APT Pipelines (NSW) Pty Limited
ACN 080 842 360

(formerly known as AGL Pipelines (NSW) Pty Limited)

Access Arrangement Information for Central West Pipeline

September 2000

1. INTRODUCTION

1.1 Overview of the Access Arrangement Information

APT Pipelines (NSW) Pty Limited (**"APT(NSW)"**) is the owner of the Pipeline referred to in the Access Arrangement.

This company was formerly a subsidiary of The Australian Gas Light Company and was known as AGL Pipelines (NSW) Pty Limited. The company was sold into the Australian Pipeline Trust when the Trust was established on 13 June 2000.

The Access Arrangement adopts a Net Present Value (NPV) approach (with residual) to the determination of Reference Tariffs.

Terms used in this Access Arrangement Information have the meanings given to them in Schedule 1 of the Access Arrangement.

Attachment 1 to this document shows the information categories listed in Attachment A of the Code and indicates where this information is contained within this document.

IMPORTANT NOTICE

This Access Arrangement Information for the Central West Pipeline replaces any previous, proposed or revised Access Arrangement Information documents submitted for the Central West Pipeline.

This Access Arrangement Information is based on the 30 June 2000 Final Decision of the Australian Competition and Consumer Commission (ACCC) on the Access Arrangement by APT Pipelines (NSW) Pty Ltd for the Central West Pipeline (Final Decision).

1.2 Background to the Central West Project

Having successfully introduced natural gas to other regional centres in New South Wales, the AGL Group began, in the 1990s, to investigate the potential of transporting and distributing natural gas to the Forbes, Parkes, Narromine and Dubbo environs (known as the "Central West Project"). However, the project's relatively small loads and the presence of competing fuels meant that its commercial viability was questionable.

With the establishment of the Federal Government's Regional Development Program, funding of up to $2 million was made available to the Orana Regional Economic Development Organisation[1] ("ORDO") towards the installation of gas infrastructure in the Central West region. The availability of this funding contributed to making the Central West Project a more commercially viable proposal.

A condition of the Federal Government funding was that a tender process to select the preferred developer of the gas infrastructure would be managed by ORDO. The AGL Group was selected as the preferred developer and by June 1998 had constructed the

[1] ORDO later became Orana Development & Employment Council ("ODEC").

Central West Pipeline ("CWP"[2]) from the Marsden off-take (on the Moomba to Sydney pipeline) to Dubbo.

The AGL proposal, which was supported by the local communities, included a common (ie zonal) tariff for all Users of the pipeline within the Marsden/Dubbo zone. A zonal tariff has the benefit that no community within the zone would be at a cost disadvantage relative to any other community in securing a gas supply.

[2] This is the Pipeline referred to in the Access Arrangement.

2. ACCESS & PRICING PRINCIPLES

2.1 Tariff Pricing Principles

The CWP is a new pipeline which will deliver gas into a yet to be established market, and consequently the Reference Tariff Policy reflects the market realities of introducing natural gas as a competitive energy source in the Central West region. With reference to market realities, the pricing principles need to take into account the following:

1) Entry price for gas: The Code requires that the Reference Tariffs should be designed with a view to replicating the outcomes of a competitive market[3]. The price of established alternate fuels is a key element in determining a competitive market price for gas in the Central West region.

2) Price path: The Code requires that the Reference Tariffs should be designed with a view to providing the Service Provider with the opportunity to earn a stream of revenue that recovers the efficient costs of delivery of the Reference Service over the expected life of the assets used in delivering this Service[4]. In order to achieve this objective, and recognising the effect of the competitive fuel market on prices, it is necessary to ensure that the price path compensates in later years for the early years of low tariffs.

3) Market growth: The Code requires that the Reference Tariffs should be designed with a view to providing an incentive to the Service Provider to reduce costs and to develop the market for Reference and other Services[5]. In the absence of significant foundation contracts and in the light of competitive fuel prices, APT(NSW) faces significant risks in developing the market for use of the CWP. The Reference Tariffs must be established at a level which allows APT(NSW) to grow the market as quickly and efficiently as possible, in order to achieve this objective.

4) Zonal tariffs: In accordance the tender proposal, a single common tariff is to apply for all Users within the Marsden to Dubbo zone.

2.2 Reference Tariff Determination

2.2.1 Price Path

Reference Tariffs will follow a price path determined by applying the NPV methodology over the economic life of the CWP. During the first Access Arrangement Period, Reference Tariffs will follow a price path that reflects both the need for a low entry price, and the requirement for Reference Tariffs to move to an appropriate level to provide the revenues required to sustain APT(NSW)'s investment in the CWP over its economic life.

Of the Reference Tariffs set out in Section 3 of the Access Arrangement, tariffs of $1.78[6], $1.98 and $2.17 per GJ for the years ending 30 June 1999, 2000 and 2001

[3] Section 8.1(b).
[4] Section 8.1(a).
[5] Section 8.1(f).
[6] All tariffs in this section are in dollars of the day.

have already been committed to by APT(NSW) and communicated to the market. This was necessary because at the time the CWP was commissioned the Code was not in place, and Prospective Users required tariff certainty prior to committing to using the CWP.

The ACCC Final Decision requires a pre NTS tariff of $2.17 per GJ for the year ending 30 June 2001 and a pre NTS tariff of $2.37 per GJ for the year ending 30 June 2002 with the Reference Tariff price path thereafter to be linked to a CPI – X adjustment as shown in the Access Arrangement (section 3). (The above tariffs equate to a post NTS tariff of $2.38 per GJ for the year ending 30 June 2001 and a post NTS tariff of $2.60 per GJ for the year ending 30 June 2002).

2.2.2 Zonal Tariff

For new pipelines (and particularly those with no identifiable cost attributable to any specific user - eg compression costs) linking similar user classes in different geographic areas, a zonal tariff structure ensures that all Users will benefit whilst no User is disadvantaged in terms of price. One of the concerns of ORDO in pursuing the development of gas infrastructure in the Central West region was that no local community within the zone should be at a price disadvantage to any other. The benefit of a common zonal tariff for the CWP is that the zonal tariff lies between the stand alone costs of transporting gas to each of the communities along the pipeline and a distance based tariff to service these communities.

A major issue with attempting to underwrite a new pipeline project with a distance based tariff is that while it has intuitive appeal (ie users only paying for the length of pipeline they utilise) it means that unless the entry tariff for users at the end of the pipeline is at or below the equivalent competing fuel price, then the pipeline will not be built to that location. This has a cascading effect, because in progressively reworking the tariffs for a pipeline to service the remaining users, these users have to bear a higher proportion of fixed costs, resulting in users no longer seeking gas, creating a price spiral. That is, the users at the end of the pipeline will face a higher tariff than the required entry tariff, so that user drops off the pipeline. This process undermines the economics of the pipeline to the point it is no longer viable.

