Experience that Delivers

jp kenny

Client:

# APA GASNET (OPERATIONS) PTY LTD

Project Name:

# VICTORIAN TRANSMISSION SYSTEM

APA Group

Document Title:

# ACCESS ARRANGEMENT 2013-17 CAPEX & OPEX REVIEW

Document Number:

01-1369-01-G-3-001

Client Document Number:

Document Type:

Report

Number of Pages:

83

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| Rev | Date | Reason for Issue | Prep. By | Chk. By | App. By | Client Approval |
|---|---|---|---|---|---|---|
| 1 | 11 May 2012 | Issued for AER Publication | BH | RD | CC | AC |
| 0 | 31 Mar 2012 | Issued for Use | RC | BH | CC | AC |
| A | 26 Mar 2012 | Draft | RC | BH | CC | |

| COMMENTS SHEET | | |
|---|---|---|
| **REVISION** | **DATE** | **COMMENTS** |
| A | 26 Mar 2012 | *Draft - Issued for comment* |
| 0 | 31 Mar 2012 | *Issued for Use* |
| 1 | 11 May 2012 | *Issued for AER publication. Confidential information redacted.* |

| SAFETY HEALTH AND ENVIRONMENTAL ISSUES | | |
|---|---|---|
| **No.** | **DESCRIPTION OF ISSUE** | **POTENTIAL MITIGATION MEASURE** |
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Where the term “HOLD” is specified in this document, it signifies that additional engineering or information shall be required to finalise this document.

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# 1.0 EXECUTIVE SUMMARY

## 1.1 Introduction

JP Kenny has conducted an independent review of the following components of APA GasNet's capital and operating expenditure as part of its access arrangement proposal for the Victorian Transmission System (VTS) for the period 2013-2017:

- Information and justification for capital expenditure undertaken in the previous access arrangement period (2008-2012);
- Information and justification for capital expenditure forecast for the upcoming access arrangement period (1 January 2013-31 December 2017);
- Details of operating expenditure in the previous access arrangement period, in particular the efficiency of the 2011 base year for forecast operating expenditure, and
- Forecast operating expenditure for the upcoming access arrangement period, derived using the base year methodology.

JP Kenny was given access to a vast amount of material as well as to key members of staff to conduct the review. The process involved drilling down to examine detailed information. APA GasNet members of staff were helpful and cooperative in the process. In general, JP Kenny was impressed with the rigour of cost estimation.

## 1.2 Historic Capital Expenditure for 2008-2012

The most notable aspect of this category of expenditure was the decision taken by the APA Group to defer capital expenditure where possible in the wake of the Global Financial Crisis (GFC). This had a profound impact on APA GasNet's CAPEX program for the period and numerous projects were affected. The changed priorities and changes in the operation of the VTS meant significant change in the CAPEX undertaken by comparison with the program proposed in the 2008-2012 access arrangement proposal.

JP Kenny concluded that in the unusual operating environment the company took sound decisions and that the expenditure was prudent in accordance with the National Gas Rules.

## 1.3 Forecast Capital Expenditure for 2013-2017

A consequence of the deferral of a number of CAPEX projects in the 2008-12 period is the need to catch up on this deferred work in the 2013-2107 period to avoid adverse impacts to the integrity and performance of the VTS assets. JP Kenny reviewed a total of 24 stay-in-business capital projects and 5 system augmentation projects. Expenditure for each of the projects discussed in this report was found to be conforming CAPEX in accordance with the National Gas Rules.

## 1.4 Historic Operating Expenditure for 2008-2012

Overall, there was a shortfall of actual expenditure in comparison to the amount approved by the Australian Energy Regulator in the previous review period. A feature of the operation of gas transmission systems is that a certain amount of expenditure is essential to keep the system going, regardless of the external financial environment. Thus, although some expenditure was deferred, the bulk of approved expenditure in the previous review period still occurred. During the period the regulator removed expenditure on fuel gas from the approved categories of operating

expenditure because APA GasNet has no control over the operation of the VTS. This is the function of the Australian Energy Market Operator (AEMO). Hence, the fuel gas item needed to be excluded for the purpose of comparison.

The category of Outside Services was the one with the greatest shortfalls from approved expenditure. JP Kenny concluded from the review that the operating expenditure of APA GasNet for the period was conforming expenditure in accordance with the National Gas Rules.

It was also concluded that 2011 is the appropriate base year for forecasting OPEX data for the period 2013-17.

### 1.5 Forecast Operating Expenditure for 2008-2012

JP Kenny reviewed the estimated impact of the five proposed new pipelines and compression augmentation projects on OPEX. In addition, a number of step changes to OPEX due to changes in legislation, standards, levies, and input costs were considered. The outcome of the independent review was that APA GasNet's forecast OPEX for the period 2013-17 was assessed as conforming expenditure in accordance with the National Gas Rules.

# 2.0 INTRODUCTION

## 2.1 Scope of Works

APA Group, owner of the Victorian Transmission System (VTS), has retained the services of JP Kenny (the consultant) to prepare an independent review and assessment of APA GasNet (Operations) Pty. Ltd, herein after referred to as APA GasNet's capital and operating expenditure for the VTS, and provide advice on whether the capital and operating expenditure is prudent and efficient as required under the National Gas Rules (Rules).

JP Kenny is an engineering and project management company providing services primarily to energy utility companies, governments and the international oil and gas industry. JP Kenny's extensive design engineering and project management experience includes offshore pipelines, sub-sea facilities and onshore pipelines including compressor stations, pressure reduction stations, metering stations and supporting SCADA / telemetry installations.

JP Kenny is an autonomous operating company of the JP Kenny Group of companies with JP Kenny Engineering Group being a wholly owned subsidiary of the Wood Group which is a leading international energy services company operating in over 30 countries.

Financial analysis services were provided by Ross Calvert Consulting Pty. Ltd. in preparing this report.

The Expert Consultant's Terms of Reference are included in Appendix A. Curriculum Vitae for the personnel involved in preparing the report and included in Appendix B.

Parts of the VTS are regulated under the National Gas Law and Rules and under those rules APA GasNet is required to submit revisions to its access arrangement to the Australian Energy Regulator (AER) by 31 March 2012. These revisions must include the following:

- Information and justification for capital expenditure undertaken in the previous access arrangement period (2008-2012);
- Information and justification for expenditure forecast for the upcoming access arrangement period (1 January 2013-31 December 2017);
- Details of operating expenditure in the previous access arrangement period, in particular the efficiency of the 2011 base year for forecast operating expenditure, and
- Forecast operating expenditure for the upcoming access arrangement period, derived using the base year methodology.

In order for the AER to approve the expenditure it must conclude that the expenditure is consistent with the relevant provisions of the Rules. The consultant has been requested to prepare a report, suitable for submission to the AER by APA GasNet, which sets out the expert consultant's advice and opinion as to whether expenditure meets the requirements under the Rules.

The expert consultant is required to assess whether the expenditure is reasonable, based on benchmarking against industry practices, and with consideration of:

- Asset condition;
- Technical risks;
- Commercial risks;

- Technical compliance, and
- Specifics of asset location.

## 2.2 Compliance with governing Rules

The relevant National Gas Rules covering capital and operating expenditure are Rules 79 and 91. These are set out in the box below.

### 79 New capital expenditure criteria

(1) Conforming capital expenditure is capital expenditure that conforms with the following criteria:

(a) the capital expenditure must be such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services;

(b) the capital expenditure must be justifiable on a ground stated in sub rule (2).

(2) Capital expenditure is justifiable if:

(a) the overall economic value of the expenditure is positive; or

(b) the present value of the expected incremental revenue to be generated as a result of the expenditure exceeds the present value of the capital expenditure; or

(c) the capital expenditure is necessary:

(i) to maintain and improve the safety of services; or

(ii) to maintain the integrity of services; or

(iii) to comply with a regulatory obligation or requirement; or

(iv) to maintain the service provider's capacity to meet levels of demand for services existing at the time the capital expenditure is incurred (as distinct from projected demand that is dependent on an expansion of pipeline capacity); or

(d) the capital expenditure is an aggregate amount divisible into 2 parts, one referable to incremental services and the other referable to a purpose referred to in paragraph (c), and the former is justifiable under paragraph (b) and the latter under paragraph (c).

(3) In deciding whether the overall economic value of capital expenditure is positive, consideration is to be given only to economic value directly accruing to the service provider, gas producers, users and end users.

(4) In determining the present value of expected incremental revenue:

(a) a tariff will be assumed for incremental services based on (or extrapolated from) prevailing reference tariffs or an estimate of the reference tariffs that would have been set for comparable services if those services had been reference services; and

(b) incremental revenue will be taken to be the gross revenue to be derived from the incremental services less incremental operating expenditure for the incremental services; and

(c) a discount rate is to be used equal to the rate of return implicit in the reference tariff.

(5) If capital expenditure made during an *access arrangement period* conforms, in part, with the criteria laid down in this rule, the capital expenditure is, to that extent, to be regarded as conforming capital expenditure.

(6) The AER's discretion under this rule is limited.

**91 Criteria governing operating expenditure**

(1) Operating expenditure must be such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of delivering pipeline services.

(2) The AER's discretion under this rule is limited.

## 2.3 Abbreviations

| | |
|---|---|
| AA | Access Arrangement |
| ACCC | Australian Competition and Consumer Commission |
| AEI | Approved Engineering Investigation |
| AEMO | Australian Energy Market Operator |
| AER | Australian Economic Regulator |
| AMS | Asset Management System |
| AMP | Asset Management Plan |
| APA | APA Group |
| AS | Australian Standards |
| ASV | Anti-surge Valve |

| | |
|---|---|
| AWOTE | Average Weekly Ordinary Time Earnings |
| BC | Business Case |
| CAPEX | Capital Expenditure |
| CP | Cathodic Protection |
| CPI | Consumer Price Index |
| DCG | Dandenong City Gate |
| DPI | Department of Primary Industry |
| EGW | Electricity, Gas and Water |
| ESV | Energy Safe Victoria |
| FSV | Fast stop valve |
| GFC | Global Financial Crisis |
| HAVD | Hazardous Area Verification Dossier |
| ISO | International Standards Organisation |
| km | Kilometre |
| kPa | Kilopascals |
| LPI | Labour Price Index |
| MAOP | Maximum Allowable Operating Pressure |
| NGL | National Gas Law |
| OPEX | Operating Expenditure |
| PLC | Programmable Logic Controller |
| PRS | Pressure Regulating Station |
| RTU | Remote Telemetry Unit |
| SAOP | Safety and Operating Plan |
| SCADA | Supervisory Control and Data Acquisition |
| scmh | Standard cubic metres per hour |
| SIB | Stay In Business |
| SMS | Safety Management Study |
| TJ | Terrajoule |
| TR | Transformer-rectifier |
| VTS | Victorian Transmission System |
| WORM | Western Outer Ring Main |

# 3.0 HISTORICAL CAPITAL EXPENDITURE

## 3.1 Access Arrangement: 2008 - 2012

This chapter reviews capital expenditure undertaken in the earlier access arrangement period.

Table 3.1 compares forecast capital expenditure approved in the ACCC 2008 final decision with APA GasNet estimates actual and estimated capital expenditure over the access arrangement period in constant 2012 dollars.

**Table 3.1: Comparison of ACCC 2008 Final Decision and outturn capital expenditure over the earlier access arrangement period ($k 2012)**

| Category | 2008 | 2009 | 2010 | 2011 | F2012 | TOTAL |
|---|---|---|---|---|---|---|
| **ACCC 2008 Final Decision** | | | | | | |
| Augmentation | 16,803 | 94,900 | - | - | - | **111,703** |
| Refurbishment and Upgrade | 29,922 | 51,074 | 5,242 | 15,566 | 4,398 | **106,202** |
| Non-system | 1,238 | 146 | 125 | 1,936 | 458 | **3,902** |
| **Total forecast** | **47,963** | **146,120** | **5,367** | **17,502** | **4,856** | **221,807** |
| **Actual and forecast capital expenditure** | | | | | | |
| Augmentation | 18,600 | 2,384 | 4,284 | 43,467 | 23,356 | **92,090** |
| Refurbishment and Upgrade | 19,240 | 7,048 | 1,223 | 4,792 | 22,503 | **54,807** |
| Non-system | 619 | 821 | 5,577 | 1,679 | 4,783 | **13,479** |
| **Total actual** | **38,458** | **10,253** | **11,085** | **49,939** | **50,641** | **160,376** |
| **Variance between ACCC 2008 Final Decisions and APA GasNet actual and forecast capital expenditure** | | | | | | |
| Augmentation | 1,797 | (92,516) | 4,284 | 43,467 | 23,356 | **(19,612)** |
| Refurbishment and Upgrade | (10,682) | (44,026) | (4,019) | (10,774) | 18,105 | **(51,395)** |
| Non-system | (620) | 675 | 5,453 | (256) | 4,325 | **9,577** |
| **Total variance** | **(9,505)** | **(135,867)** | **5,718** | **32,437** | **45,786** | **(61,431)** |

The most notable feature of the comparison is the significant underspending of total capital expenditure. While a total capital expenditure of $221.8m was approved, only $160.4m was actually spent. Nevertheless, APA GasNet delivered each of its proposed augmentation capital projects and achieved some significant efficiency in doing so. The major underspending occurred in refurbishment and upgrade projects.

APA GasNet advises that the major reason for the significant underspending was the uncertainty about availability of funds from early 2009 through 2010 period due to the global financial crisis (GFC). In these circumstances, the company chose to limit capital and operating expenditure during this period which was not considered time-critical. This action was guided by the knowledge that much stay-in-business capital expenditure, which is generally undertaken

according to periodic timetables, can be deferred in the short term without an adverse impact on safety or the integrity of assets. Nevertheless, the deferral then creates a need to catch up in these programs so that safety and asset integrity is not compromised.

