Access Arrangement Information for the Dampier to Bunbury Natural Gas Pipeline

INDEPENDENT GAS PIPELINES ACCESS REGULATOR
WESTERN AUSTRALIA

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CONTENTS

1 INTRODUCTION

This document comprises the Access Arrangement Information for the Dampier to Bunbury Natural Gas Pipeline pursuant to the requirements of the *Gas Pipelines Access (Western Australia) Act 1998*, which incorporates the *National Third Party Access Code for Natural Gas Pipeline Systems* ("Code").

2 ACCESS AND PRICING PRINCIPLES

2.1 FIRM SERVICE

Section 3.3 of the Code requires Epic Energy's Access Arrangement to offer a Reference Tariff for at least one service sought by a significant part of the market.

The Reference Tariff for Firm Service offered by Epic Energy in its Access Arrangement is such a Reference Tariff.

2.2 NON-REFERENCE SERVICES

Section 3.3 of the Code requires Epic Energy's Access Arrangement to offer a Reference Tariff for at least one service sought by a significant part of the market.

In addition to the Reference Service, Epic Energy will, subject to operational availability and commercial feasibility, make available to a prospective shipper the following Service or Services:

(i) Secondary Market Service;

(ii) Park & Loan Service;

(iii) Seasonal Service;

(iv) peaking service;

(v) metering information service;

(vi) pressure and temperature control service;

(vii) odorisation service;

(viii) co-mingling service.

Each of the above services named in this section 2.2 is known as a Non-Reference Service. The Non-Reference Services offered by Epic Energy are intended to cater to prospective shippers on an individual basis. Some of them are described in more detail below.

(i) Secondary Market Service

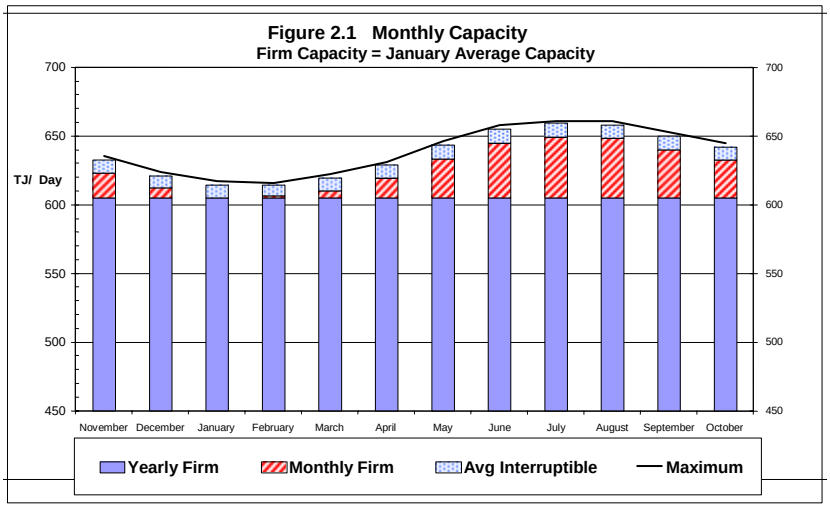
Epic Energy supports a secondary, or "spot", market for gas using unutilised capacity on the DBNGP. Shippers with unutilised Firm Service capacity will be able to "post" all or any part of that unutilised capacity for a day in the Secondary Market, and sell it to Approved Third Parties on a firm basis.

Epic Energy will also offer spare capacity it may have available in the DBNGP for sale on a Day, in the Secondary Market. This Secondary Market Service will be made available on a Day by Day basis only. Shippers will not be able to contract with Epic Energy for Epic Energy's Secondary Market Service capacity for extended periods.

Capacity which Epic Energy may offer as Secondary Market Service will be offered in competition with Shippers offering unutilised capacity in the Secondary Market. As a result there is substantial uncertainty regarding the future revenue that Epic Energy can expect from that service. Secondary Market Service is therefore a rebateable service.

(ii) Seasonal Service

Capacity in the DBNGP varies inversely with ambient temperature (see Figure 2.1). A higher pipeline capacity is available during winter months when ambient temperatures are low. A lower capacity is available during summer months, with the lowest capacity usually available in January. The pipeline capacity determined assuming January conditions ("Yearly Firm" in Figure 2.1) is the capacity made available to users of Firm Service. During the remaining eleven months of the year, capacity will usually be higher than the Firm Service capacity, and the difference ("Monthly Firm" in Figure 2.1) can be made available to shippers with seasonal variation in their gas transportation requirements. This will be after taking into account Epic Energy's obligations under pre Access Arrangement contracts.



Shipper requirements for seasonal capacity, which can only be made available on a seasonal basis, are uncertain, and the revenue which might be obtained is also uncertain. Seasonal Service is therefore a rebateable service.

(iii) Park and Loan

Shippers or prospective shippers serving end users with gas demands that are difficult to predict from day to day, or when faced with an outage from their gas supplier, may find the maintenance of their imbalances within the tolerance specified in the Access Arrangement difficult. To assist these shippers and prospective shippers, Epic Energy will offer a Park and Loan Service, permitting limited gas storage in the DBNGP, and/or taking of additional gas from the DBNGP when required. Epic Energy's ability to offer a Park and Loan Service is restricted by the operating characteristics of the DBNGP.

Park and Loan Service is likely to be required only by those few shippers supplying gas to end users with unpredictable patterns of demand or to cover spasmodic

occurrences caused by ad hoc incidents, making revenue obtained from the service uncertain. Accordingly, Park and Loan Service is offered as a rebateable service.

(v) Peaking service

This service will enable an increase in the MHQ at a Delivery Point for a specified period.

(vi) Metering Information service

This service will entail the provision of metering and operational data directly to a third party in addition to the data Epic Energy agrees to provide under an Access Contract for any other Reference Service.

(vii) Pressure and Temperature Control Service

This service will entail the provision by Epic Energy of a service to vary the temperature and/or pressure at which Epic Energy shall deliver gas at a Delivery Point.

(viii) Odorisation Service

This service will entail the provision of a service by Epic Energy to odorise the gas being delivered at a Delivery Point.

(ix) Co-mingling service

This service entails the agreement by Epic Energy with a Shipper to blend Out – of - Specification Gas with the main gas stream such that the aggregate of the main gas stream is within specification.

In addition to the rebateable Non-Reference Sservices, Epic Energy will provide services to shippers with gas transportation contracts entered into before commencement of the Access Arrangement.

3 TARIFF DETERMINATION METHODOLOGY

3.1 TARIFF STRUCTURE

3.1.1 Pricing Zones

The DBNGP has been divided into 12 pricing zones in so far as the Reference Tariff relates to the Pipeline Capacity Charge. The Zones are listed in Table 1. Zone 1 commences at the Dampier receipt point which is located on the Burrup Peninsula immediately downstream of Woodside Petroleum's gas processing and liquefaction facilities.

Table 1: Pipeline Zones

Zone	Downstream Zone Boundary	Zone Length	Delivery Points In Zone
1a	30 km downstream of Dampier Receipt Point	30 km	Hamersley Iron Robe River Port Hedland
1b	1 km downstream of CS2 downstream isolating valve (MLV 30)	244 km	
2	1 km downstream of CS3 downstream isolating valve (MLV 42)	137 km	
3	1 km downstream of CS4 downstream isolating valve (MLV 54)	138 km	
4	1 km downstream of CS5 downstream isolating valve (MLV 66)	138 km	
4a	Zone extends from branch of DBNGP mainline at MLV 55 to Carnarvon Power Station	170 km	Carnarvon Power Station
5	1 km downstream of CS6 downstream isolating valve (MLV 78)	140 km	
6	1 km downstream of CS7 downstream isolating valve (MLV 90)	142 km	Eradu Road
7	1 km downstream of CS8 downstream isolating valve (MLV 102)	147 km	Geraldton (Nangetty Road) Mungarra Pye Road Mondarra Mount Adams Road Eneabba
8	1 km downstream of CS9 downstream isolating valve (MLV 114)	143 km	
9	Upstream flange of Kwinana Junction valve V4 and upstream flange of valve HV401A	141 km	Muchea Pinjar Della Road Ellenbrook Harrow Street Caversham Welshpool Forrestdale Russell Road

Zone	Downstream Zone Boundary	Zone Length	Delivery Points In Zone
10	Downstream flange of joint immediately downstream of MLV 157	131 km	Wesfarmers LPG Australian Gold Reagents Kwinana West lateral: Alcoa Kwinana Kwinana Power Station Barter Road/HiSmelt Rockingham lateral: Mission Energy Cogeneration Kwinana Beach Road Thomas Road WMC Rockingham Pinjarra Main line South: Alcoa Pinjarra Oakley Road Alcoa Wagerup Harvey Worsley South West Cogeneration Kemerton Clifton Road

Zones 1a and 1b are part of a gas production/gathering zone, although an Access Contract for the Firm Service may make provision for receipt of gas into the DBNGP at any location along the length of the DBNGP.

