), through his Department, the WA Office of Energy, found there were compelling reasons for the continued coverage of the Tubridgi Pipeline.

BHP, Mobil, CMS and Western Power Corporation all made separate submissions to the NCC indicating the potential demand for services which could be provided by the Tubridgi Pipeline.

The NCC in its final recommendation on 30 July 1999 stated:

> *"The Council considers that in assessing the likelihood that access to the Tubridgi Pipeline will encourage competition amongst gas producers, it is important to focus on likely future developments rather than focus on what has occurred historically. While history may be a guide to likely future developments, it is also reasonable when assessing likely future development to take into account the views of current gas producers in the region. On the evidence available to it, the Council considers that it is reasonably likely that third party access to the Tubridgi Pipeline will be sought within a reasonable period."*

The Minister, in his final decision dated 20 August 1999, said:

> *"I consider that access to the Tubridgi Pipeline is likely to promote competition amongst gas producers by encouraging exploration and the development of additional gas fields in the Carnarvon Basin. I also consider that the presence of additional sources of gas may place competitive pressures on gas producers to supply gas at cheaper rates or on better terms and therefore the ability to obtain access to the (Tubridgi) Pipeline may also promote competition in the energy market of Western Australia.*
>
> *The Tubridgi Pipeline could provide additional gas transport capacity and may therefore promote competition if the Griffin Pipeline became capacity constrained and not able to fully meet the requirements of gas producers in the Carnarvon Basin once fields such as the Macedon (offshore gas) field are developed.*
>
> *The Tubridgi Pipeline also could be used to transport gas of a different specification to the Griffin Pipeline where this was necessary to meet the requirements for delivery of gas. In addition to the options raised by the submissions, the Tubridgi Pipeline could potentially be used to transport industrial quality gas in the event an industrial quality pipeline emerges as one possible outcome of the Expressions of Interest process for additional pipeline capacity to the South West currently undertaken by the Western Australian Government."*

BHP and Mobil, both participants in the Macedon Joint Venture, have indicated the development of this offshore gas field will require pipeline capacity of up to 120 TJ/day, which is equal to the total capacity of the Tubridgi Pipeline System.

Based on the information and views above, the Tubridgi Parties have optimised the Tubridgi Pipeline System as a single pipeline with a nominal capacity of 120 TJ/day.

It should be noted that the optimisation process performed as part of the DORC methodology has been completed in accordance with the best current design practices which exist in the Australian gas pipeline industry.

3. REPLACEMENT COST

3.1. Overview

Assumptions made to calculate the replacement cost of the depreciated optimised pipeline system:

i. As outlined above, the construction of a notional single pipeline with the same capacity as the Tubridgi Pipeline and the Griffin Pipeline combined has been assumed. The Tubridgi Pipeline became fully operational in 1992 and the Griffin Pipeline was first used in 1994. Therefore, it has been assumed the notional single pipeline was installed ready for use in 1993, the midpoint between the two existing pipeline's operational start dates.

ii. The use of Modern Engineering Equivalent (MEE), being a welded high strength (X-70) steel, polyethylene-coated pipeline, which is based on proven technology and accepted as common practice within the pipeline construction industry.

iii. The system operates with protected steel at transmission pressure.

iv. The Replacement Cost is based on economies of scale, and not piecemeal extensions.

v. The Replacement Cost per metre of pipeline is built up from budget quotations from suppliers for major material supply, together with estimates of the quantities and rates which an efficient contractor could reasonably be expected to quote for contracts of a similar size and location. The quantities are derived from an examination of the route and design of the existing pipeline. The rates are derived from past experience for similar projects, suitably adjusted for current market conditions.

vi. Pricing for materials and labour rates is based on typical and sustainable market conditions.

vii. The Replacement Cost assumes that all existing infrastructure which impacts upon the Replacement Cost, such as roads, rural communities, power supply and telecommunications is in place (ie a brownfields valuation).

viii. The gas suppliers can produce gas at the Maximum Allowable Operating Pressure (MAOP) of the pipeline.

3.2. Transmission Pipe

3.2.1. Project Management, Design, and Supervision

Project management, design and supervision costs have been based on the actual costs incurred for these items in building the Griffin Pipeline in 1993, and adjusted for inflation accordingly.

3.2.2. Land Management, Environmental and Cultural Heritage

The process of addressing these issues is now more thorough and extensive than under the regulatory environment existing when the existing pipelines were constructed in the early 1990's.

A lump sum of $600,000, allocated as $480,000 for environment and indigenous issues, and $120,000 for shire and pastoralist compensation, was adopted to reflect current industry practice and reasonable costs.

3.2.3. Line Pipe, Major Valves & Other Materials

A budget quotation for supply of line pipe for a pipeline capable of transporting 120 TJ/day was obtained from Tubemakers Piping Systems.

Major valve quantities and costs have been derived from relevant experience in past projects, and recent quotations.

The cost of other materials has been adjusted for inflation, and the "six tenths" rule in adjusting size applied as appropriate. The "sixths tenths" method is a common engineering rule of thumb which acknowledges that, for example, if the size of a pipeline was to be doubled only sixth tenths of the original cost would be incrementally incurred, rather than twice the expenditure.

3.2.4. Pipeline Construction

Pipeline construction costs have been estimated from relevant experience in past projects, pro-rated to this Pipeline, and adjusted where applicable to reflect current industry practice.

3.2.4.1 Meter Stations

Replacement costs have been based on the actual costs for the fabrication and installation of the metering station at the time the Griffin Pipeline was constructed, and adjusted for inflation accordingly.

The meter stations at both the start of the Tubridgi Pipeline System adjacent to the Tubridgi Gas Processing Facility and at CS2 on the DBNGP are included.