In the uncertain circumstances, the company concentrated expenditure in areas where it was underpinned by secure volumes of gas to be transported. The prudency of this approach is acknowledged.

## 3.2 Augmentation capital expenditure

The following augmentation projects were undertaken:

- Northern augmentation;
- Pakenham Loop; and
- Brooklyn Lara Pipeline (Corio Loop).

### 3.2.1 Northern Augmentation

The Northern Augmentation project approved by the AER included the following components (with costs in $2012):

- upgrading of the Wollert compressor station at a forecast cost of $47m;
- 11 km of looping on the Wollert to Wandong pipeline between Wollert Compressor station and Line Valve 3 in 450mm diameter at an expected cost of $17.2 m; and
- Installation of two Saturn 20 compressor units at Euroa at an expected cost of $29.5m.

The project was scheduled for completion in 2009 at a total cost of $93.5m to achieve capacity of 17 TJ/day of exports through Culcairn. Commencement of the project was delayed due to the GFC. This delay enabled investigation of alternative options for the project with the potential to deliver greater benefits at lower cost.

The original scope for the upgrade at Wollert was to replace the wet-seal compressors with dry-seal units to meet a gas quality recommendation from Energy Safe Victoria. While it was originally proposed to replace three existing Saturn units with two Centaur 40 units, further analysis of the long-term demand growth expected in the northern zone indicated that two Centaur 50 units would result in a higher NPV. Ultimately, this component of the project was completed in 2011 at a cost of $35.5 m ($2012) which meant a reduction of $11.3m on the forecast cost.

APA GasNet also identified an alternative solution to the looping the Wollert to Wandong pipeline, which involved a MAOP upgrade of the pipeline as well as modifications to the Springhurst compressor station to make it bidirectional. This solution was dependent upon approval of a licence variation by the Victorian Department of Primary Industries and Energy Safe Victoria. The successful outcome of the approval process enabled a higher capacity to be achieved than the original project design and at lower cost. The proposed looping project was no longer necessary and the new compressor station at Euroa could be deferred by two years.

The MAOP upgrade and Springhurst compressor station modifications cost was $7.3m, compared with a forecast cost of $17.2m for the original project. Moreover the achieved capacity increment was 28TJ/day, compared to the original 14TJ /day. APA GasNet is now completing construction of Euroa compressor station with an expected cost of $24m.

Accordingly, the total expenditure on the northern augmentation project will be $66.8m by comparison with the original forecast of $93.5m.

This project satisfies Rule 79 (2)(c)(iv) because the expenditure was necessary to maintain the service provider's capacity to meet levels of demand for services existing at the time the capital expenditure is incurred (as distinct from projected demand that is dependent on an expansion of pipeline capacity).

In accordance with Rule 79 it is concluded that expenditure on the Northern Augmentation project is conforming capital expenditure because it would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services.

### 3.2.2 Pakenham Loop

The Pakenham loop project was proposed in response to increasing loads along the Lurgi pipeline, accompanied by a higher than average growth in Pakenham South. While network planning analysis did not indicate that the minimum pressure obligation would be breached, the increased gas flow velocity nevertheless required pipeline augmentation. Around two-thirds of the 80 mm diameter Pakenham South Branch pipeline had already been replaced with 150 mm line.

In this project a further 550m of 150 mm pipe was installed to duplicate the remaining section of 80 mm pipeline. The AER approved expenditure of $1.4m ($2012) for completion by winter 2009. APA GasNet completed the project in 2010 at a cost of $1.3m ($2012). In accordance with Rule 79 it is concluded that expenditure on the Pakenham Loop project is conforming capital expenditure because it would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services.

### 3.2.3 Brooklyn Lara Pipeline (Corio Loop)

Previously, the AER had approved expenditure of $61.7 m ($2005) for completion of the Brooklyn Lara loop project by 2007. Due to delays in some stages of the project it was completed in 2008. Although there was late expenditure on the project in 2011 and 2012 associated with finalisation of compulsorily acquired easements.

Total expenditure approved by the AER for the project amounted to $71.1m ($2012), while APA GasNet's total expenditure was $70.3m ($2012). The major delays for the project were mostly attributable to difficulties associated with the compulsory acquisition of easements.

In accordance with Rule 79 it is concluded that expenditure on the Corio Loop project is conforming capital expenditure because it would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services.

## 3.3 Refurbishment and upgrade capital expenditure

Refurbishment and upgrade projects carried out during the access arrangement period were as follows:

- Gas Heaters;
- City gate works;
- Pipeline upgrades;
- Safety and security systems;
- Brooklyn Compressor Station;
- Gooding Compressor Station;
- Wollert Compressor Station;
- Iona Compressor Station;
- Other Compressor Stations; and
- Other Refurbishment and Upgrades.

### 3.3.1 Gas Heaters

Gas heaters are used where the temperature reduction due to pressure reduction could cause hydrocarbon condensation or hydrate formation. The AER had approved expenditure of $9.2m ($2012) for gas heating facilities, involving seven sites in the years 2008 and 2009. Ultimately, APA GasNet spent $8.4m on gas heating facilities over the access arrangement period but there were significant changes to the scope of work and the timing of projects.

JP Kenny sought additional information from APA GasNet on the changing conditions that led to the need for larger heaters at the Brooklyn Lara pipeline City gate. APA GasNet advised that a revised assessment of the gas heating duty for the Brooklyn Lara pipeline City gate indicated that the larger heater would be required in order to accommodate the necessary flexibility in delivery pressure sought by AEMO regarding delivery pressures in the Brooklyn Lara pipeline.

This increased scope led to delays in scheduled work for other facilities including the Dandenong city gate heater for which forecast expenditure was $3.8m ($2012) in 2008. Because of the GFC, APA GasNet rescheduled the work to the current forecast period.

The scope of work on the Lara - South West pipeline city gate reduced because of changes in AEMO's operation of the Geelong pipeline and upgrading of liquids removal facilities by the gas producers. The consequence was that all necessary works site were completed for $0.04m compared to forecast expenditure of $0.4m ($2012).

Heating facilities at the Dandenong terminal were completed as forecast, but work on the North Laverton heater was largely deferred because of expected pressure increases in the Geelong Pipeline due to the Western Outer Ring Main project.

Proposed work on a heater at Clonbinane did not proceed because the MAOP upgrade associated with the Northern zone augmentation project rendered it unnecessary.

JP Kenny's assessment is that in accordance with Rule 79, expenditure on Gas Heating Facilities is conforming capital expenditure because it would be incurred by a prudent service provider

acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services.

### 3.3.2 City gate works

The AER approved a total of $15.4m ($2012) for city gate works over the access arrangement period. While that amount was spent on city gate works over the period, the program of work undertaken was altered due to changing pipeline operation and dynamics. The re-prioritisation works has lead to rescheduling of some projects originally scheduled for the earlier access arrangement period to the 2013-2017 period.

### 3.3.3 Pipeline upgrades

APA GasNet had previously forecast a need to complete the Sunbury loop in the previous access arrangement proposal. However, VENCorp's assessment at the time was that forecast work on installation of units 13 and 14 at Brooklyn compressor station would defer that requirement (Reference [1]). In the event, VENCorp revised its advice and agreed that the Sunbury loop was required in 2009 (Reference [2]). .

APA GasNet will complete the Sunbury loop in 2012, at a cost of $13.5m. As discussed later in this report the pipeline has been sized to form part of the Western Outer Ring Main.

Pipeline upgrade work in the forecast program was concentrated on routine areas such as recoating, replacement of cathodic protection and the longer term program of Line Valve automation. Scheduled works also completed included an emergency centre upgrade, anode bed and CP replacement and the Keon Park pig trap. An unscheduled installation of a pig trap was also completed at Bunyip. JP Kenny sought further advice from APA GasNet as to the reason for this additional work and was advised that it was installed as part of a wider program of making unpiggable pipelines piggable (also a feature of the forecast capital program).

### 3.3.4 Safety and security systems

In the previous access arrangement decision, the AER approved $5m ($2012) of expenditure on safety and security systems across seven sites. Only $1.5m ($2012) of that amount was spent. Because of the uncertainty of funds availability due to the GFC, much of the work in this category was deferred, based on risk assessment. More than half approved funding amount relates to security fencing. This identified need arises from risk management plans prepared by APA GasNet in accordance with the Victorian *Terrorism (Community Protection) Act 2003*.

A $0.8m ($2012) project to replace emergency response equipment was also deferred until the upcoming access arrangement period.

### 3.3.5 Brooklyn Compressor Station

The AER had approved $58.6m ($2012) of expenditure at the Brooklyn compressor station for the previous access arrangement period. The program of work ultimately carried out differed significantly from that originally proposed. Replacement of compressor 10 with compressor 12, a dry-seal unit, and works on the vent stack at a total cost of $16.6 m ($2012) was approved in the preceding access arrangement for completion in 2007. However, $2.1m ($2012) was actually spent in the 2008-2012 access arrangement period which was not forecast for that period. Nevertheless, the total project expenditure of $14.8m was less than the 2007 forecast amount.

There was approved expenditure in the earlier access arrangement period to maintain gas supply to Sunbury and Ballarat by installing compressor units 13 and 14 and relocating unit 11. However, GasNet has now identified a superior option involving the first stage of the Western Outer Ring Main project. This is discussed in more detail in the section on new augmentation projects for the new access arrangement period.

### 3.3.6 Gooding Compressor Station

Expenditure on the Gooding compressor station was originally approved as part of the 2002 to 2007 access arrangement, the project was ultimately completed in 2008 at a total cost of $19.8 m. While this exceeds the approved forecast amount of $18.5m, the result is within the normal contingency bounds for such projects.

### 3.3.7 Wollert Compressor Station

A requirement for automation work compressor station arose due to the increase in demand for northern export gas and the consequent more extensive use of compressor units at the station. The approved forecast expenditure was $3.2m ($2012) but the final cost of the project was $4.5m.

Further information was sought from APA GasNet on the reasons for this increase in expenditure. APA GasNet has advised that the main contributors are increases in internal and external labour associated with problems encountered during the project, including:

- Delays in developing the design and in securing council approval for the concrete slab for the new generator;
  - This contributed to additional costs in the hire of back-up generation, and delays in installation of the new generator and fuel gas skid, leading to additional labour costs
- The need to replace existing station emergency shutdown valves with new spring-to-close actuators after finding that the existing actuators were undersized and not able to be overhauled, and
- Limited documentation and drawings of installed electrical systems, meaning that the design and installation of new wiring was a time-consuming, step-by-step process.

APA GasNet advised that these issues were only identified during the project.

### 3.3.8 Iona Compressor Station

In the earlier access arrangement period APA GasNet had forecast expenditure of $0.8m for an upgrade to the gas cooler capacity at Iona compressor station. Because the proposed western outer ring main avoids the necessity for this upgrade, expenditure on this project was deferred.

JP Kenny sought further information from APA GasNet as to relationship between Iona Compressor Station and the western outer ring main project and was satisfied that deferral of this project was prudent in light of the inclusion of the western outer ring main project in the forecast period (a project that is endorsed by JP Kenny as being prudent).

### 3.3.9 Other Compressor Station Projects

APA GasNet spent $2.5m ($2012) on other compressor station projects, whereas the AER had approved a total of $3.4m ($2012). The work ultimately undertaken differed from that forecast. A

risk assessment, taking into account the low utilisation of the Iona compressor station, resulted in deferral of controls upgrading and fire suppression works in the forecast period. These projects were forecast to cost $2.3m.

Condition monitoring of unit 3 at Gooding compressor station has allowed APA GasNet to delay the major overhaul of this unit but the operating hours will necessitate the overhaul in the 2013-2017 access arrangement period. Some expenditure on control systems and safety control systems at the station had not been forecast but the work needed to be undertaken because critical equipment was no longer supported by the manufacturers and needed to be replaced.

3.3.10 Other Refurbishment and Upgrades.

Forecast expenditure of $1m on other refurbishment and upgrades included work on Longford odorant facilities ($0.2m), Brooklyn compressor station fuel gas system ($0.4m) and replacement of gas chromatographs and sample probes ($0.3m). Additional work on line valves and electrical work on the odorant building led to unforecast expenditure of $0.4m on odorant facilities.

The Brooklyn fuel gas system was completed at a higher cost of $0.9m because of more stringent fuel gas heating specifications by the original equipment manufacturer. Hence the total expenditure in this category for the period amounted to $1.3m.

3.3.11 Summary

Table 3.2 summarises refurbishment and upgrade capital expenditure against forecast.

**Table 3.2: Summary of refurbishment and upgrade capital expenditure ($k 2012)**

| Sub-Category | Forecast Expenditure | Actual Expenditure | Main reasons for variance |
|---|---|---|---|
| Gas Heating facilities | 9,154 | 8,409 | Scope of work change due to higher Brooklyn Lara Pipeline City Gate upgrade costs, deferral due to GFC |
| City Gate Works | 15,350 | 15,351 | Change of priorities within budget |
| Pipeline Upgrades | 11,395 | 17,755 | Scope of work change due to Sunbury loop, deferral of expenditure due to GFC |
| Safety and Security Systems | 5,023 | 1,451 | Revisions to risk management plan, deferral of expenditure due to GFC |
| Brooklyn Compressor Station | 58,598 | 4,355 | Avoided need to install new compressors (Sunbury loop), carry-over of expenditure from 2007 |
| Wollert Compressor Station | 6 | 1,926 | Carry-over of expenditure from 2007 |
| Iona Compressor Station | 798 | - | Avoided because of forecast Western Outer Ring Main |
| Gooding Compressor Station | 1,445 | 1,777 | Carry-over of expenditure from 2007 |
| Other Compressor Stations | 3,435 | 2,512 | Unforecast work at Gooding, deferral due to GFC |
| Other | 997 | 1,270 | Scope of work change due to higher odorant plant costs |
| **Total** | **106,202** | **54,807** | |

There was significant underspending of forecast expenditure and significant changes to the scope of work on various projects. It is nevertheless concluded that APA GasNet's capital expenditure program on refurbishment and upgrades for the period was such that it would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services.