Zone 1a extends from the Domgas receipt point to a point on the DBNGP 30 km downstream of Dampier.

Zone 1b extends from the downstream boundary of Zone 1a to the downstream boundary of Zone 1a to 1 km downstream of the downstream isolating valve (MLV 30) at Compressor Station 2.

Zones downstream of Zone 1b (other than Zone 4a) are of roughly equal length, with each Zone being approximately 140 km. Each of Zones 2 to 8 terminate 1 km downstream of a compressor station. Zone 9 terminates at Kwinana Junction, and Zone 10 terminates at the end of the DBNGP (downstream of MLV 157) immediately downstream of the Clifton Road meter station in the Bunbury area.

Zone 4a extends from the branching point on the DBNGP mainline at MLV 55 into the town of Carnarvon, some 170 kilometres to the west.

Commercially significant delivery points are located in Zone 7 (Geraldton and the Mid-West), Zone 9 (Perth and the surrounding urban area), and Zone 10 (the Kwinana industrial area and south to Bunbury).

3.1.2 Multi Part Tariff Structure

The Reference Tariff comprises a multi-part tariff as follows:

1. Pipeline Capacity Charge

   The Pipeline Capacity Charge payable by a Shipper is the product of the Pipeline Capacity Charge rate and the shipper's MDQ. The Pipeline Capacity Charge is payable for each Zone between a Shipper's Receipt Point and Delivery Point (including the Zones in which the receipt point and the delivery point are located).

2. Compression Capacity Charge

   The Compression Capacity Charge is payable by a shipper for each compressor station located between that shipper's receipt point and delivery point. The Compression Capacity Charge is the product of the Compression Capacity Charge rate and the shipper's MDQ.

3. Compressor Fuel Charge

   The Compressor Fuel Charge is payable by a shipper in respect of each compressor station located between the shipper's receipt point and delivery point. The Compressor Fuel Charge is the product of the Compressor Fuel Charge rate and the quantity of gas actually delivered to the shipper at the delivery point on a Day.

4. Delivery Point Charge

   The Delivery Point Charge is an annual fixed charge which recovers the cost of the delivery point facilities used by the shipper. Where gas is delivered to more than one shipper at a delivery point, the Delivery Point Charge is shared between shippers on the basis of the total quantity of gas delivered at the delivery point.

3.1.3 Cost Allocation

The costs recovered by each component of the Reference Tariff are indicated in Table 2.

Table 2 - Allocation of Forecast Total Cost Components to Charge Rates

Charge rate
Pipeline capacity charge rate
Recovers
Pipeline asset return by zone
Pipeline asset depreciation by zone
Pipeline maintenance costs by zone
Other assets return
Other assets depreciation
Other non-capital costs
Recovery basis
Passthrough MDQ in each zone
Delivery point MDQ
Compression capacity charge rate
Recovers
Compressor station asset return by compressor station
Compressor station asset depreciation by compressor station
Compressor station maintenance costs by compressor station
Recovery basis
Passthrough MDQ for each compressor station
Compressor Fuel Charge rate
Recovers
Compressor fuel costs by compressor station
Recovery basis
Passthrough volume for each compressor station
Delivery point charge
Recovers
Metering assets return by delivery point
Metering assets depreciation by delivery point
Recovery basis
Fixed charge

The Reference Tariff has been determined under an assumption that all Shippers, including those with gas transportation agreements entered into before the commencement of the Access Arrangement, are users of the Reference Service.

Asset-related costs have been determined for each of the component charges of the Reference Tariff in accordance with the value ascribed to the assets and by calculation of the asset-return and depreciation costs for the particular assets to which each charge relates.

Compressor Station maintenance costs and compressor station fuel costs are attributed to each Compressor Station and recovered accordingly through the Compressor Station Capacity Charge and Compressor Station Fuel Charge.

Pipeline maintenance costs and Other Non Capital Costs are attributed to pipeline zones on the basis of zone length as a proportion of the total length of the pipeline, and recovered through the Pipeline Capacity Charge.

3.2 INCENTIVE STRUCTURES

The Reference Tariff Policy set out in the Access Arrangement provides for Reference Tariff adjustment in accordance with a predetermined price path. The Reference Tariff will be adjusted annually by 67 per cent of the increase in the CPI.

Price path regulation provides Epic Energy with an incentive to minimise the costs of delivering the Reference Service. With the Reference Tariff constrained to increasing at no more than 67 per cent of the increase in CPI, reductions in the cost of delivering the Reference Service increase profits, and these increases in profits are retained at least until the end of the Access Arrangement Period.

If Epic Energy is able to increase demand for the Reference Service above the forecast quantities used in tariff determination, its revenue from sales will exceed the forecast revenue. To the extent that the increase in demand can be accommodated without a proportionate increase in cost, Epic Energy will generate higher than expected profits. These higher profits are retained at least until the end of the Access Arrangement Period.

A second structure of incentives for Epic Energy to reduce the costs of delivering the Reference Service is provided through the offering of a number of Non-Reference Services as rebatable services.

In offering these rebatable services, Epic Energy is seeking to expand utilisation of the DBNGP asset. To the extent that it is able to secure a market for rebatable services, Epic Energy will retain a portion of the revenue generated. A further portion of that revenue will be returned to shippers using the Firm Service, effectively lowering their costs of gas transportation.

3.3 FIXED AND VARIABLE COSTS

The costs recovered through the Pipeline Capacity Charge are fixed costs. They do not vary with pipeline throughput. The level of these costs is determined by the total requirement for pipeline capacity and they have been recovered on the basis of Shippers' contracted capacity requirements in each zone.

The costs recovered through the Compression Capacity Charge are essentially fixed costs, the level of which is determined by requirements for pipeline capacity. Accordingly, they have been recovered on the basis of shipper's contracted capacity requirements through each compressor station.

Compressor fuel costs are the only variable costs associated with operation of the DBNGP. They are recovered from shippers on the basis of the quantity of gas passing through each compressor station.

The Delivery Point Charge recovers the capital costs – metering asset return and metering asset depreciation – of facilities at each delivery point. It is a fixed charge. The costs of maintaining delivery point facilities are small relative to the capital costs, and are captured as pipeline maintenance costs and recovered through the Pipeline Capacity Charge.

4 INFORMATION REGARDING CAPITAL COSTS

4.1 ASSET VALUES

The Initial Capital Base has been established at a value of $1,550 million as at 31 December 1999 in accordance with the Final Decision of the Independent Gas Pipelines Access Regulator.[1]

The allocation of the Initial Capital Base to assets is as follows.

- A fixed value of 10.24 million is allocated to non-depreciable assets, including provision for land assets, linepack and working capital.
- The remainder of the asset value is allocated to asset classes (pipeline assets, compression assets and metering assets and other depreciable assets) in the same proportions as evident from the proposed Access Arrangement submitted by Epic Energy on 15 December 1999.
- Within each of the classes of assets of compression assets, metering assets and other depreciable assets, asset value is attributed to individual assets with each class in the same proportions as evident from the proposed Access Arrangement submitted by Epic Energy on 15 December 1999.
- For the class of assets of pipeline assets, asset value is allocated to each of Zones 1a to 10 of the pipeline consistent with Epic Energy's proposed zonal tariff structure (with step changes in the Pipeline Capacity Charge across zone boundaries) and to achieve similar relativities between the 100 percent load-factor tariff for the Firm Service at 1 January 2000 (excluding the Delivery Point Charge) in each zone and the 100 percent load-factor tariff for the T1 Service that would have applied to a Shipper in each zone at 1 January 2000. This allocation of asset value was determined as follows.
  - For each of Zones 1a to 8, the 100 percent load factor tariff for the T1 Service was calculated as if a Shipper of the T1 Service was located at the mid point of each zone, except for Zone 4a for which it was assumed that the Shipper was located at the end of the lateral pipeline (to Carnarvon) that comprises Zone 4a.
  - For Zone 10, the 100 percent load factor tariff for the T1 Service was calculated as if a Shipper of the T1 Service was located at Kwinana Junction.
  - An allocation of pipeline asset value to each pipeline zone was determined that resulted in a similar proportional difference between the 100 percent load-factor tariff for the Firm Service (excluding the Delivery Point Charge) in each zone and the 100 percent load-factor tariff for the T1 Service, subject to a constraint that the 100 percent load-factor tariff for the Firm Service (excluding the Delivery Point Charge) in Zone 10 (and downstream of Compressor Station 10) is 108 percent of the

[1] Independent Gas Pipelines Access Regulator Western Australia, 23 May 2003,Final Decision: Access Arrangement Dampier to Bunbury Natural Gas Pipeline, para 724.