The Code requires that the legitimate business interests of the Service Provider be taken into account[7], and the interests of Users and Prospective Users be taken into account[8]. It was a key element of the tender for the CWP, and its acceptance as preferred developer, that zonal pricing be offered to Users. Prospective Users of the CWP supported zonal pricing. The tender and the commitment by the AGL Group to the CWP occurred prior to the finalisation of the Code, and all parties acted in a reasonable expectation that zonal pricing would be accepted in the subsequent Access Arrangement for the CWP. Accordingly, the acceptance by the Regulator of zonal pricing is in the legitimate business interests of APT(NSW), and in the interests of Users and Prospective Users.

[7] Section 2.24(a).
[8] Section 2.24(f).

In light of the above, and in recognition of the fact that there is only one Reference Service being offered, it is not commercially and technically reasonable[9] to allocate revenue (or costs) to Users, other than on a zonal (ie common) basis.

2.3 Reference Tariff Structure

In the light of the matters referred to in Section 2.1, the Reference Tariff structure for the CWP during the initial Access Arrangement Period consists of a single throughput tariff. To stimulate throughput growth in the CWP, Users will pay a Reference Tariff which has the following features:

1) no load factor adjustment (which is usual for pipelines as a means to adjust throughput tariffs to reflect the pipeline capacity actually required to deliver the gas);
2) no overruns until such time as the pipeline achieves Contracted Capacity of 85%; and
3) no minimum annual bills (which usually require payment for a minimum annual quantity of gas being delivered).

This simple tariff structure is designed to encourage usage of the CWP as Users (particularly inexperienced gas consumers) will know they will pay solely for the quantity of gas delivered, without having to be concerned about load management issues which could impact on their cost of gas transportation.

2.4 Cost Allocation

As discussed in Section 2.3, there is only one Reference Service being offered (ie throughput), and all costs of providing this Reference Service are fully allocated to Users by way of the zonal throughput tariff. It is not technically and commercially reasonable[10] to allocate costs to particular Users by any other means and maintain the long term viability of the pipeline.

2.5 Incentive Mechanism

The incentive structures in the Reference Tariffs are:

1) The level of Reference Tariff is determined to enable APT(NSW) to develop the market for the Reference Service and other Services[11]; and

2) The prospect of retaining improved returns for the Access Arrangement Period provides an incentive to APT(NSW) to increase the volume of sales and minimise the cost of providing Services;

3) In determining Reference Tariffs after the current Access Arrangement Period, APT(NSW) will ensure that Users and Prospective Users will benefit from increased efficiencies achieved by APT(NSW) up to that date.

[9] In accordance with Sections 8.38 and 8.42 of the Code.
[10] In accordance with Sections 8.38 and 8.42 of the Code.
[11] In accordance with Section 8.1(f) of the Code.

These incentive mechanisms provide an incentive to APT(NSW) to reduce total operating costs and increase pipeline throughput.

2.6 Other Revenue

The Reference Tariff throughput tariff has been designed to recover the revenue attributable to the Reference Service. No allowance has been made for other revenue that may accrue from any other charge incorporated in the Reference Tariff as these are not considered material.

3 CAPITAL COSTS

3.1 Asset Base

3.1.1 Depreciated Optimised Replacement Cost ("DORC")

APT(NSW) used a DORC approach to value the CWP. A DORC approach involves estimating the efficient cost of constructing the asset using current technology to meet current markets, which results in the identification of the Optimised Replacement Cost (ORC) of the asset. Depreciation is then applied to the ORC to determine the DORC.

3.1.2 Optimised Replacement Cost ("ORC")

At the time of construction of the CWP it was recognised that the CWP may ultimately be extended to Tamworth, and so it has been designed to accommodate the estimated loads between Dubbo and Tamworth, in addition to the estimated loads between Marsden and Dubbo. In effect the CWP has been "oversized" to enable the cost effective haulage of gas to Tamworth in the future.

Until such time as the CWP is extended to Tamworth, it will operate in free-flow (ie no compression) conditions.

For the purposes of the ORC valuation the CWP was redesigned to determine an optimised configuration in which the capacity installed to accommodate the load beyond Dubbo is removed and the pipeline sized accordingly.

3.1.3 Valuation of non-system assets

There are no non-system assets (ie land and buildings, plant and equipment) to be added to the valuation.

3.1.4 Initial Capital Base

In arriving at an initial capital base (ICB) the Final Decision considers various factors, including:

- A CWP Depreciated Actual Cost value of $28.27 million (1999 $) where straight line depreciation is used; and
- A CWP Depreciated Optimised Replacement Cost value of $25.55 million (1999 $) where straight line depreciation is used.

The Final Decision[12] (Amendment A3.1) requires the initial capital base (ICB) of the CWP assets to be $28.48 million (1999 $).

3.1.5 Speculative Investment Fund

An amount of $2.78m (ie the difference between the actual transmission pipeline cost of $29.76m and the optimised transmission pipeline replacement cost of $26.98m) is to be placed into a Speculative Investment Fund until such time as it can

[12] The Regulator discusses the reasoning underlying this value in Section 3.2 of the Final Decision.

be added to the Capital Base in accordance with the Code[13]. The Final Decision notes that this is consistent with the Code[14].

It is expected that the full amount of this fund will be added to the Capital Base of the CWP upon the construction of an extension to Tamworth.

3.1.6 Back-ended Depreciation[15]

As is usually the case with "green-field" developments, the growth in pipeline utilisation will be a gradual process. For the CWP, this means that during the initial Access Arrangement Period estimated returns will not be sufficient to cover the total accounting expenses (including profit and depreciation) of providing the Reference Services. Accordingly there is a need for a mechanism to provide for the under-recovery of revenue in the early years of the CWP's life which can be offset against over-recovery in the later years of operation.

The concept of back-ended depreciation provides such a mechanism and in respect of the CWP is necessary to achieve the objective of the Code, which requires that the Reference Tariffs should be designed with a view to providing the Service Provider with the opportunity to earn a stream of revenue that recovers the efficient costs of delivering the Reference Service over the expected life of the assets used in delivering that Service[16].