### 3.3.12 Non-system capital expenditure

Actual expenditure in this category was $13.5m, compared with a forecast of $3.9m. Expenditure on Victorian-based non-system assets was close to forecast at $3.7m. Forecast repair and maintenance works at the Dandenong office in 2011 and 2012 have not been undertaken because replacement of the office has now been identified as the only option available to resolve issues at the site.

The main item of expenditure in this category is for IT system expenditure at a corporate level. These projects were responsible for $9.7m of expenditure and were not part of the capital expenditure forecast for the earlier access arrangement period.

#### *3.3.12.1 IT system capital expenditure*

The APA Group has invested significantly in IT systems to meet the needs of a business that is markedly different in 2012 to what it was in 2008.

**Portfolio and Project Operating Model (PPOM)**

This project seeks to create efficiencies in project delivery and portfolio reporting by aligning processes across the company. Total project expenditure is forecast at $2.4m ($2012) with a VTS allocation of $0.5m in the earlier access arrangement period and a further $0.04m in the 2013-17 period.

**Financial Transformation System**

This project seeks to eliminate a number of legacy systems throughout the APA Group and create a single system which should deliver considerable efficiencies. Total expenditure on this project is $19.9m ($2012) with a VTS allocation of $3.7m in the earlier access arrangement period and a further $0.8m in the 2013-2017 period.

**Project Colin**

Project Colin is a web-based customer interface to provide metering, billing, contractual information and other functions relevant to the Short Term Trading Market (some of which are not relevant to the VTS but the allocation reflects this). Total expenditure on this project is $16.4m ($2012) with a VTS allocation of $1.9m in the earlier access arrangement period and no further allocation in the 2013-2017 period.

**Enterprise Historian**

This is to provide a SCADA historian as a secure warehouse for validated SCADA data. It provides the functions of viewing, managing and auditing data from the various systems on a consistent basis. Total expenditure on this project is $3.4m ($2012) with a VTS allocation of $0.7m in the earlier access arrangement period and no further allocation in the 2013-2017 period.

**Integrity Data Management Project**

This project enables management of data generated from intelligent pigging, including a comparison of pigging results over time. Because of the vast volume of such data, this project will also create significant efficiencies for APA GasNet.

### 3.3.13 Summary

APA GasNet's major investments in IT projects over the earlier access arrangement period should deliver major efficiencies across the company which will be reflected in cost savings and work processes in years to come.

In accordance with Rule 79 it is concluded that expenditure on Corporate IT Projects is conforming capital expenditure because it would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services.

# 4.0 STAY IN BUSINESS CAPITAL EXPENDITURE

## 4.1 In-Line Inspection

### 4.1.1 Background

The Victorian Pipeline Regulations 2007 require that pipelines be operated in accordance with AS 2885.1-2007 (Reference [18]) and AS 2885.3-2001 (Reference [19]) as a means of ensuring that pipelines are operated in a manner that best protects public safety and security of supply. Maintenance of the Victorian transmission network, carried out by APA GasNet, in accordance with the safety case approved by Energy Safe Victoria under the Gas Safety Act 1997. In-line inspection activities are conducted by APA GasNet, in accordance with APA GasNet operating procedure OPS 509. This procedure incorporates a generic interval of 10 years between pipeline in line inspections. APA GasNet's policy on in-line inspections incorporates an engineering calculated period between inspections with a default interval of 10 years.

Clause 5.3.1 of AS 2885.3 requires periodic inspections to be *carried out to identify actual and potential problems that could affect the integrity of the pipeline* and *Where available intelligent pigging results should be considered when assessing pipeline integrity*.

In-line inspection is one of the key activities associated with integrity management of pipelines. It is by far the most effective and reliable method of assessing pipeline condition, and provides detailed information for the identification and assessment of damage. This enables prioritisation of rectification work that is vital to the preservation of pipeline integrity.

In-line inspection generates data used to assess pipeline integrity and calculations based on this data are able to confirm the fitness for purpose of the pipeline to continue operating at its maximum allowable operating pressure (MAOP), as well as determining whether the default inspection interval may be increased or decreased.

### 4.1.2 Assessment of In-line inspection projects

APA GasNet currently has a contract in place [redacted], one of the world's leading providers of in-line inspection services. APA GasNet awarded the contract in a competitive environment. The decision to enter into a contract with a leading in-line service provider is acknowledged to be sound business practice. Apart from offering certainty with regard to pigging projects for the contract period, this strategy confers considerable efficiencies. [redacted]

The in-line inspection proposal is considered to be justifiable under the following Rules:

- Rule 79 (2)(c)(i) to maintain and improve the safety of services;
- Rule 79 (2)(c)(ii) to maintain integrity of services; and
- Rule 79 (2)(c)(iii) to comply with regulatory obligation or requirement.

JP Kenny was provided with a copy of the contract which includes for 22 nominated pipelines in the APA GasNet network a schedule of rates covering mobilisation costs, rate per run, reporting costs and various other items. For the purpose of generating estimates for the forthcoming access arrangement period APA GasNet obtained estimates [redacted] pipelines scheduled for inspection during that period. In addition to the direct costs payable to the contractor, APA GasNet

will also incur significant costs in carrying out the proposed pigging runs. Apart from direct internal labour there will be project management, drafting, gathering of pipeline information and extra control room staffing. Special, dedicated control room staff are required during pigging runs because of the need to carry out extra duties that would prevent control room staff from performing their normal duties safely. Typically two additional control room staff will be required.

Materials and equipment costs associated with pigging runs will include those for cleaning pigs, gauge pigs, consumables (nitrogen, gaskets, studs, bolts etc.) and waste disposal.

Apart from the costs [redacted], there will be costs payable to contractors associated with transportation and storage of pigging tools, transportation and installation of liquid collectors, and the verification dig ups and repairs which will follow the pigging runs.

Estimates for all cost items were provided for scrutiny, and these were found to be reasonable. Table 4.1 provides a high-level breakdown of cost estimates for each of the pipelines scheduled for pigging in the forthcoming access arrangement period.

In the case of the Wollert to Keon Park Pipeline, the unusually high dig-up and repair estimate of $100,000 was queried as the pipeline is only 14.1 km long. APA GasNet advised that 10 dig-ups had been allowed for because the age of the pipeline, the fact it has not been previously pigged and its suburban location which makes it more vulnerable to third party damage. Moreover, the pipeline is buried deeper than usual, traffic management will be required because of the location and some non-destructive testing is also expected. These reasons were considered sufficient to justify the allowance made.

In the case of the Guilford to Maryborough pipeline the estimates for internal APA GasNet labour and project management were queried. APA GasNet subsequently revised these items and advised that the correct costs were as shown in the Table 4.1.

**Table 4.1: Cost Estimates for In-line Inspection ($k 2012)**

| Pipeline | Pipe NB (mm) | Internal Labour | Contractors | Materials and Equipment | Project Costs |
|---|---|---|---|---|---|
| **Dandenong - Morwell** | 450 | c-i-c | c-i-c | c-i-c | c-i-c |
| **Wollert - Keon Park** | 600 | c-i-c | c-i-c | c-i-c | c-i-c |
| **Brooklyn - Ballan** | 200 | c-i-c | c-i-c | c-i-c | c-i-c |
| **Guilford – Maryborough**(1) | 150 | c-i-c | c-i-c | c-i-c | c-i-c |
| **Euroa - Kyabram** | 200 | c-i-c | c-i-c | c-i-c | c-i-c |
| **Iona - Brooklyn** | 500 | c-i-c | c-i-c | c-i-c | c-i-c |

Notes:

1. Guildford – Maryborough costs revised and corrected by APA GasNet.

In accordance with Rule 79 it is concluded that expenditure on the above 6 pigging projects is conforming SIB capital expenditure because it would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services.

## 4.2 Pipeline Rectification for In-line Inspection (BC166)

### 4.2.1 Need

The technical and regulatory reasons for carrying out in-line inspection of pipelines were outlined above in section 2.1 of this report. Not all pipelines in the VTS are currently configured in a state that enables pigging runs to be carried out. This applies to the following pipelines in the system:

- PL 36 Princes Highway to Regent Street
- PL 67 Tyers to Maryvale
- PL 68 Pakenham
- PL 124 Newport
- PL 129 Dandenong to Princes Highway
- PL 162 Laverton North
- PL 238 Somerton.

In each case the deficiency is the lack of a launching trap and/or a receiving trap for pigging operations. These vessels are essential to such operations. The estimated costs are set out in Table 4.2:

**Table 4.2: Estimated costs for pig trap installation ($k 2012)**

| | Internal Labour | External Labour | Material and Equipment | Project Costs |
|---|---|---|---|---|
| PL 36 Princes Hwy To Regent St | c-i-c | c-i-c | c-i-c | c-i-c |
| PL 67 Tyers To Maryvale | c-i-c | c-i-c | c-i-c | c-i-c |
| PL 68 Pakenham | c-i-c | c-i-c | c-i-c | c-i-c |
| PL 124 Newport | c-i-c | c-i-c | c-i-c | c-i-c |
| PL 129 Dandenong to Princes Highway | c-i-c | c-i-c | c-i-c | c-i-c |
| PL 162 Laverton Nth | c-i-c | c-i-c | c-i-c | c-i-c |
| PL 238 Somerton | c-i-c | c-i-c | c-i-c | c-i-c |
| **TOTAL** | c-i-c | c-i-c | c-i-c | **8,240** |

APA GasNet provided detailed estimates to back up the summary data set out in Table 4.2. These were examined closely and found to be reasonable estimates.

In some instances the pig trap installations will be permanent. At face value all installations might be expected to be made permanent. When queried about this APA GasNet advised that the locations of some installations were not suitable for permanent installation. For example, some were in public parks. In some cases the temporary pig traps will be reused on other pipelines.

### 4.2.2 Assessment

Capital expenditure for the pig traps installation program is considered to be justified under the following Rules:

- Rule 79 (2)(c)(i) to maintain and improve the safety of services;
- Rule 79 (2)(c)(ii) to maintain integrity of services; and
- Rule 79 (2)(c)(iii) to comply with regulatory obligation or requirement.

In accordance with Rule 79 it is concluded that expenditure on the Pipeline Rectification for In-line Inspection program is conforming SIB capital expenditure because it would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services.

## 4.3 Dandenong City Gate Upgrade (BC139)

### 4.3.1 Background

The Dandenong city gate (DCG) is the major gas supply inlet point to the Melbourne metropolitan area. Other city gates are located at Wollert and Corio. Its key function is to regulate the pressure of gas entering the distribution system down to 2760 kPag. [redacted]

First commissioned in 1969, the DCG had a major upgrade in 1979. In the early 1990s three of its seven regulator runs were converted from self-pneumatic control to electro-pneumatic control in order to improve pressure control performance.

### 4.3.2 Need

Clause 5.8.2 of AS 2885.3 requires that *all pressure control and protective equipment, including regulators, controllers, relief valves and safety devices, shall be subjected to systematic inspection and testing in accordance with the maintenance plan...*to ensure continued fitness for purpose.

A number of major issues have emerged with the DCG, which require attention:

- The ageing jetstream plug-type regulators suffer recurring faults and are prone to excessive leakage in the closed position;
- The run outlet isolation valves are not related to the upstream Class 600 pressure rating, because there is a potential risk over pressurising the outlet valves during maintenance and operation. The outlet valves must not be left in the closed position, unless a pipe spool is removed.
- The pneumatic runs do not operate in harmony with PLC controlled runs which leads to set point error and poor performance.
- Contrary to preferred engineering practice, AEMO controllers regularly use the slam-shut valves to open and close additional pneumatic controlled runs.
- The station relies on a remote telemetry unit to provide an additional layer overpressure protection by activating the slam shut valves on all seven runs. This function should be performed in a safety system, rather than an operational telemetry system.

- The six filters are in poor condition and obsolete. Necessary regular inspections are made difficult because the filter enclosure doors are difficult to seal once opened.
- The header pipework does not comply with current standards due to a lack of supporting documentation from construction time.
- Upgrading of the station is required in order to achieve the safety and reliability requirements set out in the AS2885.

The case for upgrading is compelling. The options are either to replace the whole station or to replace the regulator runs and associated equipment but to reuse the headers.

APA GasNet estimates the cost of the full replacement option to be $8.992m, while the alternative option is estimated to cost $6.257m. Because of the significantly easier construction, improved access and lower safety risk, APA GasNet initially preferred the full replacement option. After discussions with JP Kenny and further analysis by APA GasNet, the company has assessed the principle of re-using the headers to be sound as there are no known integrity issues. This option carries the minor risk that the headers may be found unsuitable in which case full replacement would become necessary. The suitability of the headers for continued use will need to be verified by non-destructive testing.

Estimated costs for the project are set out in Table 4.3.

**Table 4.3: Estimated costs for DCG Upgrade ($k 2012)**

| Year | Internal Labour | External Labour | Materials and Equipment | Project Costs |
|---|---|---|---|---|
| 2012-2013 | c-i-c | c-i-c | c-i-c | **6,257** |
| 2013-2014 | c-i-c | c-i-c | c-i-c | **5,637** |

APA GasNet would carry out project design and commissioning. Contractors would be employed to the physical work under supervision of APA GasNet staff.

### 4.3.3 Assessment

APA GasNet provided full details of the cost estimate in a spreadsheet. After query of major valve costs by JP Kenny, APA GasNet obtained vendor quotes. JP Kenny is now satisfied that the estimated cost of the project is reasonable and supports the chosen option.