100 percent load-factor tariff for the Firm Service (excluding the Delivery Point Charge) in Zone 9.

Asset values by class of assets as at 31 December 1999 are indicated in Tables 3 to 6.

Table 3: Asset Value by Asset Class

Asset	Percent of Total Asset Value	Asset Value at 31 December 1999 ($ million)
Pipeline assets	81.49	1,263.15
Compression assets	13.65	211.60
Metering assets	1.12	17.35
Other assets		
Depreciable	3.07	47.66
Non-depreciable (land and pipeline linepack)	0.66	10.24
Total	100.00	1,550.00

Table 4: Pipeline Asset Value by Pipeline Zone

Asset	Percent of Total Pipeline Asset Value	Asset Value at 31 December 1999 ($ million)
Pipeline assets		
Zone 1a	1.12	14.12
Zone 1b	9.83	124.18
Zone 2	15.20	191.99
Zone 3	8.99	113.52
Zone 4	10.26	129.64
Zone 4a	0.29	3.66
Zone 5	8.94	112.87
Zone 6	9.27	117.08
Zone 7	10.64	134.40
Zone 8	9.31	117.57
Zone 9	10.04	126.86
Zone 10	6.12	77.25
Total	100.00	1,263.15

Table 5: Compressor Asset Value by Compressor Station

Asset	Percent of Total Compression Asset Value	Asset Value at 31 December 1999 ($ million)
Compression assets		
Compressor station 1	6.90	14.59
Compressor station 2	7.48	15.82
Compressor station 3	12.74	26.96
Compressor station 4	7.26	15.36
Compressor station 5	12.88	27.25
Compressor station 6	14.18	30.00
Compressor station 7	6.98	14.77
Compressor station 8	13.14	27.80
Compressor station 9	14.51	30.71
Compressor station 10	3.95	8.35
Total	**100.00**	**211.60**

Table 6: Metering Asset Value by Delivery Point

Asset	Percent of Total Metering Asset Value	Asset Value at 31 December 1999 ($ million)
Delivery Point		
Hamersley Iron	3.41	0.59
Robe River	2.17	0.38
Carnarvon	2.00	0.35
Eradu Road	1.53	0.27
Oakajee	0.00	0.00
Geraldton (Nangetty Road)	1.88	0.33
Mungarra	2.96	0.51
Pye Road	1.87	0.32
Mondarra	1.71	0.30
Mount Adams Road	1.82	0.32
Eneabba	1.96	0.34
Muchea	2.47	0.43
Della Road	1.33	0.23
Pinjar	7.61	1.32
Ellenbrook	1.73	0.30
Harrow Street	2.66	0.46
Caversham	1.92	0.33
Welshpool	2.87	0.50
Forrestdale	2.87	0.50
Russell Road	1.92	0.33
Wesfarmers LPG		
Australian Gold Reagents	1.63	0.28
Alcoa Kwinana	4.66	0.81
Kwinana Power Station	8.52	1.48
Barter Road/HiSmelt	3.70	0.64
Mission Energy Cogeneration	1.61	0.28
Beach Road (Kwinana)	2.08	0.36
Thomas Road	2.50	0.43
WMC	1.67	0.29
Rockingham	1.88	0.33
Pinjarra	1.86	0.32
Alcoa Pinjarra	6.10	1.06
Oakley Road	1.61	0.28
Alcoa Wagerup	4.30	0.75
Harvey	2.02	0.35
Worsley	4.03	0.70
South West Cogeneration	1.33	0.23
Kemerton	1.76	0.31
Clifton Road	2.02	0.35
Total	**100.00**	**17.35**

4.2 NEW FACILITIES INVESTMENT

The value of New Facilities Investment for the Access Arrangement Period has been established at values indicated in Table 7 in accordance with the Final Decision of the Independent Gas Pipelines Access Regulator.[2]

Table 7: Forecast New Facilities Investment (31 December 1999 $million, year ending 31 December)

Year ending 31 December	2000	2001	2002	2003	2004	Total
Pipeline	0.43	0.28	0.16	0.36	0.16	1.38
Compression	0.96	4.35	4.45	1.83	1.85	13.44
Metering	0.00	0.05	0.05	0.05	0.05	0.20
Other	5.06	5.04	5.72	4.72	0.52	21.06
Total	6.45	9.72	10.38	6.96	2.58	36.08

The allocation of the New Facilities Investment to asset classes and pipeline zones is as proposed by Epic Energy in the proposed Access Arrangement submitted by Epic Energy on 15 December 1999.

4.3 RATE OF RETURN

The Rate of Return for the Access Arrangement Period has been established using the Capital Asset Pricing Model (CAPM) with the calculation methodology and parameter values as described in the Draft and Final Decisions of the Independent Gas Pipelines Access Regulator.[3] The CAPM parameter values and Rate of Return values are indicated in Table 8. A Rate of Return value rounded to one decimal place (7.4%) has been used in calculation of Total Revenue.

[2] Independent Gas Pipelines Access Regulator Western Australia, 23 May 2003, Final Decision: Access Arrangement Dampier to Bunbury Natural Gas Pipeline, para 724.

[3] Independent Gas Pipelines Access Regulator Western Australia, 23 May 2003, Draft Decision: Access Arrangement Dampier to Bunbury Natural Gas Pipeline, Part B pp189–210; Independent Gas Pipelines Access Regulator Western Australia, 23 May 2003, Final Decision: Access Arrangement Dampier to Bunbury Natural Gas Pipeline, para 310–330, 724.

Table 8: CAPM Parameter Values and Rate of Return

Parameter	Parameter symbol	Value
Risk free rate (nominal)	R_f	5.28%
Market risk premium	–	6.0%
Asset beta	β_a	0.60
Equity beta	β_e	1.20
Debt beta	β_d	0.20
Cost of debt margin		1.20%
Corporate tax rate	T	31.4%
Franking credit value	γ	50%
Debt to total assets ratio	D/V	60%
Equity to total assets ratio	E/V	40%
Expected inflation	π_e	2.25%
Return on Equity		
Nominal post-tax		12.48%
Real post-tax		10.00%
Nominal pre-tax		14.80%
Real pre-tax		12.28%
Rate of Return (WACC)		
Nominal post-tax		6.73%
Real post-tax		4.38%
Nominal pre-tax		9.81%
Real pre-tax		7.39%

4.4 DEPRECIATION

Depreciable assets were depreciated by a straight-line methodology according to assumptions indicated in Tables 9 to 11 for asset lives and the averaging remaining lives for assets in existence at 31 December 2001.

A regulatory asset account showing values of capital expenditure and Depreciation over the Access Arrangement Period and the residual asset value is provided in Table 12.