Application of back-ended depreciation to the CWP is also consistent with the provisions of Section 8.33(a) of the Code, which provides that the depreciation schedule[17] should be designed:

> *"so as to result in the Reference Tariff changing over time in a manner that is consistent with the efficient growth of the market for the Services provided by the pipeline (and which may involve a substantial portion of the depreciation taking place in future periods, particularly where the calculation of the Reference Tariffs has assumed significant market growth and the pipeline has been sized accordingly)".*

This section of the Code recognises that such a mechanism is necessary to justify commitment to major infrastructure projects, and that this objective outweighs any argument that the ability to roll forward estimated under-recovery lessens incentives for efficiency. In addition, the Code recognises that inherent in investment in pipelines is a significant market risk of growing an undeveloped gas market, as is the case for the CWP.

The Final Decision accepts that the depreciation approach adopted by APT(NSW) is consistent with Code principles[18].

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[13] Section 8.19.
[14] Final Decision p67
[15] Also referred to by APT(NSW) in the proposed Access Arrangement and original Access Arrangement Information as "economic depreciation".
[16] Section 8.1(a).
[17] Application of depreciation principles to the IRR/NPV methodology is addressed in Section 8.34 of the Code, which includes reference to Section 8.33.
[18] Final decision p71

3.1.7 Economic Life and Remaining Economic Lives

Based on APT's and AGL's experience as major owners and operators of pipelines in Australia together with various recent access arrangements proposed by service providers, submissions of industry participants and decisions of Regulators, economic lives for the various assets making up the CWP have been established. These are set out in the table below together with the average remaining economic life of each of the asset classes making up the CWP.

Table Asset Economic Lives (from installation and remaining years)

Asset	**Economic Life (years)**	**Average Remaining Economic life (1 July 1999) (years)**
Transmission Pipelines (coated and CP protected):		
Constructed pre 1970	60	N/A
Constructed post 1970	80	79
Compressor Stations:		
Rotating Equipment	25	N/A
Station Facilities	35	N/A
Regulation and Metering Stations	50	49
Odorising Stations	35	34
SCADA	10	9
Plant and equipment	5-20	N/A
Buildings	50	N/A

3.1.8 Estimated and Committed Capital Expenditure

Capital expenditure for a pipeline system comprises two components:

1) capacity expansion and system replacement; and

2) non-pipeline system expenditure (plant and equipment etc).

As there are no non-system assets included in the capital base for the CWP, there is no non-system capital expenditure estimated.

For the CWP, the only capital expenditure estimated during the initial Access Arrangement Period is the replacement of the SCADA system (shown in the table below as occurring in 2008) and minor pipeline components (ie "stay in business" capital expenditure). It is assumed such components would include replacement and upgrading of:

- instrumentation - metering, telemetry remote terminal units etc;
- pipeline hardware – valves, regulators and fittings etc;
- minor site capital improvements – fencing, security etc; and

- specialised major spares.

The amounts estimated for capital expenditure are set out in the table below[19].

Estimated Capital Expenditure[20]

Year Ending 30 June	Capital Expenditure ($ of the day)
2001	7,229
2002	7,434
2003	7,646
2004	7,863
2005	8,086
2006	8,316
2007	8,552
2008	829,715
2009	12,061
2010	12,404

3.2 Rate of Return

APT(NSW) adopted a weighted average cost of capital (WACC) approach as a guide to determining the appropriate rate of return for the CWP.

As required by the ACCC Final Decision Amendment A2.2[21] the rates of return to be used in the calculation of the price path for the CWP are a post tax nominal cost of equity of 15.38 % and the pre tax real WACC of 7.78 %.

These rates are based on:

- A nominal post tax cost of equity of 15.38 %, which is based on a nominal risk free rate of 6.38%, an equity beta of 1.50 and a market risk premium of 6%;
- A nominal cost of debt of 7.58 %, which is based on a nominal risk free rate of 6.38% and a cost of debt margin of 1.20%; and
- A capital structure of debt – 60%, and equity – 40 %.

3.3 Throughput, Cash Flow Projections[22], and Residual Value

Throughput and cash flow projections over the economic life of the CWP are summarised in the table below for years 2001-2010. . Details relating to the NPV cash flow analysis are also noted. Unless specified otherwise, all financial information is in 1999 dollars.

[19] These estimates reflect the assumed levels and timing of replacement of components. Although APT(NSW) regards these assumptions as appropriate to base its capital expenditure estimates on at the present time, APT(NSW) cannot and does not make any representation or warranty as to the accuracy of the estimates presented.

[20] In dollars of the day.

[21] The Regulator discusses the reasoning underlying these cost of capital figures in some detail in Section 2 of the Final Decision.

[22] The projections in this section 3.3 are based on a number of assumptions including those noted in this section. Although APT(NSW) regards these assumptions as appropriate to base the projection on at the present time, APT(NSW) cannot and does not make any representation or warranty as to the accuracy of the projections.

Throughput, Capex, Opex and Price Path

Year ending 30 June	Throughput (TJ/year)	Capital Expenditure ($'000)	Operational Expenditure ($'000)	Price Path Nominal ($/GJ)
2001	720	6.75	723.5	2.17
2002	942	6.75	723.5	2.37
2003	1164	6.75	723.5	2.44
2004	1255	6.75	723.5	2.50
2005	1320	6.75	723.5	2.57
2006	1360	6.75	723.5	2.64
2007	1400	6.75	723.5	2.72
2008	1439	636.75	1108.5	2.79
2009	1479	9.00	723.5	2.87
2010	1520	9.00	723.5	2.95

WACC (pre-tax real) = 7.78 %[23].

Initial Capital Base[24] = $28.48 million (1999$)[25].

Price Path: A pre NTS tariff of $2.17 per GJ for the year ending 30 June 2001 and a pre NTS tariff of $2.37 per GJ for the year ending 30 June 2002 with the price path thereafter to be linked to a CPI – X adjustment as shown in the Access Arrangement where X equals 0.06. (The above tariffs equate to a post NTS tariff of $2.38 per GJ for the year ending 30 June 2001 and a post NTS tariff of $2.60 per GJ for the year ending 30 June 2002).

Inflation: estimated at 2.84% per annum.

Residual Value: The above gives a residual value of:

2010 = $51.75[26]m (NPV basis @ 7.78% pre-tax real – 1999 dollars)
(2010 reflects the expected term of the Access Arrangement)

2078 = $0 (NPV basis @ 7.78% pre-tax real – 1999 dollars)
(2078 reflects the expected economic life of the CWP)

[23] As per Final Decision section 2
[24] Cash flow analysis commenced from 1 July 1998 with an initial investment of $25.94m. The first year of the Access Arrangement Period is proposed to commence on 1 July 1999. This timing difference results in the variation between nominal and real Initial Capital Base.
[25] As per Final Decision section 3.2
[26] As per Final Decision (see, for example, Final Decision pviii)

4. NON-CAPITAL COSTS: OPERATIONS AND MAINTENANCE AND OVERHEADS AND MARKETING[27]

Estimates of non-capital costs have been developed by APT(NSW) for the ten years to 2010. These estimates are viewed by the Regulator as prudent[28].