Capital expenditure for the Dandenong City Gate Upgrade program is considered to be justified under the following Rules:

- Rule 79 (2)(c)(i) to maintain and improve the safety of services;
- Rule 79 (2)(c)(ii) to maintain integrity of services; and
- Rule 79 (2)(c)(iii) to comply with regulatory obligation or requirement.

In accordance with Rule 79 it is concluded that expenditure on the Dandenong City Gate Upgrade is conforming SIB capital expenditure because it would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services.

## 4.4 Design Life Review of Facilities (BC 090)

### 4.4.1 Background

Gas pipelines have a nominated design life from the date of construction which range from 30 to 60 years. Site facilities associated with pipelines may have been constructed much later than the original pipeline and may have quite different design lives. Hence every site needs to be assessed at a time, which depends on its initial construction date. Many old facilities were designed without a specified design life. For such facilities the default design life is set out in Table 4.4 below.

**Table 4.4: Summary of Asset Technical Life**

| Asset Category | Technical Life |
|---|---|
| Compressor Stations | 30 years |
| Heaters | 20 years |
| Regulator & Meter Stations | 30 years |
| Pipelines | 60 years |
| Telemetry Equipment | 10 years |

Section 4.5.3 of AS 2885.1 requires that at the end of the system design life pipelines shall be abandoned, unless an approved engineering investigation determined that its continued operation is safe. This requirement has similar implications for pipeline facilities, which may have a different design life.

Section 8.5 of AS 2885.3 requires that, where it is intended to operate the pipeline beyond its design life then, prior to the expiry of the design life an engineering investigation shall be conducted into the design, operating conditions and history of the pipeline, to determine its condition and any limits for safe operation.

The approved engineering investigation must also identify any additional requirements that enable the pipeline or facility to comply with the latest versions of AS2885.1 and AS2885.2 which may not have been in force during the original design and construction.

### 4.4.2 Need

APA GasNet proposes to commence a design life review process 18 months prior to the end of each pipeline or facility's design life. The review involves desktop review of records, carrying out calculations, and physical inspections of pipe, flanges and associated fittings, many of which may be buried. The process comprehensively covers all aspects of the facility's design, construction and operation and is therefore time-consuming and rigorous. The Morwell to Dandenong (Lurgi) Pipeline is the only pipeline to reach the end of its design life in the access arrangement period. The estimated costs for the project are set out in
Table 4.5 and Table 4.6.

**Table 4.5: Cost Breakdown for Design Life Review of Facilities ($k 2012)**

| Category | 2013 | 2014 | 2015 | 2016 | 2017 | Totals |
|---|---|---|---|---|---|---|
| Internal labour | c-i-c | c-i-c | c-i-c | c-i-c | c-i-c | c-i-c |
| Contractor | c-i-c | c-i-c | c-i-c | c-i-c | c-i-c | c-i-c |
| Material | c-i-c | c-i-c | c-i-c | c-i-c | c-i-c | c-i-c |
| **Forecast** | **210** | **210** | **210** | **210** | **314** | **1,155** |

**Table 4.6: Detailed Cost Breakdown ($k 2012)**

| Activity | Quantity | Unit Cost | Total Cost |
|---|---|---|---|
| Buried inspections | c-i-c | c-i-c | 438 |
| Exposed inspections | c-i-c | c-i-c | 58 |
| Engineering review - no major defects | c-i-c | c-i-c | 401 |
| Engineering review - major defects | c-i-c | c-i-c | 70 |
| Pipeline Facilities SMS | c-i-c | c-i-c | 14 |
| Design Life Review of T1 pipeline | c-i-c | c-i-c | 104 |
| Locations | 11 | | |
| **Total** | **36** | | **1,155** |

### 4.4.3 Assessment

Upon request APA GasNet provided a detailed list of relevant sites to be reviewed and a detailed cost estimate.

In view of the complexity of these reviews and the need for rigorous analysis, the assumption by APA GasNet of an average of 100 hours of a dedicated professional engineer's time is considered reasonable for reviews where no major defects are identified. The allowance of 150 hours for reviews where major defects are identified is also considered reasonable, based on good industry practice. The allowances made for the review of the Lurgi pipeline (450 hours for a mechanical engineer and 100 hours for a principal engineer) are considered reasonable in view of the greater complexity of this particular review.

Necessarily, assumptions had to be made about the proportion of inspections of buried pipe as well as the proportion of reviews in which major defects would be identified. In both cases these assumptions were considered reasonable, based on good industry practice (32 out of 41 buried and 4 with major defects). A greater number of buried inspections than exposed inspections were assumed because the exposed pipework is already inspected periodically for paint condition, corrosion and damage. It follows that the need to perform more non-destructive inspection on the buried pipework is greater because of the greater probability of undetected corrosion.

Capital expenditure for the Design Life Review of Pipelines and Facilities is considered to be justified under the following Rules:

- Rule 79 (2)(c)(i) to maintain and improve the safety of services; and

- Rule 79 (2)(c)(ii) to maintain integrity of services.

In accordance with Rule 79 it is concluded that expenditure of $1.155m on the program is conforming SIB capital expenditure because it would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services.

## 4.5 Cathodic Protection Replacement

### 4.5.1 Need

AS 2885.1 includes a requirement that *cathodic protection shall be applied to each section of the pipeline.* AS 2885.3 section 5.6.4 states that *where any inspection indicates that satisfactory performance is not fully achieved on the pipeline, timely and appropriate action should be taken to restore full protection...*

It follows that maintenance of adequate cathodic protection (CP) is not only essential to maintaining the integrity of the pipeline but required under the Victorian Pipeline Regulations 2007. Inadequate maintenance of the CP system could result in metal-loss corrosion and subsequently a pipeline leak or rupture. Proactive monitoring of the condition of CP facilities provides an early indication of any site that performance is deteriorating and indicates where additional protection is desirable. A typical service life for ground-beds is 20 to 30 years and 15 years for transformer rectifiers. There are currently 63 cathodic protection sites within the VTS. APA GasNet advises that on average 2 transformer-rectifiers and 2 ground-beds will need replacement each year, in the 2013-2017 period.

### 4.5.2 Assessment of estimated costs

The estimated cost for such a program is $200,000 for each of the five years in the access arrangement period, based on previous experience with such work. The estimated costs are set out in Table 4.7 below:

**Table 4.7: Estimated costs for Cathodic Protection Replacement ($k 2012)**

| Item | Internal Labour | External Labour | Materials and Equipment | Project Costs |
|---|---|---|---|---|
| TR and ground bed replacement | c-i-c | c-i-c | c-i-c | 1000 |

APA GasNet has a dedicated engineer who would manage the program. Local contract labour would be utilised as required. The estimate assumes 500 hours of contractor labour per year. The cost estimate is considered reasonable and justifiable under the following Rules:

- Rule 79 (2)(c)(i) to maintain and improve the safety of services;
- Rule 79 (2)(c)(ii) to maintain integrity of services; and
- Rule 79 (2)(c)(iii) to comply with regulatory obligation or requirement.

In accordance with Rule 79 it is concluded that expenditure on the cathodic protection replacement is conforming SIB capital expenditure because it would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services.

## 4.6 Coating Refurbishment on Exposed Pipework (BC176)

### 4.6.1 Background

Sections of above-ground pipework such as valve sites are protected from corrosion by a coating system to create a barrier between the steel pipework and its environment. Section 5.3.6.1 of AS 2885.3 states *Above-ground pipelines shall be inspected for evidence or corrosion or damage to or deterioration of any anti-corrosion coatings at intervals defined in the safety and operating plan and the rate of corrosion shall be assessed. Where the rate of corrosion will reduce the design life, remedial action shall be taken.*

APA GasNet advises that typically such coating will provide effective protection for 10 years. Failure to maintain effective protective coating on pipework could allow metal loss corrosion to occur, potentially leading to a pipeline leak or rupture. Refurbishment of protective coating on exposed pipework allows for more effective routine inspection as areas of incipient corrosion become readily visible and can be treated in timely fashion.

### 4.6.2 Need

The $2.3 m program of work proposed by APA GasNet is set out in Table 4.8

**Table 4.8: Estimated Cost of Coating Refurbishment on Exposed Pipework ($k 2012)**

| Facility | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Ballan to Ballarat Pipeline (T57) | c-i-c | | | | |
| Koroit and Allansford City Gate | c-i-c | | | | |
| T016 Dandenong to West Melbourne | c-i-c | | | | |
| T56 Brooklyn to Ballan Pipeline | c-i-c | | | | |
| T63 Tyers to Morwell Pipeline | | c-i-c | | | |
| T61 Pakenham to Wollert | | c-i-c | | | |
| T001 Morwell -Dandenong | | | | | c-i-c |
| T70 Ballan to Bendigo | | c-i-c | | | |
| Wandong to Bendigo Pipeline | | c-i-c | | | |
| T24 Brooklyn to Corio Pipeline | | c-i-c | | | |
| Mt Franklin to Maryborough | | | c-i-c | | |
| T59/T71 Euroa to Echuca | | | c-i-c | | |
| Dandenong Terminal Station | | | c-i-c | | |
| T1 Morwell to Dandenong (Lurgi Line) | | | | c-i-c | |
| T74 Wollert to Wodonga | | | | c-i-c | c-i-c |
| Regulators - Painting | | c-i-c | | | c-i-c |
| Brooklyn Compressor station | c-i-c | | | | |
| Gooding Compressor station | | | c-i-c | | |
| Springhurst compressor Station | | | | c-i-c | |
| Wollert Compressor Station | c-i-c | | | | c-i-c |
| **Total each year** | **385** | **665** | **450** | **330** | **470** |
| **Total** | | | | | **2,300** |

The program would be managed by APA GasNet's dedicated corrosion protection engineer. APA GasNet also provided the estimated cost by year broken down into categories of Internal Labour, Contractors and Materials. This is set out in Table 4.9

**Table 4.9: Cost breakdown for coating refurbishment ($k 2012)**

| Category | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Internal labour | c-i-c | c-i-c | c-i-c | c-i-c | c-i-c |
| Contractors | c-i-c | c-i-c | c-i-c | c-i-c | c-i-c |
| Materials | c-i-c | c-i-c | c-i-c | c-i-c | c-i-c |
| **Total** | **385** | **665** | **450** | **330** | **470** |

### 4.6.3 Assessment

APA GasNet's costs for the program are assessed as reasonable. Capital expenditure for the Coating Refurbishment on Exposed Pipework is considered to be justified under the following Rules:

- Rule 79 (2)(c)(i) to maintain and improve the safety of services;
- Rule 79 (2)(c)(ii) to maintain integrity of services; and
- Rule 79 (2)(c)(iii) to comply with regulatory obligation or requirement.

In accordance with Rule 79 it is concluded that expenditure of $2.3m on the program is conforming SIB capital expenditure because it would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services.

## 4.7 Recertification of Emergency Pipe and Fittings (BC024)

### 4.7.1 Need

Under section 4 of AS2885.3, a Safety and Operating Plan or 'Safety Case' is required for the VTS. An important component of the Safety Case is policies and procedures to deal with emergency response. Section 4 also recommends *having adequate emergency equipment, pipe and fittings fit for the intended purpose readily available at all times complete with traceable material test certificates.* APA GasNet advises that the inventory at Dandenong is slow moving and up to 40 years old. Over the years, code requirements associated with the required materials certificates have increased and a large proportion of the pipe and fittings were purchased in accordance with these now superseded standards. These certificates are essential to ensure that the equipment is used appropriately. Measures need to be taken to rectify the situation to ensure that the existing material is appropriate for its intended use.

Section 3.2.8 of AS 2885.1 allows that *Where an identity with a nominated Standard is in doubt, any material or component may be used, providing it is approved and has the chemical composition mechanical properties and integrity tests specified in the nominated Standard.* Accordingly, proper identification of fittings in the inventory provision of certificates needs to occur. In cases where this cannot be achieved, chemical composition, mechanical properties, and integrity tests will be required to establish this purpose. In the case of the emergency pipes hydrostatic testing can confirm suitability for installation at nominated pressures.

APA has provided a detailed list of pipes and fittings for which this work needs to be completed together with a breakdown of estimated costs which are set out in Table 4.10. The total cost is $1.257m.

**Table 4.10: Estimated Costs for Emergency Pipe and Fittings Recertification ($k 2012)**

| Item | Internal Labour $k | External Labour $k | Materials and Equipment $k | Project Costs $k |
|---|---|---|---|---|
| **Total** | c-i-c | c-i-c | c-i-c | **1,257** |

APA GasNet would give responsibility to one of its suitably qualified engineers to manage the program.

4.7.2 Assessment

The cost estimate is considered reasonable and justifiable under the following Rules:

- Rule 79 (2)(c)(i) to maintain and improve the safety of services;
- Rule 79 (2)(c)(ii) to maintain integrity of services; and
- Rule 79 (2)(c)(iii) to comply with regulatory obligation or requirement.

In accordance with Rule 79 it is concluded that expenditure on emergency pipe and fittings recertification project is conforming SIB capital expenditure because it would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services.

## 4.8 Hazardous Area Rectification (BC113)

4.8.1 Need

Section 6.2.4.1 of AS2885.1 requires that Hazardous Areas be determined in accordance with AS60079. It is a requirement of AS60079 to inspect and demonstrate the continued compliance and safety of electrical installation within hazardous areas. All electrical equipment installed in hazardous areas must be recorded in a Hazardous Area Verification Dossier (HAVD). A hazardous area inspection is necessary to enable recording of relevant equipment information and to identify any non-compliance to the HAVD. Non-conforming equipment must then be rectified.