Table 9: Assumed Asset Lives

Asset	Asset Life (years)	Averaging Remaining Asset Life at 31 December 1999 (years)
Pipeline assets	30	54.50
Compression assets	30	19.34
Metering assets	50	39.98
Other depreciable assets	30	16.85

Table 10: Assumed Compressor Compression Asset Lives by Compressor Station

Asset	Asset Life (years)	Remaining Asset Life at 31 December 1999 (years)
Compression assets		
Compressor station 1	30	19.75
Compressor station 2	30	13.75
Compressor station 3	30	17.40
Compressor station 4	30	13.75
Compressor station 5	30	19.75
Compressor station 6	30	21.49
Compressor station 7	30	13.75
Compressor station 8	30	19.75
Compressor station 9	30	25.75
Compressor station 10	30	28.25

Table 11: Assumed Metering Asset Lives by Delivery Point

Asset	Asset Life (years)	Averaging Remaining Asset Life at 31 December 1999 (years)
Delivery Point		
Hamersley Iron	50	36.08
Robe River	50	34.75
Carnarvon	50	38.25
Eradu Road	50	48.25
Oakajee	50	50.00
Geraldton (Nangetty Road)	50	35.92
Mungarra	50	39.75
Pye Road	50	44.92
Mondarra	50	48.25
Mount Adams Road	50	48.25
Eneabba	50	36.67
Muchea	50	41.08
Della Road	50	48.25
Pinjar	50	40.33
Ellenbrook	50	45.67
Harrow Street	50	35.00
Caversham	50	35.00
Welshpool	50	35.00
Forrestdale	50	35.00
Russell Road	50	36.83
Wesfarmers LPG		
Australian Gold Reagents	50	47.08
Alcoa Kwinana	50	34.75
Kwinana Power Station	50	34.83
Barter Road/HiSmelt	50	36.08
Mission Energy Cogeneration	50	47.08
Beach Road (Kwinana)	50	37.08
Thomas Road	50	48.25
WMC	50	34.83
Rockingham	50	38.08
Pinjarra	50	43.58
Alcoa Pinjarra	50	34.67
Oakley Road	50	38.92
Alcoa Wagerup	50	34.75
Harvey	50	39.00
Worsley	50	35.50
South West Cogeneration	50	38.50
Kemerton	50	48.25
Clifton Road	50	34.92

Table 12: Regulatory Asset Accounting (31 December 1999 $million, year ending 31 December)

	2000	2001	2002	2003	2004
Beginning of year balance					
Physical asset account	1,550.00	1,518.69	1,490.43	1,462.52	1,430.85
Depreciation: physical asset account	(37.76)	(37.97)	(38.29)	(38.63)	(38.85)
New Facilities Investment	6.45	9.72	10.38	6.96	2.58
End of year balance					
Physical asset account	1,518.69	1,490.43	1,462.52	1,430.85	1,394.58

5 INFORMATION REGARDING NON CAPITAL COSTS

Non Capital Costs for the Access Arrangement Period are indicated in Table 13. The Non Capital Costs are as required by the Final Decision of the Independent Gas Pipelines Access Regulator.[4]

Table 13: Forecast New Facilities Investment (31 December 1999 $million, year ending 31 December)

Year ending 31 December	2000	2001	2002	2003	2004	Total
Total Non Capital Costs	38.41	39.58	41.83	42.09	41.65	203.56

[4] Independent Gas Pipelines Access Regulator Western Australia, 23 May 2003, Final Decision: Access Arrangement Dampier to Bunbury Natural Gas Pipeline, para 347–363, 724.

6 TOTAL REVENUE

6.1 CALCULATION METHODOLOGY

The Total Revenue has been calculated by the Cost of Service methodology as described in section 8.4 of the Code, wherein the Total Revenue is equal to the cost of providing all Services (some of which may be the forecast of such costs), and with this cost to be calculated on the basis of:

- a return (Rate of Return) on the value of the capital assets that form the Covered Pipeline or are otherwise used to provide Services (Capital Base);
- depreciation of the Capital Base (Depreciation); and
- the operating, maintenance and other non capital costs incurred in providing all Services (Non Capital Costs).

The methodology has been applied on a real basis as described in section 8.5A(b) of the Code under which the Capital Base, Depreciation and all costs and revenues are expressed in constant prices and a real Rate of Return is allowed.

The Total Revenue for the Access Arrangement Period is indicated in Table 14.

Table 14: Total Revenue (31 December 1999 $million, year ending 31 December)

	2000	2001	2002	2003	2004
Return on Assets	114.70	112.38	110.29	108.23	105.88
Depreciation	37.76	37.97	38.29	38.63	38.85
Non Capital Costs	38.41	39.58	41.83	42.09	41.65
Total	**190.87**	**189.93**	**190.41**	**188.95**	**186.38**

The total value of Total Revenue for the Access Arrangement Period is $946.55 million and the present value of this Total Revenue is $768.53 million in dollar values of 31 December 1999.

7 INFORMATION REGARDING VOLUME ASSUMPTIONS

7.1 FORECAST OF CONTRACTED CAPACITIES AND VOLUMES

Tables 15 and 16 indicate the forecasts of capacity to be contracted during the Access Arrangement Period, and forecasts of the volumes of gas expected to be delivered using that contracted capacity, were used in the determination of the Reference Tariff.

Table 15: Forecast of Contracted Pipeline Capacity

	2000 TJ/d	2001 TJ/d	2002 TJ/d	2003 TJ/d	2004 TJ/d
Zone 1a	48.0	48.0	48.0	48.0	48.0
Zone 1b	0.0	0.0	0.0	0.0	0.0
Zone 2	0.0	0.0	0.0	0.0	0.0
Zone 3	0.0	0.0	0.0	0.0	0.0
Zone 4	0	0	0	0	0
Zone 4a	1.5	1.5	1.5	1.5	1.5
Zone 5	0.0	0.0	0.0	0.0	0.0
Zone 6	5.0	5.0	5.0	5.0	5.0
Zone 7	13.6	13.6	13.6	11.8	10.6
Zone 8	0.0	0.0	0.0	0.0	0.0
Zone 9	57.0	57.0	57.0	57.0	57.0
Zone 10	469.7	467.9	469.8	479.0	485.9
Zones 1a – 10	**594.8**	**593.0**	**594.8**	**602.3**	**607.9**

Table 16: Forecast of Delivered Gas Volumes

	2000 TJ/d	2001 TJ/d	2002 TJ/d	2003 TJ/d	2004 TJ/d
Zone 1a	26.0	25.1	25.3	25.3	25.3
Zone 1b	0.0	0.0	0.0	0.0	0.0
Zone 2	0.0	0.0	0.0	0.0	0.0
Zone 3	0.0	0.0	0.0	0.0	0.0
Zone 4	0	0	0	0	0
Zone 4a	1.5	1.5	1.5	1.5	1.5
Zone 5	0.0	0.0	0.0	0.0	0.0
Zone 6	4.5	5.9	5.9	5.9	5.9
Zone 7	13.1	13.8	14.0	12.2	11.0
Zone 8	0.0	0.0	0.0	0.0	0.0
Zone 9	76.0	77.4	78.4	79.4	80.4
Zone 10	411.7	416.6	417.0	428.0	434.1
Zones 1a – 10	**532.8**	**540.2**	**542.0**	**552.3**	**558.1**

7.2 DELIVERY POINTS AND NUMBERS OF CUSTOMERS

Table 17 shows Delivery Points of the DBNGP and numbers of Shippers taking delivery of gas at each of the Delivery Points.

Zone	Delivery Point	Number of Shippers
1a	Hamersley Iron	2
	Robe River	2
	Port Hedland	0
1b		
2		
3		
4		
4a	Carnarvon Power Station	1
5		
6	Eradu Road	1
7	Geraldton (Nangetty Road)	1
	Mungarra	1
	Pye Road	1
	Mondarra	2
	Mount Adams Road	1
	Eneabba	1
8		
9	Muchea	1
	Pinjar	2
	Della Road	1
	Ellenbrook	1
	Harrow Street	1
	Caversham	1
	Welshpool	1
	Forrestdale	1
	Russell Road	1
10	Wesfarmers LPG	1
	Australian Gold Reagents	1
	Alcoa Kwinana	1
	Kwinana Power Station	2
	Barter Road/HiSmelt	1
	Mission Energy Cogeneration	3
	Kwinana Beach Road	1
	Rockingham	1
	WMC	1
	Pinjarra	1
	Alcoa Pinjarra	1
	Oakley Road	1
	Harvey	1
	Worsley	1
	South West Cogeneration	1
	Kemerton	1
	Clifton Road	1

APPENDIX 1

DBNGP SYSTEM:

DESCRIPTION OF THE GAS TRANSMISSION SYSTEM AS AT 1 JANUARY 2000

DESCRIPTION OF THE GAS TRANSMISSION SYSTEM: RECEIPT POINTS, DELIVERY POINTS AND NOTIONAL DELIVERY POINTS

The schematic on the following page describes the DBNGP in terms of its receipt and delivery points.

For the purposes of this System Description:

- "receipt point" means a flange or joint or other point specified in an Access Contract as the point at which the shipper delivers gas to Epic Energy under the Access Contract. Table 1 defines each of the receipt points in the gas transmission system.
- "delivery point" means a flange or joint, notional delivery point or other point specified in an Access Contract as a point at which Epic Energy delivers gas to the shipper under the Access contract. Table 2 defines each of the delivery points.
- "notional delivery point" means the point for a distribution sub-network at which the Shipper has Delivery Point MDQ in respect of that sub-network. Each notional delivery point is defined in Table 3 which also shows the associated delivery points.