As discussed in this section, such estimates have been established in the light of operations and maintenance activities being provided on a contract basis.

4.1 Operations and Maintenance Costs

Operation and maintenance activities for the CWP are to be performed under contract The efficiency of the operating and maintenance costs for the Pipeline are discussed in Section 6.

Operating and maintenance cost estimates are based on actual costs expected to be incurred over the Access Arrangement Period. There has been no allowance for contingency, and in respect of the operations and maintenance costs over the life of the CWP, infrequent but recurring costs (eg intelligent pigging) have been accounted for in the cash flow analysis in the year in which they are expected to occur.

Estimated operations and maintenance costs for the Access Arrangement Period have been included in the table below. These costs include all direct operation and maintenance activities relating to the CWP. Of the estimated costs, labour, outside services, and materials and supply account for some 29%, 27% and 6% of the total operations and maintenance cost respectively. Property taxes of $2,750 are also included in operations and maintenance cost.

No allowance has been made for system use gas in the operations and maintenance costs, since system use gas will be provided by the users[29].

4.2 Overheads and Marketing Costs

The cost of corporate services provided to APT(NSW) in respect of general and administrative activities relating to the CWP and to market its services are as set out in the following table.

[27] Projections in this section are based on a number of assumptions. Although APT(NSW) regards these assumptions as appropriate to base the projection on at the present time, APT(NSW) cannot and does not make any representation or warranty as to the accuracy of the projections.
[28] Final Decision p 76
[29] Refer to Schedule 3, Part 1 of the Access Arrangement.

Total Operating Cost[30]

Year Ending June 30	Operations and Maintenance ($ of the day)	Administration and General[31] (see note) ($ of the day)	Sales and Marketing[32] ($ of the day)	Total ($ of the day)
2001	481,917	239,352	53,546	774,815
2002	495,614	246,155	55,068	796,837
2003	509,700	253,151	56,633	819,485
2004	524,187	260,346	58,243	842,776
2005	539,086	267,746	59,898	866,730
2006	554,407	275,356	61,601	891,364
2007	570,165	283,182	63,352	916,698
2008	1,088,042	291,230	65,152	1,444,425
2009	603,036	299,508	67,004	969,548
2010	620,175	308,020	68,908	997,104

Note: Administration and general costs include insurance, regulatory affairs, compliance, personnel and training, legal, accounting, taxation and government levies.

4.3 Fixed versus Variable costs

Operating and maintenance costs of the CWP will not vary with throughput during the Access Arrangement Period.

4.4 Cost Allocation

All of the operating and maintenance costs are direct costs to APT(NSW) and will be applied to all Users in the single zone applying under the CWP Access Arrangement. Overheads and marketing costs will be applied on the same basis. There is no regulated differentiation of Users.

[30] In dollars of the day.
[31] The estimated cost of these activities has been determined by an allocation process on the basis of hourly rates, equivalent cost per employee or asset base depending on the specific activity.
[32] The cost of these activities have been allocated on the basis of estimated employee time spent performing the activities.

5 SYSTEM CAPACITY AND VOLUME ASSUMPTIONS

5.1 General

This section provides details relating to the technical specifications and throughput assumptions of the CWP. As the CWP has only been recently commissioned, its design specification provides an appropriate description.

The CWP is designed for a maximum operating pressure of 10.2MPa. The pipeline is 219.1mm (8") for the southern 130km to Alectown (near Parkes) and 168.3mm (6") outside diameter for the remaining 125km.

The pipeline steel specification is API 5L Grade X65 and X52 (in accordance with API Specification for Line Pipe, API Spec 5L). Pipeline wall thickness design has been determined in accordance with the Pipeline Code AS2885. A brief summary of technical details associated with the CWP is as follows:

Applicable Code	AS2885-1997	
Maximum allowable operating pressure (MAOP)	10,200 kPa (class 600)	
Steel grades	API 5L X52 and X65	
Diameter and Wall thickness	168.3mm	4.8mm – 50% SMYS 6.4mm – 40% SMYS
	and	
	219.1mm	5.0mm – 50% SMYS 6.4mm – 40% SMYS
Length	255km	
External coating	high density polyethylene – 1.2mm thickness	
Internal coating	epoxy	
Depth of cover	1200mm in roads and most locations 5000mm for directional drills 2000mm under rails and 1200 under rail reserve 900mm in private property	
Marker tape	in designated areas (built up areas, road crossings etc)	
Concrete coating	at watercourses and flood plains	
Concrete slabs	under table drains on road crossings	
Valve coating	Intertuff UHB over 2.5 blast clean	
Joint coating	Polyken 943-30 (inner) and 955-20 (outer) tape	

- Five off-take points (off-take and valve) supply reticulation systems in Forbes, Parkes, Narromine, Dubbo and Dubbo West.
- An extension to the existing off-take station near Marsden, incorporating metering, line valve and scraper station and a new odorant facility.
- Scraper stations near Alectown West and at the Dubbo end site.
- Additional above-ground valve sites at average 27km intervals.
- Pipeline markers and cathodic protection test points at intervals throughout.

5.2 Map of CWP and Pipe Specification

A map of the CWP Route is attached as Attachment 3.

Pipe sizes, lengths and delivery capability are set out in the tables below:

Pipeline Section	Diameter (mm outside)	Length (km)
• **Marsden off-take to Alectown Scraper Station**	219.1	130
• **Alectown Scraper Station to Dubbo**	168.3	125

Maximum Delivery Capability (Marsden inlet pressure = 4000kPa, free flow conditions)	10.1 TJ/d

5.3 Average Daily and Peak Demands

The estimated throughput and load profiles until 2004 are detailed in the table below. These are based on experience in comparable projects and assumptions as to the timing and level of penetration of natural gas[33].

[33] Although APT(NSW) regards these assumptions as appropriate to base the projections on at the present time, APT(NSW) cannot and does not make any representation or warranty as to the accuracy of the projections.