APA GasNet has concluded that it should develop an electronic HAVD and perform regular inspections and rectification in order to achieve and maintain compliance with the relevant standards.

Accurate estimation of the associated costs for this project is difficult before individual sites have been audited and subsequent rectification works specified. APA GasNet has developed policy and procedures to deal with this issue. It proposes to utilise external qualified inspectors to carry out inspections and identify non-compliance. An APA GasNet hazardous area record officer would enter the relevant data in the HAVD and the APA GasNet project team would then analyse the data and prioritise any non-compliance. A schedule for necessary rectification work would be prepared, and then the work would be carried out.

Some specific examples of non-compliance with the relevant standards that have been identified by APA GasNet to date include; unsupported equipment, missing cable markers, equipment labels

missing or faded, loose glands, unterminated cores within junction boxes, damaged cables, dirty equipment e.g. due to bird droppings and corroded or otherwise damaged equipment housings.

On the basis of the inspections carried out to date APA GasNet has assumed that 50% of equipment at each site will required some rectification work. For the estimate they assumed that on average these rectification works will require 2 hours of contractor labour and $200 in materials. These assumptions are considered to be reasonable. The estimated costs are set out in Table 4.11

**Table 4.11: Estimated Costs for Hazardous Area Rectification ($k 2012)**

| Item | Internal Labour | External Labour | Materials and Equipment | Project Costs |
|---|---|---|---|---|
| **Total** | c-i-c | c-i-c | c-i-c | **894** |

4.8.2 Assessment

The independent consultant's assessment is that this project is justified in accordance with the following:

- Rule 79 (2)(c)(i) to maintain and improve the safety of services;
- Rule 79 (2)(c)(ii) to maintain integrity of services; and
- Rule 79 (2)(c)(iii) to comply with regulatory obligation or requirement.

A more detailed breakdown of costs in the costing spreadsheet has been examined and found to be reasonable.

In accordance with Rule 79 it is concluded that expenditure on the Hazardous Area Rectification project is conforming SIB capital expenditure because it would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services.

## 4.9 High Risk Sites Security Upgrade (BC148)

4.9.1 Need

APA GasNet is a declared operator of an essential service under the Terrorism (Community Protection) Act 2003. The Company is therefore obliged to prepare a risk management plan in accordance with the Act. The risk management plan has identified a number of high and moderate risk sites that require an upgrading of security. [redacted]

[redacted]

A breakdown of the estimated costs for this project is set out in Table 4.12.

**Table 4.12: Estimated Costs for High Security Sites Upgrade ($k 2012)**

| Facility | Fence Length m | Labour | Materials | Contractor | Project Costs |
|---|---|---|---|---|---|
| c-i-c | c-i-c | c-i-c | c-i-c | c-i-c | c-i-c |
| c-i-c | c-i-c | c-i-c | c-i-c | c-i-c | c-i-c |
| c-i-c | c-i-c | c-i-c | c-i-c | c-i-c | c-i-c |
| c-i-c | c-i-c | c-i-c | c-i-c | c-i-c | c-i-c |
| **Total** | | c-i-c | c-i-c | c-i-c | **2,464** |

### 4.9.2 Assessment

A more detailed cost breakdown supplied by APA GasNet was examined in detail and found to be reasonable. [redacted]. The company's response was that any savings from commonality of hardware were estimated to be a maximum of $10,000. As that amount is within the bounds of uncertainty for the cost estimate, any such saving has been disregarded in the assessment.

The capital expenditure for this project is assessed is to be justifiable under the following rules:

- Rule 79 (2)(c)(ii) to maintain integrity of services; and
- Rule 79 (2)(c)(iii) to comply with regulatory obligation or requirement.

In accordance with Rule 79 it is concluded that expenditure on the High Risk Sites Security Upgrade project is conforming SIB capital expenditure because it would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services.

## 4.10 Dandenong City Gate Heater (BC170)

### 4.10.1 Background

The Dandenong city gate, which supplies around 50% of Melbourne gas demand, reduces the pressure of gas entering the distribution system at that point to a maximum of 2760 kPag. Depending upon the composition of gas entering the city gate, potential exists for higher hydrocarbon components to condense due to the sudden pressure reduction. Presence of hydrocarbon liquids could affect the operation and safety of the downstream pipeline system and its equipment and can lead to the failure of pressure control and overpressure protection systems

of APA GasNet and the gas distributors. Energy Safe Victoria, the Safety Case Regulator, has expressed concern at the increase in incidents arising from the presence of hydrocarbon liquids in the Victorian gas transmission and distribution networks (Reference [3]) and required all gas companies to *take all practical steps to minimise the risks from these liquids to domestic commercial and industrial consumers*.

AS4564, the Australian Standard for natural gas quality, specifies a maximum hydrocarbon dewpoint of 2°C at 3500 kPag. In addition, the potential exists for occasional presence of water in the gas to lead to hydrate formation, which could cause blockages of pipework and meters. Gas currently being supplied has a sufficiently low hydrocarbon dewpoint to avoid such condensation.

However, the quality of gas transported is outside APA GasNet's control. From time to time, changes in operating conditions at the gas treatment plants can lead to changes in gas composition which result in a much greater risk of condensation. The gas producers are free to supply gas that is within the specification included in their sales contracts. Often it is considered better to supply gas that is slightly out of specification for a limited period than to interrupt supply. Moreover the composition of gas supplied will vary over time as new fields are developed. AS4564 has been made as broad as possible to facilitate competition in gas supply.

### 4.10.2 Need

Installation of a 4 MW heater has been selected to address the issue. Relevant parameters would be telemetered to the SCADA system. APA GasNet proposes to manage the design and installation and to purchase the heater through an established vendor by competitive tender. It proposes to have installation carried out by a contractor.

The estimated cost is set out in Table 4.13.

**Table 4.13: Estimated Costs for DCG Heater ($k 2012)**

| Item | Internal Labour | External Labour | Materials and Equipment | Project Costs |
|---|---|---|---|---|
| Total | c-i-c | c-i-c | c-i-c | **2,918** |

### 4.10.3 Assessment

A more detailed breakdown of costs was supplied in a spreadsheet by APA GasNet. A major component is the water bath heater which was estimated from a recent vendor quote. APA GasNet's estimate of costs is considered reasonable. The expenditure is judged by JP Kenny to be necessary in accordance with the following Rules:

- Rule 79 (2)(c)(i) to maintain and improve the safety of services;
- Rule 79 (2)(c)(ii) to maintain integrity of services; and
- Rule 79 (2)(c)(iii) to comply with regulatory obligation or requirement.

In accordance with Rule 79 it is concluded that expenditure on the Dandenong City Gate Heater project is conforming capital expenditure because it would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services.

## 4.11 Laverton North Heater (BC091)

### 4.11.1 Background

The Laverton North offtake from the Geelong Pipeline supplies the Laverton North Power Station. The inlet pressure currently typically fluctuates in the range 5000 kPag to 6000 kPag and the outlet pressure set point is 2750 kPag. Construction of the Western Outer Ring Main will enable the Geelong pipeline to operate continuously at 7000kPag with little pressure fluctuation. The pressure cut from 7000kPag to 2750 kPag will cause a temperature reduction in the gas of around 20 deg C. The Geelong Pipeline transports gas produced in the Otway Basin fields which have 'wetter' gas compositions with the result that during winter conditions particularly, there is significant potential for hydrocarbon condensation. Such condensation could cause damage to downstream equipment. In the case of a gas turbine power station such as Laverton North, there is a risk of catastrophic turbine failure.

As noted in the section on the Dandenong Heater, Energy Safe Victoria has expressed concern at the increase in incidents arising from the presence of hydrocarbon liquids in the Victorian gas transmission and distribution networks (Reference [3]) and required all gas companies to *take all practical steps to minimise the risks from these liquids to domestic commercial and industrial consumers*.

### 4.11.2 Need

APA GasNet has determined that a 150 kW water bath heater will be required to reduce the risk of hydrocarbon condensation. External labour would be used for installation with design work and project management performed by APA GasNet. The estimated cost is set out in Table 4.14.

**Table 4.14: Estimated Costs for Laverton North Heater ($k 2012)**

| Item | Internal Labour | External Labour | Materials and Equipment | Project Costs |
|---|---|---|---|---|
| Total | c-i-c | c-i-c | c-i-c | 715 |

### 4.11.3 Assessment

The solution proposed by APA GasNet is considered acceptable however APA GasNet could consider alternative options that avoid the installation of a water bath heater such as separation or filtration equipment.

Upon request, APA GasNet supplied a spreadsheet setting out details of the estimate. We understand that cost estimate for the major equipment item in this case (i.e. the heater itself) is based on escalation of a previously supplied quote by a vendor. The estimate has been reviewed and found to be reasonable.

It is noted that a new meter for fuel gas is required under the National Gas Law and this item has been included at a cost of $22,000.

In accordance with the following Rules the expenditure is assessed to be justified:

- Rule 79 (2)(c)(i) to maintain and improve the safety of services;
- Rule 79 (2)(c)(ii) to maintain integrity of services; and

- Rule 79 (2)(c)(iii) to comply with regulatory obligation or requirement.

In accordance with Rule 79 it is concluded that expenditure on the Laverton North Heater project is conforming SIB capital expenditure because it would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services.

## 4.12 Replacement of Iona Compressor Station Control System (BC053)

### 4.12.1 Background

The Iona compressor station is located within the Iona (Western Underground Storage) facility within the APA GasNet compound. Equipped with two reciprocating compressors, it compresses gas into the Western Transmission System which supplies loads along the Iona to Portland pipeline. Security of supply for the system is therefore dependent on reliable operation of the compressor station.

The station control system is obsolete and suffers numerous breakdowns. Spare parts are difficult to obtain and the system is not compliant with current hazardous area standards. The safety control system operates through the station's obsolete Bristol remote telemetry unit (RTU). It is proposed to replace the unit under the separate RTU upgrade project.

### 4.12.2 Need

APA GasNet proposes to manage procurement of the equipment and to use contractors for installation.

The estimated costs for the project are set out in Table 4.15. The work is scheduled for 2014.

**Table 4.15: Estimated Costs for Iona Compressor Station Control System ($k 2012)**

| Item | Internal Labour | External Labour | Materials and Equipment | Project Costs |
|---|---|---|---|---|
| Total | c-i-c | c-i-c | c-i-c | 660 |

### 4.12.3 Assessment

A detailed breakdown of the estimate was provided by APA GasNet in a spreadsheet. This estimate was reviewed and found to be reasonable.

In accordance with the following Rules the expenditure is assessed to be justified:

- Rule 79 (2)(c)(i) to maintain and improve the safety of services;
- Rule 79 (2)(c)(ii) to maintain integrity of services; and

In accordance with Rule 79 it is concluded that expenditure on the Replacement of Iona Compressor Station Control System project is conforming SIB capital expenditure because it would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services.

## 4.13 Dandenong Storage Shed (BC121)

### 4.13.1 Need

APA GasNet has reported that the analysis of undercover storage capacity on the Dandenong site is inadequate. Emergency equipment, spares and procured equipment for capital projects, all need to be stored on site. Without undercover storage, equipment is vulnerable to damage from rain and ultraviolet light. Current use of transport containers is regarded by APA GasNet is an inadequate solution because access can be difficult.

APA GasNet has considered two to alternative sizes for a storage shed: 20 m x 30 m or 30 m x 45 m. The smaller size would be insufficient to store procured equipment for capital projects so the larger size is the preferred option. The estimated cost breakdown is shown in Table 4.16. The project would be managed by APA GasNet. The major cost component, the supply, transport and construction of the shed, is based on a quote from a vendor.

**Table 4.16: Estimated Costs for Dandenong Storage Shed ($k 2012)**

| Item | Internal Labour | External Labour | Materials and Equipment | Project Costs |
|---|---|---|---|---|
| Total | c-i-c | c-i-c | c-i-c | 503 |

### 4.13.2 Assessment

The estimated cost $502,700 is considered to be reasonable. The expenditure is assessed to be justifiable under the following Rules:

- Rule 79 (2)(c)(i) to maintain and improve the safety of services; and
- Rule 79 (2)(c)(ii) to maintain integrity of services.

In accordance with Rule 79 it is concluded that expenditure on a new storage shed at the Dandenong site is conforming SIB capital expenditure because it would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services.

## 4.14 SCADA System Upgrade (BC162)

### 4.14.1 Background

In line with gas industry best practice, APA GasNet uses a supervisory control and data acquisition (SCADA) system and to assist in the monitoring, maintenance and sometimes the operation of the VTS. The existing SCADA system is able to maintain only limited historical information that is useful for system planning and monitoring of asset performance. Moreover, the existing SCADA system is becoming more difficult to maintain. Technical expertise to undertake modifications is difficult to source, and there is very limited support from the manufacturer in Australia. Development of in-house expertise for the system is also difficult because suitable training courses are reliant on international expertise.

In 2009 APA Group made a corporate decision to:

- migrate all SCADA systems nationally to the ClearSCADA platform.
- Perform 60% of SCADA development in-house;

- select a vendor to provide external support and development;
- establish an enterprise historian to capture all company SCADA data;
- remove all direct interfaces to SCADA , where possible and interface with the historian; and
- adopt standard disaster recovery architecture.

### 4.14.2 Need

A high level breakdown of the estimated project cost is set out in the Table 4.17.

**Table 4.17: Cost Estimate for SCADA Upgrade ($k 2012)**

| Item | Internal Labour | External Labour | Materials and Equipment | Project Costs |
|---|---|---|---|---|
| Total | c-i-c | c-i-c | c-i-c | 1,691 |

### 4.14.3 Assessment

The strategy being adopted by APA Group nationally is supported as sound business practice. It can be expected to produce the best long term SCADA performance for the company.