The following designations are used in the schematic and tables:

▭		Gas source
■	Ix-xx	Receipt point x-xx
■	Oy-yy	Delivery point y-yy
■	BP-zz	Branching point zz.

Branching points have no regulatory significance but serve to identify points of branching from the main pipeline.

□	Inline metering facility
KJ-A	Kwinana Junction Meter Station M2A
●	Compressor Station n
PS	Power Station

Number of receipt points	= 4
Number of branching points	= 29
Number of delivery points	= 39
Number of notional delivery points	= 12

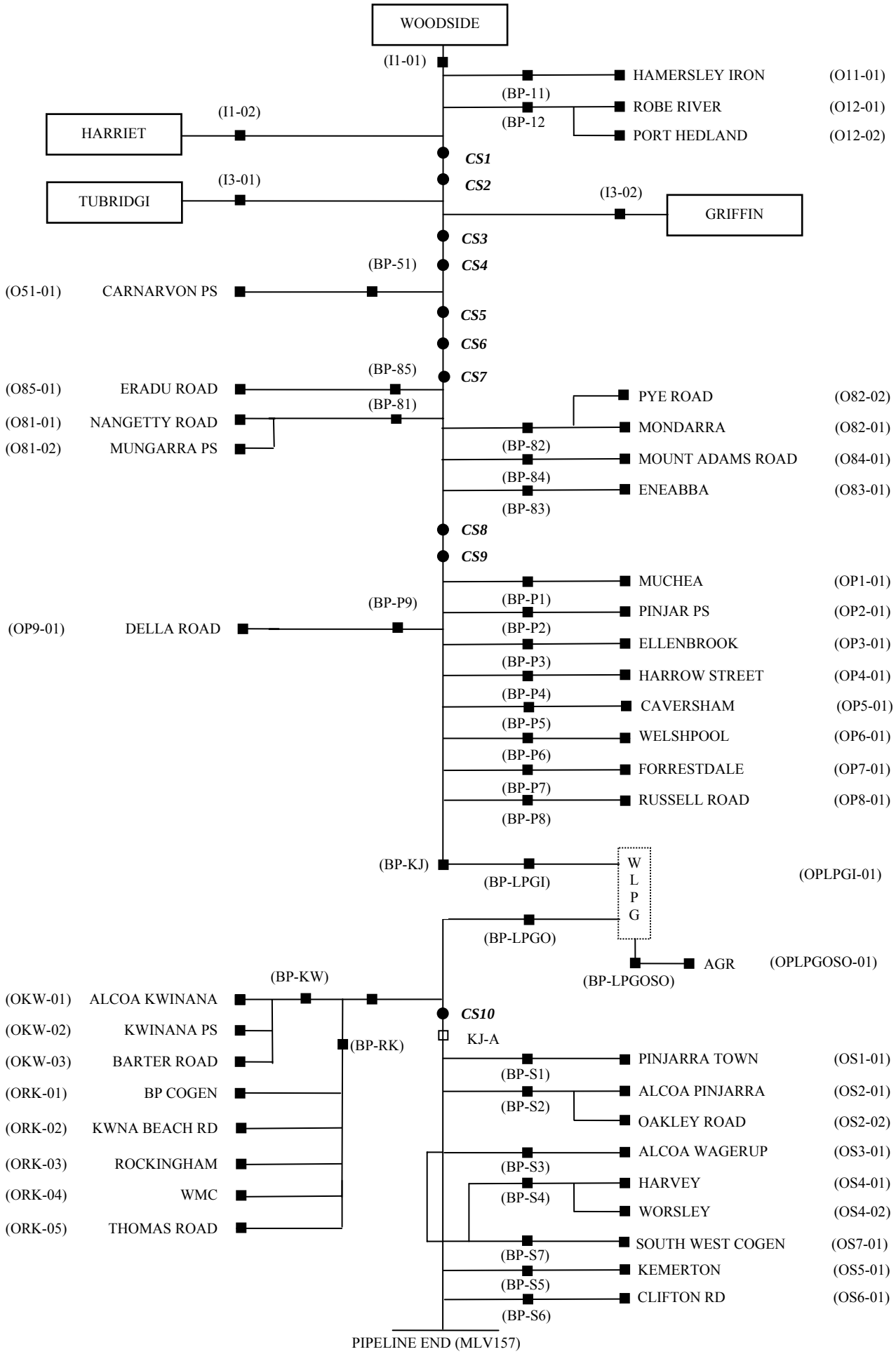

WOODSIDE
(I1-01)
HAMERSLEY IRON (O11-01)
(BP-11)
ROBE RIVER (O12-01)
(BP-12)
PORT HEDLAND (O12-02)
(I1-02)
HARRIET
CS1
CS2
(I3-01)
TUBRIDGI
(I3-02)
GRIFFIN
CS3
(BP-51)
CS4
(O51-01) CARNARVON PS
CS5
CS6
(BP-85)
CS7
(O85-01) ERADU ROAD
PYE ROAD (O82-02)
(BP-81)
(O81-01) NANGETTY ROAD
MONDARRA (O82-01)
(O81-02) MUNGARRA PS
(BP-82)
MOUNT ADAMS ROAD (O84-01)
(BP-84)
ENEABBA (O83-01)
(BP-83)
CS8
CS9
MUCHEA (OP1-01)
(BP-P1)
(BP-P9)
PINJAR PS (OP2-01)
(OP9-01) DELLA ROAD
(BP-P2)
ELLENBROOK (OP3-01)
(BP-P3)
HARROW STREET (OP4-01)
(BP-P4)
CAVERSHAM (OP5-01)
(BP-P5)
WELSHPOOL (OP6-01)
(BP-P6)
FORRESTDALE (OP7-01)
(BP-P7)
RUSSELL ROAD (OP8-01)
(BP-P8)
(BP-KJ)
(BP-LPGI)
W L P G
(OPLPGI-01)
(BP-LPGO)
AGR (OPLPGOSO-01)
(BP-LPGOSO)
(BP-KW)
(OKW-01) ALCOA KWINANA
CS10
(OKW-02) KWINANA PS
KJ-A
(BP-RK)
(OKW-03) BARTER ROAD
PINJARRA TOWN (OS1-01)
(BP-S1)
(ORK-01) BP COGEN
ALCOA PINJARRA (OS2-01)
(BP-S2)
(ORK-02) KWNA BEACH RD
OAKLEY ROAD (OS2-02)
ALCOA WAGERUP (OS3-01)
(BP-S3)
(ORK-03) ROCKINGHAM
HARVEY (OS4-01)
(BP-S4)
(ORK-04) WMC
WORSLEY (OS4-02)
(ORK-05) THOMAS ROAD
SOUTH WEST COGEN (OS7-01)
(BP-S7)
KEMERTON (OS5-01)
(BP-S5)
CLIFTON RD (OS6-01)
(BP-S6)
PIPELINE END (MLV157)

Table 1: Gas Transmission System: Receipt Points

Location	Point Designation	Distance from Dampier (Pipeline kilometres)	Description
DOMGAS Dampier Plant	I1-01	0.000	Receipt point is at the upstream flange of the flange joint upstream of the monolithic insulation joint on the main gas pipeline just inside the fence of the Dampier facilities compound.
Harriet	I1-02	136.924	Receipt point is at the second insulation gasket upstream of valve ZV1 between the Harriet meter station and the mainline interconnecting pipe. This gasket is located inside the Harriet meter compound.
Tubridgi	I3-01	272.694	Receipt point is at the second insulation gasket upstream of valve ZV1 between the Tubridgi meter station and the mainline interconnecting pipe. This gasket is located inside the Tubridgi meter compound.
Griffin	I3-02	272.729	Receipt point is at the second insulation gasket upstream of valve ZV2 between the Griffin meter station and the mainline interconnecting pipe. This gasket is located inside the Griffin meter compound.