City Gate/Parameter	2001	2002	2003	2004
Forbes:				
Total Annual Volume (TJ)	120	167	213	224
Average Daily Flow Rate (GJ)	329	458	584	614
Peak Day Flow Rate (GJ)	562	782	998	1049
Minimum Delivery Pressure (kPa)	1750	1750	1750	1750
Parkes:				
Total Annual Volume (TJ)	147	183	233	246
Average Daily Flow Rate (GJ)	403	501	638	674
Peak Day Flow Rate (GJ)	689	857	1092	1152
Minimum Delivery Pressure (kPa)	1750	1750	1750	1750
Narromine:				
Total Annual Volume (TJ)	24	30	42	48
Average Daily Flow Rate (GJ)	66	82	115	132
Peak Day Flow Rate (GJ)	112	141	197	225
Minimum Delivery Pressure (kPa)	1750	1750	1750	1750
Dubbo:				
Total Annual Volume (TJ)	429	562	676	737
Average Daily Flow Rate (GJ)	1175	1540	1852	2019
Peak Day Flow Rate (GJ)	2010	2633	3167	3453
Minimum Delivery Pressure (kPa)	1750	1750	1750	1750

5.4Estimated Load Across Each Pricing Zone[34]

Estimated average daily, peak and total pipeline load for years ending 30 June 2001 – 2010 are set out below. There is only one pricing zone for the CWP.

Load and Volume	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Average Daily Load (GJ/D)	1973	2581	3189	3438	3616	3726	3836	3942	4052	4164
Peak Load (GJ/D)	3376	4417	5458	5884	6189	6375	6563	6745	6933	7125
Annual Volume (TJ)	720	942	1164	1255	1320	1360	1400	1439	1479	1520

[34] The estimated throughput and load profiles are based on experience in comparable projects and assumptions as to the timing and level of penetration of natural gas. Although APT(NSW) regards these assumptions as appropriate to base the projection on at the present time, APT(NSW) cannot and does not make any representation or warranty as to the accuracy of the projections.

5.5 System Load Profile by Month

Given the CWP has very little operational history, the monthly load profile is based on estimated loads. In addition, as the estimated loads vary significantly, the load profile is presented in terms of percentages.

Month	**% of total Annual Load**
January	4.9
February	6.4
March	6.7
April	8.5
May	10.1
June	10.8
July	11.6
August	11.2
September	9.6
October	7.5
November	7.1
December	5.6
Total	**100**

5.6 Numbers of Users on the CWP as at September 2000

Number of Users	2

6. EFFICIENT COSTS AND PERFORMANCE MEASURES FOR PIPELINES

6.1 Introduction

(a) Objective of Demonstrating Efficient Costs

The Code provides that a Service Provider's Reference Tariff and Reference Tariff Policy should be designed to provide the Service Provider with the opportunity to earn a stream of revenue that recovers the efficient cost of delivering the Reference Service[35] and that costs be those incurred by a prudent Service Provider acting efficiently, in accordance with accepted and good industry practice to achieve the lowest sustainable cost of delivering the Reference Service[36].

(b) Issues Relating to Performance Measures and Benchmarking of Transmission Pipelines

The ACCC in its Final Decision on the access arrangements submitted by Transmission Pipelines Australia (TPA):

> *"…recognises the challenges in identifying KPIs and benchmarks especially in a newly deregulated environment such as the Victorian natural gas industry."*[37]

These same challenges will continue to exist throughout the Australian gas transmission industry until such time as there is sufficient meaningful information relating to performance in the public domain. In addition to the difficulty of identifying KPIs and benchmarks, there are further challenges to be overcome in working up meaningful comparisons of the performance of individual pipelines in the industry including:

- Limited publicly available information,
- Privatisation, resale and restructuring within the industry has meant private companies have declined to release performance indicators on the basis of commercial sensitivity and restrictions on disclosure, and
- Difficulty of "normalising" pipelines to yield meaningful comparisons due to extremely diverse characteristics of pipelines (eg size, length, geography and topography of location, operational characteristics etc).

Nevertheless, it is recognised that it is necessary for the Regulator to benchmark performance, despite these very real difficulties. In this context, whilst the performance data presented is necessarily at a high level and of limited scope, it will contribute to the development of meaningful industry performance measures over time.

(c) Tariff Setting and Performance Measures

[35] Section 8.1(a).
[36] Section 8.37.
[37] Victorian Gas Transmission Access Arrangements Final Decision, 6 October 1998, p. 157

Before performance indicators can be used to benchmark operating efficiency, an appropriate range of such measures must be developed for comparable pipelines in relation to the service offered. While it is anticipated that such measures will be developed over time to suit the Australian industry, they are not currently established.

Therefore, performance comparisons presented have not been used to set or establish tariffs, but rather to demonstrate that APT(NSW) is operating the CWP in an efficient and prudent manner.

6.2 Cost Structure of Pipelines

Operating pipelines is a capital intensive industry. As a general rule, some 80–90% of annual accounting costs of operating a pipeline are attributable to capital related expenses in the form of depreciation and EBIT.

Annual accounting costs attributable to operating and maintenance costs make up the balance – some 10-20%.

6.3 Performance Measures for Pipelines

6.3.1 Capital Costs

As capital related expenses represent 80-90% of annual accounting costs, the cost of constructing the pipeline is clearly the dominant cost and therefore the most important to measure. However, to enable a comparison of construction costs, it is necessary to adjust the costs to take into account the factors driving capital costs, such as:

- surface conditions – bare, forest,
- soil type and condition – rock, sand,
- remoteness – urban, rural,
- type of steel – for example high tensile yields lower capital expenditure,
- price of steel – steel makes up some 30% of installed cost of pipelines,
- delays – approvals, land title, weather etc.

It is difficult to "normalise" these factors between various pipeline construction costs to allow meaningful comparison.

Given these difficulties, an industry accepted measure of pipeline installation cost efficiency is $/Millimetre/km. Throughput related measures (eg $/GJ or $/GJ/km) are poor measures of efficiency because of potential distortion due to differences in economies of scale between different sized pipelines and they ignore the effects of load factors and the level of utilisation of the pipeline.

6.3.2 Operating Costs

Even though operating and maintenance costs drive a minor portion of annual pipeline costs, the range of activities required to operate and maintain a pipeline are, like capital costs, affected by a series of pipeline specific factors including:

- terrain; river, road and rail crossings etc,
- remoteness,
- age of pipe,
- condition of coating,
- type of steel,
- rotating equipment (eg compressor stations).

Given these factors, industry accepted measures of pipeline operating and maintenance efficiency include:

- $/km,
- direct pipeline O&M expense/replacement cost of pipeline, and
- direct pipeline rotating equipment O&M expense/replacement cost of rotating equipment.

As with capital costs, throughput related measures ($/GJ or $/GJ/km) are poor indicators of efficiency for the same reasons applicable to capital costs.

6.4 Key Performance Indicators

6.4.1 Australian Comparisons

6.4.1.1 Capital Costs

The table below is data extracted from a paper "Australian Transmission Pipeline Costs" presented at the 1998 Australian Pipeline Industry Association (APIA) Convention[38]. The table lists those pipelines not dissimilar to the CWP in length and diameter and expresses the capital cost[39] on a $/mm/km basis.