After being requested to do so, APA GasNet provided a more detailed breakdown of the cost estimate for the project. JP Kenny sought clarification as to whether the existing servers had become unserviceable or reached the end of their useful life. APA GasNet advised that the proposed six new servers (including 2 backup) would be installed for the new SCADA system in parallel with the existing system so that existing plant could be cut over to the new system over an appropriate period. The old SCADA system would then be decommissioned at the end of the project.

When queried, APA GasNet also advised that the cost to the company of dual screen HMI is $3000 because of the significant data storage required and that two of these would be included. Overall, JP Kenny concludes that the expenditure on the SCADA system upgrade is justifiable in accordance with the following Rules:

- Rule 79 (2)(c)(i) to maintain and improve the safety of services;
- Rule 79 (2)(c)(ii) to maintain integrity of services; and
- Rule 79 (2)(c)(iii) to comply with regulatory obligation or requirement.

In accordance with Rule 79 it is concluded that expenditure on the SCADA Replacement project is conforming SIB capital expenditure because it would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services.

## 4.15 SCADA Communication Upgrade to IP Network (BC075)

### 4.15.1 Background

Communications for the SCADA system on the VTS is predominantly via a radio service provided by Telstra as an adjunct to the mobile radio service used by Victorian emergency services such as police, fire and ambulance. [redacted]

Furthermore, APA GasNet advises that the existing SCADA protocol will not be able to be supported by AEMO's host system. Reliable communication with AEMO's system is critical for maintaining security of supply.

APA GasNet therefore proposes to replace the service with an Internet Protocol (IP) based solution. This is consistent with APA Group's national policy for SCADA. APA GasNet proposes to have a front end engineering design conducted by a suitably qualified communications specialist. APA GasNet would manage equipment procurement and install the system using a combination of in-house and contract technicians. The expenditure is scheduled for 2017.

### 4.15.2 Need

Table 4.18 below is a high-level breakdown of the estimated cost.

**Table 4.18: Estimated Costs for SCADA Communication upgrade ($k 2012)**

| Item | Internal Labour | External Labour | Materials and Equipment | Project Costs |
|---|---|---|---|---|
| Total | c-i-c | c-i-c | c-i-c | 1,887 |

### 4.15.3 Assessment

The need to upgrade the existing service is accepted as justified. JP Kenny's communications specialist reviewed detailed cost data provided by APA GasNet (Reference [4]) and concluded that the estimate was reasonable. JP Kenny therefore concludes that the expenditure on the SCADA system communication upgrade is justifiable in accordance with the following Rules:

- Rule 79 (2)(c)(i) to maintain and improve the safety of services;
- Rule 79 (2)(c)(ii) to maintain integrity of services; and
- Rule 79 (2)(c)(iii) to comply with regulatory obligation or requirement.

In accordance with Rule 79 it is concluded that expenditure on the SCADA system communication upgrade project is conforming capital expenditure because it would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services.

## 4.16 Remote Telemetry Units (RTU) Upgrade at Facilities (BC054)

### 4.16.1 Background

Many APA GasNet facilities such as compressors, pressure regulating stations and line valves are monitored and controlled by Bristol series 33xx series RTUs which are more than 10 years old and consequently ageing for this type of equipment. APA GasNet reports that this series is now obsolete and no longer supported by the manufacturer. Accordingly spare parts are becoming more difficult to source. While the obsolescence is not an immediate threat to reliability of gas supply, it makes the company vulnerable to failure when extensive delays could arise while spare parts are located. It follows that this situation will steadily deteriorate with the age of the units. Failure of RTUs would cause delays in the recovery of SCADA control and in acquisition of data from the sites. Consequently the level of over-pressure protection would be compromised. The slam-shut devices are more likely to close, causing supply termination than over-pressurisation.

### 4.16.2 Need

RTUs at the following sites have been identified as being in need of upgrading:

- Barnawartha;
- Brooklyn compressor station;
- Gooding compressor station;
- Pakenham, LV9;
- Lara City gate;
- Iona City Gate;
- Culcairn;
- Burrumbuttock;
- Birregurra;
- Mirne;
- Geringhap, and
- Dandenong city gate.

One option would be to replace RTUs upon failure. However, is likely in these circumstances that staff attendance on site would be necessary, potentially for several months. Accordingly, scheduled replacement over a five-year period is APA GasNet's preferred strategy. JP Kenny supports such a strategy.

Specification and purchasing of RTUs would be carried out in-house, but contract labour would be used for installation. Table 4.19 sets out a high-level breakdown of the estimated cost.

**Table 4.19: Estimated Costs for RTU Upgrade ($k 2012)**

| Item | Internal Labour | External Labour | Materials and Equipment | Project Costs |
|---|---|---|---|---|
| Total | c-i-c | c-i-c | c-i-c | **840** |

### 4.16.3 Assessment

Upon request, APA GasNet supplied a detailed breakdown of the estimate. The detailed estimate was reviewed by JP Kenny and found to be reasonable.

Capital expenditure on the RTU Upgrade at Facilities project is assessed as justifiable in accordance with the following Rules:

- Rule 79 (2)(c)(i) to maintain and improve the safety of services; and
- Rule 79 (2)(c)(ii) to maintain integrity of services.

In accordance with Rule 79 it is concluded that expenditure on the RTU telemetry units project is conforming SIB capital expenditure because it would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services.

## 4.17 Actuation of Mainline Valves (BC140)

### 4.17.1 Background

The 15 mainline valves on the Dandenong to West Melbourne pipeline are buried and located under the carriageway. The pipeline traverses a built up area which carries higher risk. [redacted].
Currently, the valves are manually operated and when APA GasNet staff need to operate them, they must enter the valve pits after removal of the heavy vehicle strength covers. These pits are classified as Confined Spaces and require special permits, procedures and training to access them. Although these mainline valves separate the pipeline into small sections, even with valves shut the decompression of the pipeline section may still take several hours.

Pacific Gas and Electric (PG & E), owners of the pipeline that failed at San Bruno, California, in 2009 were criticised because it took staff 95 minutes to close the manually operated line valves on the pipeline after the failure. The continued burning of gas, several hours after the rupture was considered unacceptable from the public viewpoint.

### 4.17.2 Need

The location of some of the valves in the parking lane can create access problems. The manual operation of the valves is a laborious process under awkward conditions. The task also carries the risk of personal injury during normal circumstances due to the confined space. If this were to occur during an emergency, further delay would occur.

Installation of local actuators, would eliminate the injury risk associated with manual valve operation but would still necessitate access to the pit. Installation of local actuators with remote control via the SCADA system would also eliminate delay associated with the removal of covers especially if access to site is restricted due to traffic or other means. APA GasNet favours the latter option, notwithstanding the additional cost of $1.35m for remote control. The estimated cost is set out in Table 4.20.

**Table 4.20: Cost Estimate for Actuation of Mainline Valves ($k 2012)**

| Year | Internal Labour | External Labour | Materials and Equipment | Project Costs |
|---|---|---|---|---|
| 2014 | c-i-c | c-i-c | c-i-c | c-i-c |
| 2015 | c-i-c | c-i-c | c-i-c | c-i-c |
| 2016 | c-i-c | c-i-c | c-i-c | c-i-c |
| **Total** | **416** | **1,994** | **1,532** | **3,942** |

4.17.3 Assessment

Installation of local actuators remote operation is APA GasNet practice for new facilities and is considered best practice. It is therefore supported. The expenditure is judged to be necessary in accordance with Rule 79 (2)(c)(i) since it improves the safety of services.

In accordance with Rule 79 it is concluded that expenditure on the Actuation of Mainline Valves Project is conforming SIB capital expenditure because it would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services.

## 4.18 Rockbank Pressure Regulation Station (BC087)

4.18.1 Need

The pipeline system which feeds Ballarat still requires compression at the Brooklyn compressor station in order to maintain peak loads in winter. Although removal of the Sunbury load from this system and upgrading of the Brooklyn-Ballan PRS has improved the reliability of supply, compression will still be required to meet 1 in 20 winter loads. All except one of the existing compressor units at Brooklyn are at the end of their technical life.

APA GasNet considered the following options as possible solutions:

- Option 1: Do nothing.
- Option 2: Replace Brooklyn compression.
- Option 3: Lateral pipeline from the Brooklyn Lara pipeline to a new PRS near Melton.
- Option 4: Partial looping of the Rockbank to Ballan Pipeline
- Option 5: Looping of the Daylesford to Ballan Pipeline
- Option 6: A new PRS at Rockbank.

Option 1 was unacceptable because dependence on a single compressor at Brooklyn would cause widespread disruption to supply. Option 2 is far more costly at $22m than Option 6. Option 3 at $6.6 m was more expensive than Option 6. Option 4 at $19.5m, was also more expensive than Option 6. Option 5 was not technically acceptable.

The proposed new PRS at the existing Rockbank site is located suitably close to Ballarat and adjacent to the WORM which has a higher operating pressure. The site is already equipped with communications and some infrastructure and hence could be easily upgraded to a PRS. Option 6 was clearly the most attractive.

A breakdown of the estimated capital expenditure for the preferred option is set out in Table 4.21 the project is scheduled for 2014.

**Table 4.21: Cost Estimate for Rockbank Pressure Regulation Station ($k 2012)**

| Item | Internal Labour | External Labour | Materials and Equipment | Project Costs |
|---|---|---|---|---|
| Total | c-i-c | c-i-c | c-i-c | 2,117 |

4.18.2 Assessment

The proposed Rockbank PRS provides a sound technical solution and the estimated capital cost of $2.117m is assessed to be reasonable.

The proposed capital expenditure is justifiable in accordance with Rule 79(2)(c)(i) as it is necessary to maintain the safety of downstream equipment (i.e. avoid failure of supply). It is also justifiable in accordance with Rule 79(2)(c)(ii) as it will maintain the integrity of services.

In accordance with Rule 79 it is concluded that expenditure on a new Rockbank Pressure Regulation Station is conforming capital expenditure because it would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services.

## 4.19 Springhurst Compressor Station Cooler Upgrade (BC016)

4.19.1 Background

Springhurst Compressor station in the far north of Victoria now has the ability to compress gas in either a northerly or southerly direction on the Wollert to Barnawartha Pipeline according to the requirements of the gas market. Due to a very tight deadline for the project when the station was constructed in 1999, the initial design was not subject to the normal level of client review, nor was consideration given to possible future functionality. The approach deliberately avoided investment in equipment not required for the immediate function. A consequence is that the station's gas cooler has been undersized for the summer conditions and the flows that may now be required. APA GasNet proposes to add an additional gas cooler to augment the existing gas/oil cooler.

The pipeline uses polyethylene coating with a maximum design temperature of 50 deg C. Operation of the pipeline in conditions where the maximum design temperature was exceeded would threaten the integrity of the coating and hence render the pipeline vulnerable to corrosion.

4.19.2 Need

APA GasNet provided data to demonstrate the installation of the second cooler would increase capacity from the current level of around 40 TJ/day to around 90 TJ/day. 2009 weather data suggests that without expansion of cooling capacity, the station could have its output restricted approximately 100 days a year.

To solve the problem APA GasNet considered three alternatives:

- an additional gas cooler;
- a replacement, larger gas/oil cooler;

- a replacement gas cooler with separate oil cooler.

The second alternative has an estimate of $1.11m. The third option is consistent with APA GasNet's standard design single Centaur compressor sites and would be the technically preferred solution. However, it has the highest capital cost at $1.35m and offers operating cost savings of only $10,000 per annum over the first option.

The first option has an estimated capital cost of $0.9m but with marginally higher operating cost and is the recommended solution to this problem.

The project is scheduled for 2015. A breakdown of this cost estimate is provided in Table 4.22

**Table 4.22: Cost Estimate for Springhurst Compressor Station Cooler Upgrade ($k 2012)**

| Item | Internal Labour | External Labour | Materials and Equipment | Project Costs |
|---|---|---|---|---|
| Total | c-i-c | c-i-c | c-i-c | **902** |

4.19.3 Assessment

APA GasNet provided detailed cost estimates for the three options which were reviewed and found to be reasonable. In the case of the oil cooler the item was based on a vendor quote. Estimated costs for the gas coolers were based on recent experience with projects at the Euroa and Wollert compressor stations. APA GasNet's selection of the second option is endorsed.

The expenditure is assessed to be justifiable under the following Rules:

- Rule 79 (2)(c)(i) to maintain and improve the safety of services; and
- Rule 79 (2)(c)(ii) to maintain integrity of services.

In accordance with Rule 79 it is concluded that expenditure on the Springhurst Compressor Station Cooler Upgrade project is conforming SIB capital expenditure because it would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services.

## 4.20 Type B Appliances (BC040)

4.20.1 Background

Type B gas appliances include those items such as gas turbine engines, gas engines, and gas-fired water bath heaters. APA GasNet's system includes approximately 34 such appliances. The safety of these appliances is managed under the Safety Case for which Energy Safe Victoria is the regulator in accordance with the Gas Safety Act. The relevant Australian Standard is AS 3814-2009. Type B appliances installed prior to the 1990s may not comply with the standard. APA GasNet's safety management system includes compliance audits with AS 3814.

ESV has advised APA GasNet that it expects all type B appliances to comply with AS 3814 retrospectively when equipment controls are upgraded (Reference [5]). APA GasNet is committed to a major upgrade of control systems at Gooding compressor station and proposes a similar program at Iona compressor station.

### 4.20.2 Need

APA GasNet proposes to comply with this requirement by engaging an external contractor to assess the compliance of APA GasNet gas-fired equipment with AS 3814, AS 5601 and ISO21789.

The results of this order will be used to identify and prioritise a work programme to achieve compliance at the 15 sites which are affected. These sites are compressor stations at Gooding, Wollert, Brooklyn, Iona, Springhurst and Euroa; the heaters at Dandenong city gate, Maryvale, Lara city gate, Wollert city gate, Illuka, Wandong and Somerton pressure regulating stations.