Table 2: Gas Transmission System: Branching Points, Delivery Points and Delivery Points

Location	Point Designation	Distance from Dampier (Pipeline kilometres)	Description
Branching Point: MLV6	BP-11	8.845	This is a branching point located at the first tee downstream of HV100A and HV100B valves located inside the MLV6 compound.
Hamersley Iron	O11-01	9.440	Delivery point is on the upstream side of the insulation joint located 0.5km downstream of the odorant facilities.
Branching Point: MLV7	BP-12	21.933	This is a branching point located at the first reducer downstream of HV100A and HV100B valves located inside the MLV7 compound.
Robe River	O12-01	22.083	Delivery point is at the reducer on the downstream side of the odorant injection facility at the delivery of Cajaput Well meter station.
Port Hedland	O12-02	21.968	Delivery point is at the spectacle-blind upstream joint located downstream of the meter station.
Branching Point: MLV55	BP-51	578.858	This is a branching point located at the first flanged joint downstream of HV100A and HV100B located at the MLV55 compound.
Carnarvon Power Station	O51-01	748.583	Delivery point is at the insulation joint downstream of the pig receiver located at the Carnarvon Power Station.
Branching Point: MLV90	BP-85	967.096	This is a branching point located at the pipeline junction between valve HV205C and HV206 inside the MLV90 compound.

Location	Point Designation	Distance from Dampier (Pipeline kilometres)	Description
Eradu Road	O85-01	967.116km	Delivery point is at the first isolation joint located downstream of Eradu Road meter station located inside the MLV90 compound.
Branching Point: MLV91	BP-81	996.544	This is a branching point located at the first reducer downstream of HV100A and HV100B located at the MLV91 compound.
Nangetty Road	O81-01	996.851	Delivery point is at the first insulation flange located downstream of the injection line of the odorant facility. This insulating flange is located inside the Nangetty Road compound.
Mungarra Power Station	O81-02	999.126	Delivery point is on the upstream side of the isolation valves on each gas turbine generating unit located downstream of pressure relief valves.
Branching Point: Pye Road	BP-82	1043.730	This is a branching point located on the downstream flange of valve HV001 located inside the Pye Road meter station compound.
Mondarra	O82-01	1043.740	Delivery point is at the insulating gasket downstream of Mondarra meter station. This gasket is located inside the Mondarra compound.
Pye Road	O82-02	1043.765	Delivery point is at the insulating flange upstream of the odorant injection point, located inside the Boral compound at the Pye Road meter station.
Branching Point: MLV93	BP-84	1054.211	This is a branching point located at the first insulating joint on the supply line to the meter station. The insulating joint is located in the MLV93 compound.
Mount Adams Road	O84-01	1054.216	Delivery point is at the first insulation joint located downstream of Mount Adams Road meter station located inside the MLV 93 compound.
Branching Point: CS8	BP-83	1113.551	This is a branching point located on the downstream side of HV105B. The branching point is located in the MLV95 and Eneabba meter station compound.
Eneabba	O83-01	1113.621	Delivery point is at the insulation joint downstream of the launcher isolating valve.
Branching Point: Muchea	BP-P1	1307.000	This is a branching point located at the downstream flange of HV1 located in the Muchea meter station compound.
Muchea	OP1-01	1307.036	Delivery point is at the reducer located downstream of the odorant injection facility.
Branching Point: MLV116	BP-P2	1311.157	This is a branching point located on the downstream side of the HV 100A valve located inside the MLV116 compound.
Branching Point: MLV117	BP-P9	1323.931	This is a branching point comprising the downstream flanges of valves HV100A and HV100B located inside the MLV117 compound.

Location	Point Designation	Distance from Dampier (Pipeline kilometres)	Description
Della Road Meter Station (MLV117)	OP9-01	1323.996	Delivery point is at the insulating joint upstream of the distribution system valve pit located outside the MLV117 compound.
Pinjar Power Station	OP2-01	1326.157	Delivery point is on the upstream side of isolation valves on each gas turbine generating unit located downstream of pressure relief valves.
Branching Point: MLV118	BP-P3	1336.740	This is a branching point located at the first insulation joint on the supply line to the Ellenbrook meter station. This insulation joint is located inside the MLV118 compound.
Ellenbrook	OP3-01	1336.750	Delivery point is at the first insulation joint located downstream of valve HV010.
Branching Point: Harrow Street	BP-P4	1343.510	This is a branching point located at the first tee upstream of HV100A on the 350mm receipt header to the Harrow Street meter station.
Harrow Street	OP4-01	1343.610	Delivery point is on the upstream side of the second delivery valve located downstream of odorant injection facility.
Branching Point: MLV119	BP-P5	1347.339	This is a branching point located at the first reducer downstream of valves HV100A and HV100B located inside the MLV119 compound.
Caversham	OP5-01	1347.434	Delivery point is at the insulation joint located downstream of the odorant injection facility.
Branching Point: MLV120	BP-P6	1359.664	This is a branching point located at the first reducer downstream of valves HV100A and HV100B inside the MLV120 compound.
Welshpool	OP6-01	1359.714	Delivery point is on the upstream side of the second delivery valve located downstream of the odorant injection facility.
Branching Point: MLV122	BP-P7	1379.695	This is a branching point located at the first reducer downstream of valves HV100A and HV100B inside the MLV122 compound.
Forrestdale	OP7-01	1379.750	Delivery point is on the upstream side of the second delivery valve located downstream of the odorant injection facility.
Branching Point: MLV129	BP-P8	1398.638	This is a branching point located on the downstream side of valve HV700 located on the receipt side of the Russell Road pre-regulation set. The point is adjacent to the Kwinana Junction scrubber bypass.
Thomas Road	ORK-05	1407.620	Delivery point is on the upstream side of the TiWest valve located inside the TiWest cogeneration facility.

Location	Point Designation	Distance from Dampier (Pipeline kilometres)	Description
Russell Road	OP8-01	1408.183	Delivery point is on the upstream side of the second delivery valve located downstream of the odorant injection facility.
Branching Point: Receipt to WLPG	BP-LPGI	1401.997	This branching point is at the first insulating flange located downstream of the pressure reducing valve PV035.
WLPG	OPLPGI-01	1402.025	Delivery point is at the second insulating flange located downstream of the pressure reducing valve PV035.
Branching Point: Kwinana Junction	BP-KJ	1399.000	This is a branching point located at the centreline of the valve HV401A, located in the Kwinana Junction compound.
Branching Point: Delivery from WLPG	BP-LPGO	1402.066	This branching point is at the first insulating flange upstream of valve V14 located on the return line from the WLPG plant.
Branching Point: Second Delivery from WLPG	BP-LPGOSO	1401.997	This branching point is at the insulating gasket upstream of the AGR metering facility located at the second return line from the WLPG plant.
AGR	OPLPGOSO-01	1402.297	Delivery point is at the spectacle blind located on the downstream side of the restriction nozzle/blind located downstream of the AGR meter skid.
Branching Point: KLV1	BP-RK	1405.327	This is a branching point located at the downstream side of valve VB11 located upstream of the TiWest Cogen meter station offtake.
BP Cogen	ORK-01	1407.716	Delivery point is at the upstream flange of the second isolation valve (HV017) located downstream of the meter skid.
Kwinana Beach Road	ORK-02	1409.647	Delivery point comprises the upstream flange of the second valve located downstream of the pig receiver of the BP Kwinana lateral and the first insulation gasket downstream of the first valve located downstream of the pig receiver of the BP Kwinana lateral.
Rockingham	ORK-03	1410.857	Delivery point comprises the: i) upstream flange of the meter station delivery valve located downstream of the odorant injection facilities. ii) upstream flange of the second valve located downstream of the CSBP pipe.
WMC	ORK-04	1410.837	Delivery point comprises the upstream side of the second isolating valve located on the WMC boundary for the high pressure line and the insulation joint located upstream of the second isolation valve for the low pressure line.