[38] The paper is authored by Philip Venton of Venton and Associates.

[39] In the original paper, costs were in 1995 dollars (quarter not stated), these have been adjusted to September 1998 dollars (ie financial year 1999 dollars) from an assumed September 1995 base.

Pipeline	When Constructed	Length (km)	Diameter[40] (mm)	Unit Cost $/mm/km
Mereenie to Alice Springs	1985	270	200	730
Young to Lithgow	1987	212	150	1115
Canarvon Lateral	1988	171	150	719
Whyalla Lateral	1989	71	200	1212
Gladstone to Rockhampton	1991	96	200	957
Junee to Griffith	1993	170	150	805
Marsden to Dubbo	1998	130 125	200 150	620

The unit cost figures presented in the table above suggest that capital applied to the construction of the CWP has been utilised efficiently.

6.4.1.2 Total Operating Costs[41] - Actual

As noted in Section 4, APT(NSW) will operate the CWP on the basis of direct operations and maintenance being performed under contract with general administration and marketing requirements provided to APT(NSW) as a corporate service. On this basis, the total operating costs estimated for year ending June 2001 is $774,815 ($ of the day).

6.4.1.3 Total Operating Costs – Stand Alone

On the basis of APT(NSW)'s experience as a major owner and operator of transmission pipelines in Australia, our assessment of a stand alone organisation to operate the CWP is that an equivalent of around 10 people would be required. In addition, such a stand alone organisation would incur significant costs associated with providing:

- offices and a field depot,
- vehicle and tools necessary for operating and maintaining the pipeline and associated systems,
- stand alone SCADA, telemetry and control facilities, and
- sub-contracting of specialist services such as payroll, legal, training, superannuation, auditing, project engineering, etc.

[40] Outside diameters used in analysis.

[41] In this section on efficient costs, unless otherwise specified, "total operating expense" includes all non capital costs associated with operating a pipeline (ie operation and maintenance, marketing, general and administration expenses) and excludes profit and depreciation.

Based on our experience a budget for such a stand-alone pipeline operation would be in excess of $1.2m per annum.

6.4.1.4 Total Operating Costs - Indicative Based On Experience

From APT(NSW)'s experience in constructing and operating pipelines, indicative "rules of thumb" have been developed which are used to estimate total operating costs in investigating new pipeline opportunities. Whilst acknowledging that applying generalised averages to establish a total operating cost is somewhat subjective it nevertheless provides an indication of what operating costs can be expected under "average" conditions to be incurred in operating pipelines. These are set out in the table below.

Indicative Total Pipeline Operating Expenses as a Percentage of Asset Replacement Cost

Asset	Average	Large Pipeline	Small Pipeline
Pipeline	2%	1.5%	2.5%

Asset	Average	Multiple Units	Single Unit
Compressors[42] (gas turbines)	6%	5%	7%

6.4.1.5 Total Operating Cost – Comparison with TPA

TPA total operating cost information is publicly available (the TPA[43] transmission system includes compression). Applying the indicative measures above to TPA's total 1998 operating expense is set out in the table below.

TPA Total Operating Cost ($m) – 1998

	Replacement Cost[44]	APT(NSW) Indicative Measure Applied	Indicative Operating Cost	Actual TPA Estimated Operating Cost
Pipeline Direct	596.3	2%	11.9	N/a
Compression	62.3	6%	3.7	N/a
Total	**658.6**		**15.6**	**19.5**

Assuming the indicative operating cost attributable to compression is correct, then operating cost attributable to the pipeline component of TPA is around $15.8m (ie $19.5m – $3.7m) which is 2.6% of replacement cost.

A comparison of total operating cost using APT(NSW)'s indicative measure with TPA's estimate as applied to both the TPA and the CWP is set out in the table below. Note that the compression related operational costs have been removed as per the above analysis.

[42] Excluding fuel gas cost.
[43] Transmission Pipelines Australia Pty Ltd Access Arrangement dated 3 November 1997.
[44] Quoted as at 1 July 1997 in the TPA Access Arrangement. For the purposes of this analysis these figures have been escalated to 1998 dollars assuming an inflation rate of 2.5% to match the year in which operating costs have been quoted (1998) in the TPA Access Arrangement.

Comparison of Operating Costs by Applying APT(NSW) Indicative Measure and TPA Estimates

	Replacement Cost[45] ($m)	APT(NSW) indicative measure 2% ($m)	TPA estimate 2.6% ($m)
TPA	596.3	11.9	15.5
CWP	30.71	0.61-0.77[46]	0.80

The above analysis, whilst not being based entirely on precise information does suggest that a reasonable cost of operating the CWP is within the range of $770,000 (from the above table) to $1,200,000 (on a stand alone basis) per annum. APT(NSW) has estimated total operating expense to be $774,815 (2001$) per annum[47] which is at the low end of the range.

6.4.1.6 Total Operating Cost – Comparison with Australian Pipelines

The table below sets out comparisons of estimated total operating costs for the CWP, TPA and a selection of (albeit somewhat dated) other Australian pipeline operators on a $m/1000 km basis. The data has been sourced from the TPA Access Arrangement[48].

Company	APT(NSW)	TPA	TPA	AlintaGas	Pipeline Authority	PASA
State	NSW	VIC	VIC	WA	NSW	SA
Year	98/9	98	95/6	95/6	94/5	94/5
$m/1000km	2.8	11.0[49] – 16.0[50]	9.9	13.6	10.4	10.1

Even making allowance for the fact that these pipeline systems all have compression, and are very much larger than the CWP, the above comparisons point to the total operating costs for the CWP being efficient.

6.4.2 US Comparison

6.4.2.1 Capital Costs

NERA[51] has developed construction cost estimates for long distance transmission pipelines on a per diameter/km basis for various pipe diameters for use in

[45] It is noted that there is some overlap in escalating the TPA valuations for inflation as TPA costs are in calender year 1998 dollars, while that for CWP are in financial year 1999 dollars, however this timing difference has no impact on the analysis.
[46] As CWP is a small pipeline a 2.5% measure should be applied to compare like with like.
[47] In 1999 dollars.
[48] Escalated to 1999 dollars where appropriate. For the purposes of comparison, calender year 1998 dollars are assumed to be the same as financial year 1999 dollars.
[49] TPA Access Arrangement, 3 November 1997, p. 41.
[50] Victorian Gas Transmission Access Arrangements Final Decision, 6 October 1998, p. 68.