### 4.20.3 Assessment

Upon request, APA GasNet provided a spreadsheet setting out details of the estimate. Upon review of the estimate JP Kenny found that the allowance for audit of the following sites to be a little high because economies can be expected where there are multiple units on the same site.

- Gooding Compressor Station;
- Wollert Compressor Station;
- Brooklyn Compressor Station;
- Brooklyn Heaters.

Following discussion APA GasNet reduced the estimated cost of the audit by $40,000 to $115,000 with the result that External Labour and hence total cost was reduced by the same amount. The recommended allowable costs are set out in Table 4.23.

**Table 4.23: Cost Estimate for Type B Alliance compliance ($k 2012)**

| Item | Internal Labour | External Labour | Materials and Equipment | Project Costs |
|---|---|---|---|---|
| Total | c-i-c | c-i-c | c-i-c | **861** |

In accordance with the following Rules the expenditure is assessed to be justified:

- Rule 79 (2)(c)(i) to maintain and improve the safety of services;
- Rule 79 (2)(c)(ii) to maintain integrity of services; and
- Rule 79 (2)(c)(iii) to comply with regulatory obligation or requirement.

In accordance with Rule 79 it is concluded that expenditure at the recommended reduced level on the Type B Appliance Project is conforming capital expenditure because it would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services.

## 4.21 Gooding Compressor Station Anti-Surge and Fast-Stop Valves Upgrade (BC082)

### 4.21.1 Background

The Gooding compressor station, located between Longford and Melbourne plays a critical role in delivery of gas throughout the VTS. It is equipped with four Solar Centaur compressor units, which APA GasNet advises are in good condition but the company is currently upgrading the package control systems for all units with current generation TT4000 (PLC-based) control systems in accordance with ISO 21789 which covers gas turbine safety. The new control systems make provision for fast operating anti-surge valves (ASVs) and fast stop valves (FSVs), which could not be achieved with the previous systems due to design limitations. Incorporation of ASVs and FSVs would reduce the risk of compressor surge which can damage a unit if it trips while operating.

In accordance with the Safety Case, gas turbine engines are required to comply with AS 3814 (Reference [6]). Energy Safe Victoria has advised APA GasNet that it expects the company to comply with AS 3814 retrospectively when control systems are upgraded (Reference [5]).

### 4.21.2 Need

APA GasNet's preferred approach is to replace each of the existing four 8 inch ball valves with FSVs and the existing four 6 inch control valves with ASVs. Internal labour would be utilised for project management and design.

A summary of the estimated cost of the project is set out in Table 4.24

**Table 4.24: Cost Estimate for Gooding Compressor Station ASV and FSV Upgrade ($k 2012)**

| Item | Internal Labour | External Labour | Materials and Equipment | Project Costs |
|---|---|---|---|---|
| Total | c-i-c | c-i-c | c-i-c | **668** |

### 4.21.3 Assessment

APA GasNet provided upon request a spreadsheet with a detailed cost estimate. That estimate was reviewed and found to be reasonable. The cost allowance for internal project management and design is judged as reasonable. JP Kenny understands that the cost for the valves is based on recent similar purchase prices and that the construction cost estimate is based on recent experience.

The case for carrying out the work is convincing and the capital expenditure is considered to be justified under the following Rules:

- Rule 79 (2)(c)(i) to maintain and improve the safety of services;
- Rule 79 (2)(c)(ii) to maintain integrity of services; and
- Rule 79 (2)(c)(iii) to comply with regulatory obligation or requirement.

In accordance with Rule 79 it is concluded that expenditure on the Gooding Compressor Station Anti-surge Valve and Fast Stop Valve Upgrade project is conforming capital expenditure because it would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services.

## 4.22 Brooklyn Compressor Station Decommissioning (BC088)

### 4.22.1 Background

Brooklyn compressor station, located just west of Melbourne, was built in 1972 to compress gas supplied to Geelong and Bendigo. Its current role involves compression at peak periods to supply Ballarat, supply to the Laverton North power station and to supply the Western Transmission system when Otway Basin gas is not being supplied.

Continued operation of BCS would necessitate major work associated with:

- compressor package enclosure ventilation systems, exhaust silences, in line filters, separators and balance of plant;
- refurbishment or replacement of existing water cooling systems;
- significant integrity assessment of station pipework, particularly the buried sections;
- upgrading of the control systems; and
- maintenance of the station emergency shutdown functionality.

In the previous access arrangement funds were approved to relocate compressor unit 11 to an adjacent building and upgrade it. Subsequently the work has been assessed as unnecessary. Reassessment of future requirements for compression following installation of the WORM, upgrading of Wollert compressor station and construction of Stonehaven station indicates that the existing unit 12 at Brooklyn would be adequate to support gas power generation loads on the Geelong pipeline.

Consequently, units 8, 9, 10 and 11 would become redundant. Of these, only unit 11 is considered suitable for redeployment. The remaining three units would be disposed of. With proper decommissioning unit 11 could be mothballed and ready for future use.

### 4.22.2 Need

A breakdown of the estimated cost of the project is set out in Table 4.25.

**Table 4.25: Cost Estimate for Brooklyn CS Decommissioning ($k 2012)**

| Item | Internal Labour | External Labour | Materials and Equipment | Project Costs |
|---|---|---|---|---|
| Total | c-i-c | c-i-c | c-i-c | **2,594** |

Tasks to be performed by APA GasNet in this project would be:

- design of decommissioning works;
- management of the site works; and
- management of equipment procurement, and installation contractors.

### 4.22.3 Assessment

A detailed breakdown of the estimate was provided on request by APA GasNet. There was discussion with APA GasNet about the magnitude of the estimate for demolition work. Based on data from the decommissioning of the Mars unit at the Bulla Park Compressor Station, APA GasNet provided evidence that with appropriate scaling for the size of plant and with cost escalation to the year of expenditure in 2017, the estimate was reasonable.

The case for carrying out the decommissioning work at Brooklyn is assessed as justified in accordance with the following Rules:

- Rule 79 (2)(c)(i) to maintain and improve the safety of services; and
- Rule 79 (2)(c)(ii) to maintain integrity of services;

In accordance with Rule 79 it is concluded that expenditure on the Brooklyn Compressor site decommissioning project is conforming capital expenditure because it would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services.

## 4.23 Brooklyn Compressor GEA Upgrade (BC045)

### 4.23.1 Background

The backup power supply for the Brooklyn compressor station and the city gate site is a 315 kVA gas engine alternator (GEA) which was installed in the late 1970s. Although recent changes at the site have added new electrical loads, the load will again reduce to around 300 kVA if the Western Outer Ring Main project proceeds.

### 4.23.2 Need

There have been recent breakdowns of the existing GEA. The unit is now obsolete, is no longer supported by the manufacturer and spare parts are increasingly difficult to locate. Continuing with an unreliable unit in this role poses the risk of complete loss of power on the site. Moreover, the unit's location in the equipment room is no longer considered appropriate due to be hazard of possible gas leakage.

APA GasNet proposes to replace the GEA with a diesel engine alternator (DEA) and to relocate the unit in a safer area of the site. A DEA is considered to be more appropriate, considering life-cycle costs and reliability of fuel supply. The qualification is that a risk assessment is necessary to address reliability of fuel supply. A cost breakdown for the DEA option is set out in Table **4.26**.

**Table 4.26: Cost Estimate for Brooklyn CS GEA Upgrade ($k 2012)**

| Item | Internal Labour | External Labour | Materials and Equipment | Project Costs |
|---|---|---|---|---|
| Total | c-i-c | c-i-c | c-i-c | **242** |

### 4.23.3 Assessment

APA GasNet supplied a spreadsheet with a more detailed breakdown of the estimates. These estimates were reviewed and found to be reasonable. JP Kenny's conclusion is that the DEA option is likely to be more reasonable although JP Kenny has not included detailed consideration of life-cycle costs or a proper risk assessment of the alternative fuel options. Given that it is for backup supply, provision of an appropriate quantity of on-site diesel storage should provide sufficient assurance about reliability of fuel supply.

The capital expenditure is considered to be justified under the following Rules:

- Rule 79 (2)(c)(i) to maintain and improve the safety of services;
- Rule 79 (2)(c)(ii) to maintain integrity of services.

In accordance with Rule 79 it is concluded that expenditure on the Brooklyn Compressor Station GEA Upgrade project is conforming capital expenditure because it would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services.

## 4.24 Gooding Compressor Station Actuated Valve Replacement (BC081)

### 4.24.1 Background

The Gooding compressor station between Longford and Melbourne plays a critical role in delivery of gas throughout the VTS. APA advises that the station's four solar Centaur compressor units are in good condition and it is currently upgrading the package control systems for all units with current generation TT4000 (PLC-based) control systems in accordance with ISO 21789 which covers gas turbine safety.

The suction and discharge valves of each unit were designed be driven by actuators with "fail last" positioning and directly controlled by the manufacturers package control system. This arrangement would no longer comply with ISO 21789. Moreover, the valves and actuators are approaching the end of their useful life and are becoming increasingly difficult to maintain. In accordance with the Safety Case, gas turbine engines are required to comply with AS 3814 (Reference [24]). Energy Safe Victoria has notified APA that it expects the company to comply with AS 3814 retrospectively when control systems are upgraded (Reference [5]).

The inability to close the suction and discharge valves of the compressor units could potentially lead to an explosion with loss of the compressor building and possible loss of life.

### 4.24.2 Need

A summary of the estimated cost of the project is set out in Table 4.27. APA GasNet provided a spreadsheet with a detailed cost estimate. Internal labour would be utilised for project management and design.

**Table 4.27: Cost Estimate for Gooding Compressor Station Actuated Valve replacement ($k 2012)**

| Item | Internal Labour | External Labour | Materials and Equipment | Project Costs |
|---|---|---|---|---|
| Total | c-i-c | c-i-c | c-i-c | **850** |

### 4.24.3 Assessment

The detailed cost estimate was reviewed and found to be reasonable. The major component is for materials the eight 20 inch valves on the suction and discharge sides of each unit. The allowance for internal labour is considered reasonable. JP Kenny understands that the cost for the actuated valves is based on previous similar purchase prices and that the construction cost estimate is based on recent experience for similar work.

The case for carrying out the work is compelling and the capital expenditure is considered to be justified under the following Rules:

- Rule 79 (2)(c)(i) to maintain and improve the safety of services;
- Rule 79 (2)(c)(ii) to maintain integrity of services; and
- Rule 79 (2)(c)(iii) to comply with regulatory obligation or requirement.

In accordance with Rule 79 it is concluded that expenditure on the Gooding Compressor Station Actuated Valve Replacement project is conforming capital expenditure because it would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services.

## 4.25 Dandenong Office Facility Building (BC125)

### 4.25.1 Background

APA GasNet's main base at Dandenong has two office buildings on the site. The administration building, with an area of 1113 m² and 1129 m² operations building were constructed in 1980 and refurbished in the mid-1990s. While the administration building was built as office accommodation, the operations building was originally a store and workshop and was converted to office accommodation in the refurbishment. There are now 62 staff accommodated in the administration building and 70 in the operations building. APA GasNet is implementing a national standard office accommodation, which eliminates individual offices and seeks to increase the efficient use of office space using open plan design.

Both buildings are now fully occupied and have insufficient space to meet current demand. The current requirement at Dandenong is for 156 workstations. This is projected to increase to 175 within a year and 186 in five years' time. The area previously used as a lunchroom was converted into office space but recently, an employee representative Worksafe Victoria Provisional Improvement Notice (PIN) was raised in relation to the lack of these facilities. [redacted].

The company reports continuing problems with plumbing and mechanical services, and roofing of the buildings, which are giving rise to employee discomfort and increasing maintenance costs. Moreover, outdated construction materials in the buildings such as asbestos cement and polystyrene sandwich panelling create potential safety problems for APA GasNet employees and contractors engaged in maintenance.

### 4.25.2 Need

APA GasNet considered leasing additional office space, off the site, but concluded that it remained desirable to have office facilities on the site because of the need to locate the various functional areas, together. [redacted]

The option of refurbishing the existing buildings was also considered but the architect engaged for the purpose concluded that redesign could not accommodate the current demand for office space, together with the inclusion of a lunch room, complying with OHS requirements. [redacted]

Consequently, both the above options were rejected and two alternatives designs for a new office building were considered. The first option was for a new building with sufficient capacity for future needs incorporating sustainable design. The total cost of this option, including demolition of the current buildings, relocation of the control room and information technology services to the new building, staff relocation costs and an internal project manager amounted to $14.09 m.

An alternative simpler design, which accomplished the basic objective of housing additional staff was estimated to cost a total of $11.52m. APA GasNet selected this simpler design option, because it achieves the objectives at a lower cost.

A breakdown of the cost estimate for this option is set out in Table 4.28

**Table 4.28: Cost Estimate for Dandenong Office Facility Building ($k 2012)**

| Item | Project Costs |
|---|---|
| **New Building** - design, construction and fit out of new buildings, including furniture, mechanical and electrical services, plumbing, car park, external works, etc. Demolition of existing buildings | c-i-c |
| **Information Technology and Telecommunications** - additional costs associated with new building including server room and PABX relocation; infrastructure replacement and expansion of network to accommodate additional staff | c-i-c |
| **Control Room** - relocation of control room and construction/supply of control room equipment and facilities; dedicated control room UPS | c-i-c |
| [redacted] | c-i-c |
| **Staff Relocation** - cost of relocating files, records, equipment and other items to new building | c-i-c |
| **Project Manager** | c-i-c |
| **Total** | **11,520** |

4.25.3 Assessment

The case presented by APA GasNet for selecting a new building is convincing and APA GasNet's selection of the simplified design is supported as being the appropriate choice.