Location	Point Designation	Distance from Dampier (Pipeline kilometres)	Description
Branching Point: Kwinana West	BP-KW	1405.217	This is a branching point located at 500 to 300 reducer located upstream of valves KLV3 and KLV4.
Alcoa Kwinana	OKW-01	1410.557	Delivery point comprises the delivery flanges on the downstream side of the meter station delivery valves HV601A and HV601B.
Kwinana Power Station	OKW-02	1409.651	Delivery point is at the insulating gasket on the downstream side of the meter station delivery valve HV501A.
Barter Road	OKW-03	1409.751	Delivery point comprises the upstream flange of the second meter station delivery valve downstream of the insulation joint and the upstream flange of the valve located downstream of the insulation joint.
Branching Point: South 1	BP-S1	1449.456	This is a branching point located at the first insulating flange downstream of valve HV001 located upstream of the MLV143 compound.
Pinjarra Town	OS1-01	1449.476	Delivery point is on the upstream side of the second delivery valve located downstream of the odorant injection facility.
Branching Point: South 2	BP-S2	1458.106	This is a branching point located at the anchor flange located downstream of valve PLV1 located inside the MLV143 compound.
Alcoa Pinjarra	OS2-01	1463.426	Delivery point comprises the delivery flanges on the downstream side of the meter station delivery valves HV601A and HV601B.
Oakley Road	OS2-02	1462.592	Delivery point is at the insulation gasket located downstream of valve HV105.
Branching Point: South 3	BP-S3	1489.329	This is a branching point located at the first tee upstream of MLV150 located inside the Wagerup West compound.
Alcoa Wagerup	OS3-01	1498.857	Delivery point comprises the delivery flanges on the downstream side of the meter station delivery valves HV601A and HV601B.
Branching Point: South 4	BP-S4	1513.630	This is a branching point located at the first tee upstream of the insulation joint adjacent to MLV154 located inside the MLV154 compound.
Harvey	OS4-01	1522.096	Delivery point is at the upstream flange of the isolation valve located downstream of the odorant injection facility.
Worsley	OS4-02	1546.620	Delivery point is at the flange downstream of the insulation joint located downstream of the meter station delivery valve.
Branching Point: South 7	BP-S7	1513.635	This is a branching point located on the tee at the junction of the SW loop and the Worsley Cogeneration lateral, below ground in the MLV154/155 compound.

Location	Point Designation	Distance from Dampier (Pipeline kilometres)	Description
South West Cogeneration	OS7-01	1546.000	Delivery point is at the first insulating flange located downstream of the meter skids.
Branching Point: South 5	BP-S5	1525.104	This is a branching point located on the downstream side of the offtake valve HV1 located inside the Kemerton meter station.
Kemerton	OS5-01	1525.124	Delivery point is at the upstream flange of the valve located downstream of the insulation joint.
Branching Point: South 6	BP-S6	1530.439	This is a branching point located at the first reducer downstream of MLV156 and situated in the Clifton Road compound.
Clifton Road	OS6-01	1530.457	Delivery point is at the first insulating joint located downstream of the odorant injection facility.

Table 3 Gas Transmission System: Notional Delivery Points

Notional Delivery Point	Associated Delivery Point/s	Transmission Delivery Point/s Designation
NGP - Nangetty Rd	Nangetty Road	O81-01
NGP - Eneabba	Eneabba	O83-01
NGP - Muchea	Muchea	OP1-01
NGP - Ellenbrook	Ellenbrook	OP3-01
NGP - North Metro	Harrow Street	OP4-01
	Caversham	OP5-01
NGP - South Metro	Welshpool	OP6-01
	Forrestdale	OP7-01
	Russell Road	OP8-01
NGP - Barter Road	Barter Road	OKW-03
NGP - Rockingham	Rockingham	ORK-03
NGP - Pinjarra	Pinjarra Town	OS1-01
	Oakley Road	OS2-02
NGP - Harvey	Harvey	OS4-01
NGP - Kemerton	Kemerton	OS5-01
NGP - Clifton Road	Clifton Road	OS6-01

NDP - “name” Notional delivery point - “name”

DESCRIPTION OF THE DBNGP: COMPONENT PARTS

The principal component parts of the gas transmission system are:

(a) the main line between Dampier and Bunbury;

(b) gas turbine driven centrifugal compressor units and associated facilities including aftercoolers;

(c) main line valves;

(d) laterals;

(e) delivery stations;

(f) Kwinana Junction metering station;

(g) supervisory control and data acquisition (SCADA) system and the associated microwave communications facility; and

(h) odorising facilities.

General Description

The gas transmission system comprises 1,845.3km of high pressure gas transmission pipeline, including laterals, and associated compression plant, and valves, linking gas suppliers in the north west of Western Australia with markets principally in the South West.

The gas transmission system is not a single continuous entity, and consists of the following major parts.

The Dampier to Kwinana section is 1,398.6km of 660mm (26 inch) diameter pipe, and is rated and operates at 8.48MPa. It delivers gas to all part haul delivery points, and to all full haul delivery points between Compressor Station 9 (CS9) and Kwinana Junction. Five laterals with a total length of 195.6km ranging in diameter from 350mm (14 inches) to 150mm (6 inches) are connected to this pipeline section. The main line loops to Wesfarmers LPG Plant at Kwinana Junction. This loop is 6.4km of 660mm (26 inch) diameter pipe. Under an arrangement with Wesfarmers LPG Pty Ltd, gas leaves the system at a point immediately upstream of the company's LPG extraction plant at Kwinana and is returned to the system immediately downstream of the plant.

Kwinana Junction, 1,399km downstream of Dampier, is a major junction in the gas transmission system. Two inline metering facilities are located at Kwinana Junction. One measures the quantity of gas delivered into the Kwinana West and Rockingham laterals, and the other measures the quantity of gas delivered into the Pipeline South. Facilities for gas quality measurement upstream and downstream of the LPG plant are also located at Kwinana Junction.

The main line branches immediately downstream of Wesfarmers LPG Plant into three independent sections:

- Kwinana West Lateral

  This section is rated at 6.89MPa and operates at approximately 4.5MPa. It consists of three different pipes with a total length of 6.3km, ranging in diameter from 500mm (20 inches) to 200mm (8 inches). The Kwinana West Lateral delivers gas to delivery points at Alcoa Kwinana, Kwinana Power Station, and to the delivery point at Barter Road.

- Rockingham Lateral

  A 180m long, 600mm (18 inches) pipeline provides a link between the suction of CS10 and Rockingham lateral. The Rockingham lateral and the link are rated at 6.89MPa and operates at approximately 4.5MPa. It consists of three different pipes with a total length of 8.9m, ranging in diameter from 300mm (12 inches) to 150mm (6 inches). The Rockingham Lateral delivers gas to delivery points at the BP/Mission Energy Cogeneration Plant, Mason Road, Western Mining Corporation, and the Rockingham delivery point supplying the distribution system serving Rockingham and Mandurah.

- Pipeline South

  Compressor Station Number 10 (CS10) is located at the beginning of Pipeline South. Pipeline South MAOP is equal to 6.89MPa. It consists of three different pipes with a total length of 125.1km, ranging in diameter from 500mm (20 inches) down to 200mm (8 inches). It terminates at MLV157 located at Clifton Road, north of Bunbury. Four laterals with a total length of 79.7km ranging in diameter from 450mm (14 inches) to 250mm (10 inches) are connected to this pipeline section. The pipeline section between MLV150 and MLV154 is looped. The 18" loop length is equal to 24.3km. The Pipeline South delivers gas to delivery points at Alcoa Pinjarra, Alcoa Wagerup and Worsley Alumina, South West Cogen, and to delivery points supplying the distribution systems at Pinjarra Town, Oakley Road, Harvey, Kemerton and south of Clifton Road.

The main line between Dampier and Bunbury is externally coated with a fusion bonded epoxy powder coating. Between Dampier and Wagerup West, the pipe is internally coated with a two-part epoxy paint. The pipeline section between Wagerup West (MLV150) and the end of the pipeline (MLV157), and all laterals, are not internally coated. Further corrosion protection is provided by an impressed current cathodic protection system. The physical characteristics of the main line are set out in Table 4.

Laterals for supply of gas from the Dampier to Bunbury main line are listed in Table 5. The major laterals are shown on the Pipeline Route Maps of Section 6.

The locations of the main line valves which control gas flow through the Dampier to Bunbury main line are shown on the Pipeline Route Maps of Section 6. Areas through which the main line passes are classified (in accordance with Australian Standard 2885) as broad rural R1 and suburban T1. In areas classified as R1, main line valves are spaced approximately 30km apart. They are approximately 10km apart in areas classified as T1. The majority of the mainline valves can be remotely actuated from the control centre.

"MAOP" denotes maximum allowable operating pressure.