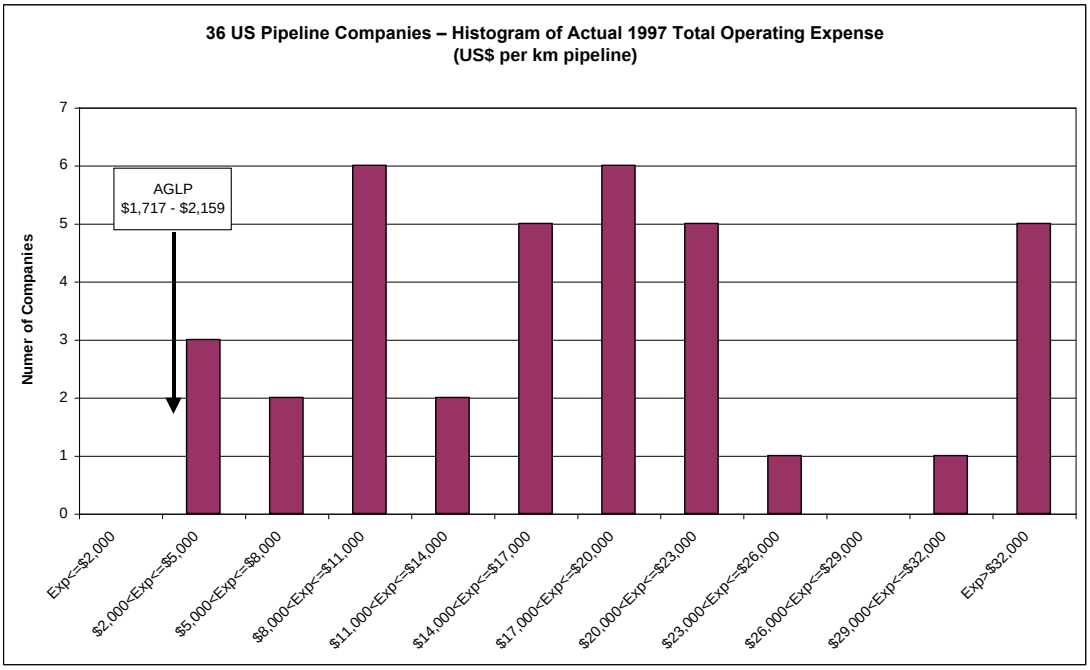
planning purposes in North America. A range of exchange rates between 62-78 US cents per $AUS[52] were applied to the NERA costs which then have been used to calculate an estimated construction cost of the CWP. The comparison is set out in the table below, in US dollars[53].

	Actual $/mm/km	**NERA estimate $/mm/km**
CWP	385-484	620

6.4.2.2 Operating Costs

In contrast to Australia the US has a significant amount of data publicly available on gas pipeline operating costs which is in a standard form as required by the Federal Energy Regulatory Commission (FERC). However the same problems of comparability that exist in Australia arise because of the environmental differences which affect costs between each pipeline.

Nevertheless, the static comparison below of total operation and maintenance expense/km of transmission pipeline provides useful insight into the efficiency of APT(NSW) in operating the CWP when compared to a range of US pipelines. It is noted that the US pipelines in the comparison tend to be very large by Australian standards and probably all having compression. Data on the US pipelines has been sourced from the 1997 FERC filings of 36 pipeline companies[54].



[51] National Economic Research Associates. Private paper 1995.
[52] This range of exchange rates is reasonable for the period in which the data was derived. Recent exchange rate volatility results in the most recent exchange rates being below this range.
[53] In 1999 dollars.
[54] Refer to Attachment 2 for a listing of the 36 companies and notes on the compilation of the US data.

ATTACHMENT 1

CATEGORIES OF INFORMATION TO BE DISCLOSED AS PART OF THE ACCESS ARRANGEMENT INFORMATION

Category in Access Code	Reference in the Access Arrangement Information
Category 1: Information regarding Access & Pricing Principles	
Tariff determination methodology.	2.2
Cost Allocation approach.	2.4
Incentive structure.	2.5
Category 2: Information regarding Capital Costs	
Asset values for each pricing zone, service or category of asset.	3.1.4
Information as to asset valuation methodologies – historical cost or asset valuation.	3.1.1, 3.1.2, 3.1.3, 3.1.4
Assumptions on life of asset for depreciation.	3.1.7
Depreciation.	3.1.6
Accumulated depreciation.	3.1.6
Committed capital works and capital investment.	3.1.8
Description of nature and justification for planned capital investment.	3.1.8
Rates of return – on equity and on debt.	3.2
Capital Structure – debt/equity split assumed.	3.2
Equity returns assumed – variables used in derivation.	3.2
Debt costs assumed – variables used in Derivation.	3.2
Category 3: Information regarding Operations and Maintenance Costs	
Fixed versus variable costs.	4.3
Cost allocation between zones, services or categories of asset & between regulated and unregulated.	4.4
Wages & Salaries – by pricing zone, service or asset category.	4.1
Cost of services by other including rental equipment.	4.1
Gas used in operations – unaccounted for gas to be separated from compressor fuel.	4.1
Materials and supply.	4.1
Property Taxes.	4.1
Category 4: Information on Overheads & Marketing Costs	
Total service provider costs at corporate level	4.2
Allocation of costs between regulated and unregulated segments.	4.4
Allocation of costs between particular zones, services or categories of asset.	4.4

Category in Access Code	Reference in Access Arrangement Information
Category 5: Information regarding System Capacity & Volume assumptions	
Description of system capabilities	
Map of piping system – pipe sizes, distances and maximum delivery capability.	
Average daily and peak demand at "city gates" defined by volume and pressure.	5.1, 5.2, Attachment 3
Annual volume across each pricing zone, service or category of asset.	5.3
System load profile by month in each pricing zone, service or category of asset.	5.4
Total Number of customers in each pricing zone, service or category of asset.	5.5
	5.6
Category 6: Information regarding Key Performance Indicators	
Industry KPIs used by The Service Provider to justify "reasonable incurred" costs.	
Service provider's KPIs for each pricing zone, service or category of asset.	6.3
	6.4

ATTACHMENT 2

COMPILATION OF US DATA FOR COST COMPARISON

2.1 Companies Included in Cost Comparison

The table below identifies the pipeline companies which have been included in the cost comparison study.