3.3. SCADA and Communications

Advances in technology have seen an increase in capability, and a reduction in capital costs since the Tubridgi Pipeline and the Griffin Pipeline were constructed. This is partly offset by the tendency to apply the increased capability. Industry practice suggests a deflation in capital cost of 13.5% would be appropriate in applying 1993 costs to a replacement in 1999.

3.4. Replacement Cost Summary

The table below lists the Optimised Replacement Cost (ORC) values for the various asset categories:

ASSET CATEGORY FOR THE TUBRIDGI PIPELINE SYSTEM	***Optimised Replacement Cost (ORC) $m***
Transmission Pipe	20.29
Design/Management/Supervision/Environmental, Right of Way	2.3
Ashburton River Crossing	0.3
Sub-Total	**22.89**
Metering and Regulation Stations	3.0
SCADA and Communications	0.2
TOTAL	**26.09**

The above valuation only relates to those parts of the Tubridgi Pipeline System which are used to provide the Haulage Reference Service in the Tubridgi Pipeline System Access Arrangement. Other assets included in the construction of the Pipeline, such as gas storage and injection facilities, are not included in this valuation.

4. USEFUL LIFE

Useful lives of the respective assets have been determined in accordance with operating experience and industry benchmarks.

The table below summarises the useful lives of each of the asset categories, with the comparison to useful lives quoted in other access arrangements.

Asset Category	***Distribution/Transmission Network***	***Useful Life (years)***
Transmission Pipe	Tubridgi Pipeline / Griffin Pipeline	80
	AGL Central West	80
	EPIC Moomba/Adelaide	79
	EAPL Moomba/Sydney	60/80 [1]
Metering & Regulation Stations	Tubridgi Pipeline / Griffin Pipeline	50
	AGL Central West	50
	SA Distribution Network	50
	AGL Distribution Network	50
	TPA	39-60
SCADA & Communications	Tubridgi Pipeline / Griffin Pipeline	15
	AGL Central West	10
	SA Distribution Network	10
	AGL Distribution Network	5-10
	GSN Distribution Network	20
	Vic. Distribution Network	10

The existing Tubridgi Pipeline and Griffin Pipeline have been properly constructed and maintained, having regard for the conditions in which they are operated. This premise is carried through for the optimised pipeline. The Tubridgi Parties believe these pipelines can sustain a physical useful life of 80 years.

As referred to in section 2.2, there is strong belief held by many parties that the capacity of the Tubridgi Pipeline System will be utilised in the decades to come. Therefore, the economic useful life of the optimised pipeline is equal to its physical useful life of 80 years.

[1] Eastern Australia Pipeline Limited Access Arrangement Information, 5 May, 1999, p27

5. RESIDUAL VALUE

Straight-line depreciation over the economic useful life has been used. No residual values have been assumed at this stage, and it is likely there would be a net cost to abandon the Tubridgi Pipeline System at the end of its physical useful life. Any abandonment of the pipelines would be in accordance with AS2885.3-1997 "Pipelines-Gas and Liquid Petroleum, Part 3 Operations and Maintenance".

6. CAPITAL COST COMPARISON

In order to determine the reasonableness of the total replacement cost for the Pipeline, a comparison has been made with other transmission pipeline projects.

The following table compares the Pipeline Optimised Replacement Cost (ORC), expressed in $/mm/km with other gas transmission pipelines constructed in Australia.

Pipeline/ Owner	***When constructed***	***Length (km)***	***Diameter (mm)***	***Unit Cost $/mm/km***
Whyalla Lateral	1989	71	200	1217
Gladstone to Rockhampton	1991	96	200	961
Junee to Griffith	1993	170	150	808
Marsden to Dubbo	1998	130 125	200 150	623
Tubridgi Pipeline System	**1993**	**87.3**	**300 (optimised)**	**996**

While there are difficulties in making meaningful comparisons between pipelines due to factors such as terrain, location, river crossings, number of compressors, etc, the above table illustrates that the derived replacement cost for the notional single pipeline is commensurate with other similar pipelines constructed around the country.

7. DORC VALUATION

The table below lists the ORC, accumulated depreciation and resultant DORC values for each asset category.

Asset Category	***ORC*** ***$m***	***Accumulated Depreciation*** ***$m***	***DORC*** ***$m***
Transmission Pipe	22.900	1.861	21.039
Metering & Regulation Stations	2.989	0.388	2.601
SCADA & Communications	0.203	0.088	0.115
TOTAL	**26.092**	**2.337**	**23.755**

List of Pipeline Assets

- Meter Station at beginning of Tubridgi Pipeline System
- Meter Station at end of the Tubridgi Pipeline System at interconnect with CS2 on the DBNGP
- Steel Pipeline
- Major Valves
- Pig Traps
- SCADA equipment
- Communications equipment
- Spare parts
- Tie-in equipment
- Tie-in instruments and controls

The Tubridgi Parties

Company	***Address***	***Interest***
SAGASCO South East Inc (ARBN: 002 382 023)	60 Hindmarsh Square ADELAIDE SA 5000	51.15%
Boral Energy Petroleum Pty Ltd (ACN: 010 728 962)	60 Hindmarsh Square ADELAIDE SA 5000	2.80%
Boral Energy Amadeus NL (ACN: 010 137 121)	60 Hindmarsh Square ADELAIDE SA 5000	2.70%
Pan Pacific Petroleum NL (ACN: 000 749 799)	Level 3, Tandem House 76 Berry Street NORTH SYDNEY NSW 2060	43.00%
Tubridgi Petroleum Pty Ltd (ACN: 076 850 881)	Level 3, Tandem House 76 Berry Street NORTH SYDNEY NSW 2060	0.35%
TOTAL		100%

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Map of Pipeline Route