Table 4: Main Line: Physical Characteristics

Section:	Dampier to Kwinana Junction	
Length	1,311.2km	87.4km
Nominal size	660mm	660mm
Wall thickness	8.74mm	12.7mm
Steel type	API 5LX 65 DSAW	API 5LX 65 DSAW
MAOP	8,480kPa (gauge)	8,480kPa (gauge)
Section:	Kwinana Junction - WLPG Plant – Kwinana Junction	
Length	6.4km	
Nominal size	660mm	
Wall thickness	14.27mm	
Steel type	API 5LX 65 DSAW	
MAOP	8,480kPa (gauge)	
Section:	Kwinana Junction To Main Line Valve 141	
Length	10.8km	
Nominal size	500mm	
Wall thickness	7.94mm	
Steel type	API 5LX 65 DSAW	
MAOP	6,890kPa (gauge)	
Section:	Main Line Valve 141 to Main Line Valve 150	
Length	73.5km	
Nominal size	500mm	
Wall thickness	5.56mm	
Steel type	API 5LX 65 DSAW	
MAOP	6,890kPa (gauge)	
Section:	Main Line Valve 150 to Main Line Valve 154	
Length	23.9km	
Nominal size	250mm	
Wall thickness	4.80mm	
Steel type	API 5LX 52 ERW	
MAOP	6,890kPa (gauge)	
Section:	Main Line Valve 154 to Main Line Valve 157A	
Length	16.9km	
Nominal size	200mm	
Wall thickness	4.80mm	
Steel type	API 5LX 52 ERW	
MAOP	6,890kPa (gauge)	

Table 5: Gas Transmission System Laterals

Section:	CS10 to Rockingham Lateral Pipeline (Rockingham Lateral Link)	
Length	0.18km	
Nominal size	600mm	
Wall thickness	12.65mm	
Steel type	API 5LX 70 ERW	
MAOP	6,890kPa (gauge)	
Section:	Main Line Valve 150 to Main Line Valve 154 (Loopline)	
Length	24.3km	
Nominal size	450mm	
Wall thickness	6.35mm	
Steel type	API 5LX 60 ERW	
MAOP	8,280kPa (gauge)	
Hamersley Iron		
Length	0.5km	
Nominal size	200mm	
Wall Thickness	6.4mm	
Steel Type	API 5LX 52 ERW	
MAOP	8,480kPa (gauge)	
Carnarvon		
Length	163.7km	7.4km
Nominal size	150mm	150mm
Wall Thickness	4.8mm	6.4mm
Steel Type	API 5LX 42 ERW	API Grade B ERW
MAOP	8,480kPa (gauge)	1,900kPa (gauge)
Mungarra		
Length	2.5km	
Nominal size	150mm	
Wall Thickness	6.4mm	
Steel Type	API 5L Grade B ERW	
MAOP	8,480kPa (gauge)	
Pinjar		
Length	14.2km	
Nominal size	350mm	
Wall Thickness	7.1mm	
Steel Type	API 5LX 52 ERW	
MAOP	8,480kPa (gauge)	
Russell Road		
Length	7.3km	
Nominal size	300mm	
Wall Thickness	9.5mm	
Steel Type	API 5LX 46 ERW	
MAOP	6,890kPa (gauge)	

Kwinana West				
Length	2.0km	2.8km	1.5km	
Nominal size	500mm	350mm	200mm	
Wall Thickness	7.9mm	9.5mm	8.7mm	
Steel Type	API 5LX 65DSAW	API 5LX 52 ERW	API Grade B ERW	
MAOP	6,890kPa (gauge)	6,890kPa (gauge)	6,890kPa (gauge)	
Rockingham				
Length	3.2km	2.6km		
Nominal size	300mm	150mm		
Wall Thickness	9.5mm	6.4mm		
Steel Type	API 5LX 46 ERW	API 5L Grade B ERW		
MAOP	6,890kPa (gauge)	6,890kPa (gauge)		
KNC/BP (Part of Rockingham Lateral Located Downstream of Mason Road Delivery Station)				
Length	1.6km			
Nominal size	250mm			
Wall Thickness	9.3mm			
Steel Type	API 5LX 42 ERW			
MAOP	6,890kPa (gauge)			
Cogen (Part of Rockingham Lateral Located Downstream of Cogen Delivery Station)				
Length	0.9km			
Nominal size	200mm			
Wall Thickness	8.2mm			
Steel Type	API 5LX 42 ERW			
MAOP	6,890kPa (gauge)			
TiWest Cogeneration Lateral (Part of Rockingham Lateral)				
Length	0.58km			
Nominal size	150mm			
Wall Thickness	7.1mm			
Steel Type	API 5LX 42 ERW			
MAOP	6,890kPa (gauge)			
Alcoa Pinjarra				
Length	2.5km	2.9km		
Nominal size	300mm	300mm		
Wall Thickness	7.1mm	9.5mm		
Steel Type	API 5L Grade B ERW	API 5LX 52 ERW		
MAOP	6,890kPa (gauge)	6,890kPa (gauge)		
Alcoa Wagerup				
Length	8.0km	1.5km		
Nominal size	350mm	350mm		
Wall Thickness	7.1mm	9.5mm		
Steel Type	API 5L Grade B ERW	API 5LX 42 ERW		
MAOP	6,890kPa (gauge)	6,890kPa (gauge)		

Worsley	
Length	32.9km
Nominal size	250mm
Wall Thickness	4.8mm
Steel Type	API 5LX 52 ERW
MAOP	6,890kPa (gauge)
South West Cogeneration Lateral	
Length	32.9km
Nominal size	450mm
Wall Thickness	6.35mm
Steel Type	API 5LX 60 ERW
MAOP	8,280kPa (gauge)

Compressor Stations

Nine compressor station sites are spaced at intervals of about 140km along the main line. Gas turbine driven centrifugal compressors at eight of these stations are used to maintain pipeline pressure to meet natural gas demand in the Perth metropolitan area and at the receipt to Wesfarmers LPG Plant.

A summary of compression plant is presented in Table 6.

Additional gas turbines are currently being installed at CS2, CS4 and CS7 as part of Epic Energy's Stage 3a upgrade to the DBNGP. These new turbines should be installed and commissioned between January and June 2000

Table 6: Compressor Stations

Compressor Station	Distance from Dampier (km)	Gas Turbine Driver	
1	137.2	Solar Mars 12600hp	(9MW)
2	272.1	General Electric Model LM500	(4MW)
3	409.3	Unit 1: Solar Mars 12600hp	(9MW)
		Unit 2: General Electric Model LM500	(4MW)
4	546.9	General Electric Model LM500	(4MW)
5	684.8	Unit 1: Solar Mars 12600hp	(9MW)
		Unit 2: Solar Mars 12600hp	(9MW)
6	824.9	Unit 1: General Electric Model LM500	(4MW)
		Unit 2: Nuovo Pignone PGT10	(10MW)
7	966.6	General Electric Model LM500	(4MW)
8	1114.1	Unit 1: Solar Mars 12600hp	(9MW)
		Unit 2: Solar Mars 12600hp	(9MW)
9	1256.8	Nuovo Pignone PGT10	(10MW)
10	1402.3	Unit 1: Solar Centaur 4700hp	(3.5MW)
		Unit 2: Solar Centaur 4700hp	(3.5MW)

Aftercoolers

Aftercoolers are installed immediately downstream of the Domgas Dampier Plant receipt point, and immediately downstream of CS1 to CS9 compressor stations. The aftercoolers have been designed to control the downstream gas temperature below 45°C.

Delivery Point Facilities and Receipt Point Facilities

Epic Energy owns and operates Delivery Point Facilities on the DBNGP. Receipt Point Facilities are located upstream of the receipt points to the DBNGP and are owned and operated by parties other than Epic Energy.

SCADA System

The SCADA system is a micro-computer facility located at the control centre. The master station is a network of nineteen stations interconnected by a local area network, and consists of four operator stations, two logging stations, seven communication stations, three remote stations and three remote operator stations. Over one hundred Field Remote Terminal Units (RTUs) are polled by the communication stations for data and respond to commands from the master station.

The communication link to stations north of Perth is a microwave system. There are microwave antennas and repeater stations at main line valve stations and at compressor stations. SCADA communications south of Perth make use of a UHF radio system.

Odorising

Gas in the main pipeline between Dampier and the Wesfarmers LPG plant at Kwinana is not odorised. Upstream of Kwinana Junction, gas is odorised at delivery stations with the exception of those stations serving the Port Hedland Pipeline and the Geraldton area. Gas into the Geraldton area is odorised at the Nangetty Road delivery station. Downstream from Kwinana Junction, gas is odorised in accordance with the Gas Standards Act sufficient for commercial/industrial use. The level of odorant is increased at delivery stations delivering gas into the distribution system and at Clifton Road delivery station.

PIPELINE ROUTE MAPS

Pipeline route maps are provided as Appendix 2.

APPENDIX 2

DBNGP SYSTEM:

DBNGP MAPS