1	ANR Pipeline Co	21	PG&E Gas Transmission Northwest Corp
2	Black Marlin Pipeline Co	22	Questar Pipeline Co
3	Chandeleur Pipeline Co	23	Sabine Pipeline Co
4	Columbia Gulf Transmission Co	24	Sea Robin Pipeline Co
5	East Tenessee Natural Gas Co	25	Stingray Pipeline Co
6	El Paso Natural Gas Co	26	Tennessee Gas Pipeline Co
7	Florida Gas Transmission Co	27	Texas Eastern Transmission Corp (Tetco)
8	Great Lakes Gas Transmission LP	28	Texas Gas Transmission Corp
9	High Island Offshore System	29	Trailblazer Pipeline Co
10	Iroquois Gas Transmission LP	30	Transcolorado Gas Transmission Co
11	K N Interstate Gas Transmission Co	31	Transwestern Pipeline Co
12	Kern River Gas Transmission Co	32	Trunkline Gas Co
13	Midwestern Gas Transmission Co	33	U-T Offshore System
14	Mojave Pipeline Co	34	Viking Gas Transmission Co
15	Mississippi River Transmission Co	35	Williams Gas Pipelines Central
16	Mobile Bay Pipeline Co	36	Wyoming Interstate Co Ltd
17	Northern Border Pipeline Co		
18	Northern Natural Gas Co		
19	Overthrust Pipeline Co		
20	Panhandle Eastern Pipeline Co		

2.2 Company Selection Criteria

Initially some 75 companies were identified from FERC filings as being "pipeline" companies. However, as some of these companies are integrated businesses which could include production, storage, transmission and distribution activities a filtering process was applied to identify those companies whose dominant business activity was transmission.

This filtering process identified 36 companies whose core business is transmission, and whose other activities (ie production, storage and distribution) make up a minor portion of total operating costs.

2.3 Operation and Maintenance Expense

In the cost comparison, only the operation and maintenance expense for transmission activities were included (ie any operation and maintenance expense allocated to production, storage or distribution have been deleted).

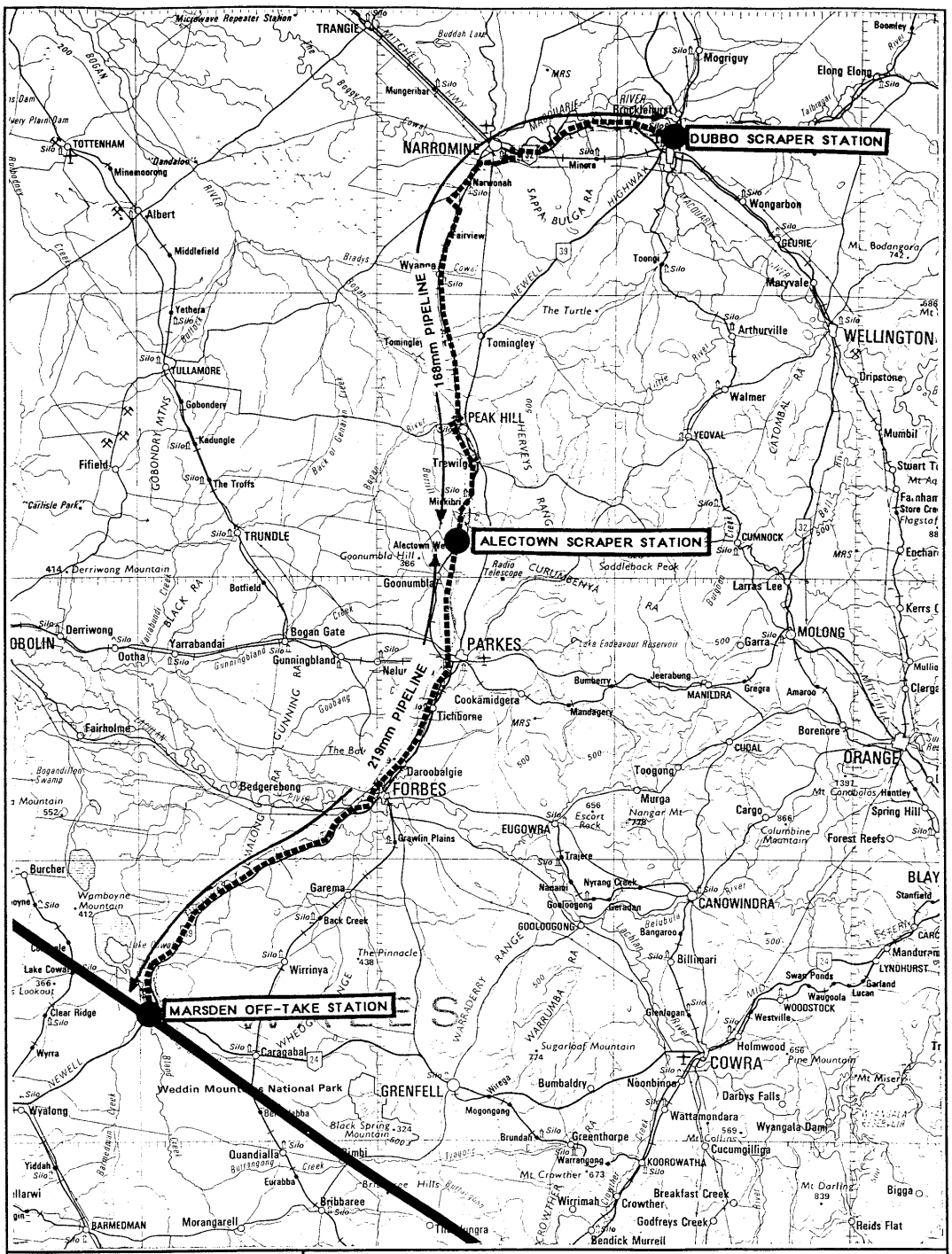
2.4 Marketing and Overhead Expenses

The FERC requires operating and maintenance cost data to be allocated to each of a company's operating activities, however this doesn't apply for marketing and overhead expenses[55]. Because marketing and overhead expenses are not allocated to separate operating activities, the share of these expenses to each of the operating activities can not be accurately determined. This means that the marketing and overhead expenses used in the cost comparison are for the total business, however because transmission activities of the companies selected are dominant, any overstating of marketing and overheads expense would be minimal, and have no impact on the conclusion drawn from the US/AUS comparison that the CWP is being operated efficiently.

[55] Includes Customer Accounts, Customer Service, Sales, General and Administration expenses.

ATTACHMENT 3

MAP OF CENTRAL WEST PIPELINE



AGL Pipelines (NSW) PTY LTD			CENTRAL WEST PROJECT				
			MARSDEN DUBBO NATURAL GAS PIPELINE ROUTE MAP				
DESIGNED			SCALE	SITE	DRG NO	REV	SIZE
DRAWN			1:1,000,000	---	MD80-0001	2	A4
CHECKED							
APPROVED							

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