APA GasNet provided a detailed preliminary estimate of costs supplied by their independent architect and this document was reviewed by JP Kenny. As reported in the section on High security Sites, APA GasNet advised that any overlap between the cost estimate for the building security system and the other project was estimated to be limited to common hardware savings of $10,000. As this amount is well within the bounds of uncertainty in the two cost estimates, no change is recommended to the cost estimate for either project.

The estimate for the simplified design was based on a quality surveyor's review of the simplified design.

The estimate is therefore assessed as reasonable.

Overall, the capital expenditure of $11.52m proposed for the Dandenong Office Facility Building is considered to be justified in accordance with the following Rules:

- Rule 79 (2)(c)(ii) to maintain integrity of services (in relation to providing suitable office accommodation for staff to perform their functions); and
- Rule 79 (2)(c)(iii) to comply with regulatory obligation or requirement (in relation to the lunch room and asbestos materials.).

In accordance with Rule 79 it is concluded that expenditure on the Dandenong office facility building is conforming capital expenditure because it would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services.

# 5.0 AUGMENTATION CAPITAL EXPENDITURE

## 5.1 Western Outer Ring Main (WORM) Project

### 5.1.1 Background

The VTS supplies around 220PJ of gas annually to approximately 1.5 million customers, mostly located in the Melbourne region. Although gas is supplied to the state from the Gippsland, Otway and Bass basins (and sometimes also from New South Wales), the Gippsland basin is the dominant source of supply.

In order to mitigate the risk of protracted supply disruption from Longford, APA GasNet has proposed the construction in 2014 of a large diameter pipeline interconnection, known as the Western Outer Ring Main (WORM) to remove the supply constraint which exists to the west of the metropolitan area.

Construction has been proposed in three stages:

- Stage one: 8.3 km of 500 millimetre diameter pipeline from Rockbank to Plumpton; and
- Stages 2 and 3: 49.3 km of 500 millimetre diameter pipeline from Wollert to Rockbank via Kalkallo.

Stage one has been committed for 2012, principally to eliminate a supply constraint on the Sunbury lateral. The diameter has been increased, so that the pipeline may be extended to complete the WORM.

Stages two and three would include upgrading of compression capacity at Wollert compressor station and a new pressure reduction station at Wollert connecting the Brooklyn Lara pipeline to the Pakenham-Wollert Pipeline.

Construction of the WORM would confer a number of benefits on the system:

- enhanced security of supply to the VTS;
- increased system reliability;
- simplified operation of the system;
- optimisation of capital and reducing operating costs; and
- provision for future growth of the VTS.

#### *5.1.1.1 Enhanced security of supply*

More than 73% of peak gas supply comes via the Longford treatment plant, which treats Gippsland basin gas. The dominance of Gippsland basin supply, together with the relatively short length of the Longford to Dandenong pipeline (meaning relatively little linepack), renders the Melbourne region, extremely vulnerable to supply disruptions at Longford.

A consultancy report by R2A Due Diligence Engineers modelled the probability of an outage. Based on past experience[1] outages at Longford and other plant, R2A calculated the financial impact of a supply outage at Longford. With the WORM in place, savings of $46m, $77.7m and

[1] JP Kenny considers that because of the age of the Longford plant, the risk of outages in the future is likely to be greater in the future than in the past.

$105.8m were calculated for a 5, 10 or 15 day outage respectively over the 60 year life of the pipeline.

*5.1.1.2 Increased system reliability*

APA GasNet advises that there were no less than 5,000 set point changes made by AEMO operators in the operation of the VTS regulators during the past year. Less dependence on operator intervention and reduced wear and tear on equipment will both improve system reliability.

*5.1.1.3 Simplified system operation*

Construction of the WORM will enable gas to flow between the eastern and western parts of the system with fixed set points and without direct intervention by the operators. AEMO currently manages linepack via stop/start operation at Brooklyn and Wollert regulators and compressors.

*5.1.1.4 Optimisation of capital and reducing operating costs*

Construction of the WORM, combined with the use of compression capacity of Wollert and Stonehaven, would increase the capacity for injection into the Western Underground Storage facility, while at the same time dramatically reducing the volume of compressor fuel used per volume of gas transported. This would enable downgrading the Brooklyn Compressor Station which is a key element of APA GasNet's compressor strategy. The Brooklyn station is currently used for refilling of the Western Underground Storage facility as well as boosting capacity on the Brooklyn to Ballarat and Geelong Systems. Furthermore, the Brooklyn compressor station site is very congested and is not the optimal location for capacity expansion of the VTS.

In addition, the need to upgrade the compressor aftercoolers at Iona is eliminated in the short to medium term. Installation of the proposed new Rockbank Pressure Regulation Station (Business Case 087) supplied via the WORM Project would reduce the need for compression at Brooklyn to supply to Ballarat only in the short to medium term.

Rather than installing two additional compressor units at Brooklyn, new units at Wollert and Stonehaven will be in better strategic locations for capacity expansion of the South West Pipeline and northern Wollert Pipeline.

By fixing regulator station outlet pressure set points at Brooklyn, Wollert, Lara and Wandong, savings will be made on operating costs. Moreover, operation of the major Melbourne supply points at Dandenong, Brooklyn and Wollert (and later Lilydale) at a fixed delivery pressure will give rise to additional capacity to measuring and regulating facility offtakes. Deferral of upgrades to meter and regulator stations will therefore be possible. Capital and operating expenditure for some heaters on the VTS may also be avoided or deferred.

*5.1.1.5 Provision for future growth of the VTS*

While improved security of supply provides the main justification for construction of the WORM, the new pipeline would also provide capacity for future growth of the VTS. The route will provide an offtake point for a mains extension at Kalkallo. The proposed Stonehaven compressor station will increase capacity of the South West pipeline by up to 59 TJ per day. Construction of the WORM, together with the Stonehaven compressor station would provide a sound platform for moving greater volumes of gas via the South West pipeline. This has important benefits for the growth of new gas-fired electricity generation, which is expected to be required increasingly by the market as carbon pricing takes effect.

### 5.1.2 Alternative Pipeline: Brooklyn to Dandenong via Port Phillip Bay

An alternative 48 km pipeline route from Brooklyn to Dandenong would also provide security of supply benefits in the event of supply disruption at Longford. However, the security of supply

benefits apply to the Melbourne region and not to the northern zone. This alternative is considered inferior to the WORM option, because it's route through built-up areas and the major Port Phillip Bay Crossing gives rise to a much greater construction cost, which is estimated to be $183.3 million.

### 5.1.3 Capital Costs of Alternatives

Table 5.1 below sets out the estimated costs for the WORM and its alternative.

**Table 5.1: Cost Estimate for WORM and alternatives ($k 2012)**

| Item | WORM (stage 2 & 3) | | | Brooklyn – Dandenong Loop |
|---|---|---|---|---|
| Facilities installed | Pipeline (49.3km x 500 mm ) | Compressor Centaur 50 at Wollert | Facilities Dual Regulators + Check Valve at Wollert | 48 km x 500 mm including Phillip Bay crossing |
| Preliminaries Establishment Project Management Approvals, Land | c-i-c | c-i-c | c-i-c | c-i-c |
| Procurement Materials | c-i-c | c-i-c | c-i-c | c-i-c |
| Construction | c-i-c | c-i-c | c-i-c | c-i-c |
| **Sub-Total** | **71,580** | **20,680** | **4,270** | **183,300** |
| **Total** | | | **96,530** | **183,300** |

The operating cost for the WORM project is estimated to be in the order of $456,500 per annum.

### 5.1.4 Assessment

JP Kenny endorses APA's view that the WORM represents by far the best solution. It considers the expenditure to be justifiable in accordance with Rule 79(2)(c)(ii) i.e. necessary to maintain integrity of services.

In accordance with Rule 79 we also conclude that expenditure on the Western Outer Ring Main project is conforming capital expenditure because it would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services.

## 5.2 Warragul Looping

### 5.2.1 Need

APA has advised that the updated growth forecast received from the gas distributor in Warragul shows an increase in demand over the next 10 years from 6,920 scmh to 11,600 scmh. Without augmentation of capacity, the minimum pressure requirement of 1400 kPag at the Warragul city gate could not be maintained. APA provided details of capacity studies and cost estimates for four options.

Option 2a was looping of the existing Warragul lateral with 4.8km of 150mm diameter pipeline which would provide sufficient capacity for long-term growth at Warragul.

Option 2b was constructing the same pipeline in 100mm diameter, which would achieve a capacity increase just over half that of a 150mm pipeline but the cost saving would be only marginal at $0.19m. Building in the 100mm diameter would carry the risk that further augmentation might be needed in the future.

Option 3 was the installation of a 100kW compressor. For a cost of $5.48 m there would be sufficient capacity increase to cope with forecast load until winter 2022, at which time further augmentation would be required. Moreover, the operating costs for this option are estimated to be $100,000 per annum, compared to $30,420 per annum for each of the pipeline options.

Option 4 was constructing a second gate station. This would require approximately 5 km of 150mm diameter pipeline also connecting to the Longford Dandenong pipeline. While this option would provide long-term capacity for growth in the Warragul network as well as providing greater security of supply, it would also involve substantially higher costs for the network operator, because of the need to install and maintain a new meter regulator and heater at the new city gate.

Costs for the four options considered are set out in Table 5.2.

**Table 5.2: Cost Estimate for Warragul Looping Options ($k 2012)**

| Budget for Project | Option 2a (Warragul 150 mm Loop) | Option 2b (Warragul 100 mm Loop) | Option 3 (100 kW Compressor) | Option 4 (Mains Extension from Longford Pipeline) |
|---|---|---|---|---|
| Preliminaries, Establishment, Project Management, Approvals, Land | c-i-c | c-i-c | c-i-c | c-i-c |
| Procurement, Materials | c-i-c | c-i-c | c-i-c | c-i-c |
| Pipeline construction | c-i-c | c-i-c | c-i-c | c-i-c |
| **Total** | **2,417** | **2,225** | **5,480** | **2,511** [1] |
| Operating Costs per annum ($ 2012) | $30,420 | $30,420 | $100,000 | $30,420 [1] |

Notes:

1. Excludes additional project and operating cost of new city gate, meter, regulator and water bath heater which would be a cost to the Network Operator.

### 5.2.2 Assessment

The costings and NPV analysis (Reference [7]) provided by APA were reviewed and found to be reasonable. The proposal to construct the loop pipeline in 150 mm diameter is supported as sound business practice.
The proposed capital expenditure is assessed as justifiable in accordance with Rule 79(2)(b) because the present value of expected incremental revenue exceeds the present value of the capital expenditure.

In accordance with Rule 79 it is assessed that expenditure on the Warragul Looping project is conforming capital expenditure because it would be incurred by a prudent service provider acting

efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services.

## 5.3 Kalkallo Pipeline

### 5.3.1 Need

APA has received a request from a gas distributor to provide a gas supply for new residential and industrial development around the township of Kalkallo. It has investigated three options to service the proposal:

- Case A, with the WORM project: a 4.5 km pipeline extension of 200mm diameter;
- Case B(i), a standalone option without the WORM, comprising 9.5 km of 200mm diameter pipeline; and
- Case B(ii), a configuration staged for a future WORM, comprising a 5 km pipeline extension of 500mm diameter and a further 4.5 km of 200mm diameter pipeline.

APA provided costings for these options as set out in Table 5.3.

**Table 5.3: Cost Estimate for Kalkallo Pipeline ($k 2012)**

| **Budget for Project** | **Case A WORM Proceeds (Recommended)** 4.5km x 200mm | **Case B (i) WORM Does not Proceed (Stand-Alone)** 9.5km x 200mm | **Case B (ii) WORM Does not Proceed (Upsized)** 5km x 500mm + 4.5km x 200mm |
|---|---|---|---|
| Preliminaries, Establishment, Project Management, Approvals, Land | c-i-c | c-i-c | c-i-c |
| Procurement, Materials | c-i-c | c-i-c | c-i-c |
| Pipeline construction | c-i-c | c-i-c | c-i-c |
| **Total** | **4,160** | **10,330** | **14,990** |

The annual operating cost for each of these options was estimated by APA at $37,300.

### 5.3.2 Assessment

The costings were reviewed and found to be reasonable. Case A with a cost estimated at $4.160m has a positive NPV (Reference [8]). It is assessed as justifiable capital expenditure, in accordance with Rule 79(2)(b).

Case B(i) and B(ii) each have a negative NPV and would require a surcharge payable by the customer to be viable. If the WORM were not to proceed in the forthcoming access arrangement period, it is recommended that B(ii) should proceed with a surcharge.

In accordance with Rule 79 it is assessed that expenditure on the Kalkallo Pipeline project is conforming capital expenditure because it would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services.

## 5.4 Anglesea Pipeline Extension

### 5.4.1 Background

The current Corio city gate is the single source of supply to over 120,000 customers, and approximately 50 major industrial customers in the Geelong area [redacted].

[redacted] has also advised APA that it intends to extend its feeder pipeline to Torquay and Jan Juc and has therefore requested APA to provide a new supply point into its new feeder pipeline which would require APA to construct a transmission pipeline to its new city gate by winter 2015. This would create a second point for the Geelong and Bellarine area.

### 5.4.2 Need

The new city gate would require a 15km pipeline extension from APA's South West pipeline to Anglesea. APA has determined that a 250mm diameter pipeline with an MAOP of 10,200kPa would be required. The pipeline would have the capability of providing full backup flow of up to 120,000 scmh in the event of loss of the Corio City Gate during the winter peak. It is forecast that the pipeline would offset initially approximately 50% of the load currently flowing through the Corio City Gate, providing a dual feed to the distribution network.

**Table 5.4: Cost Estimate for Anglesea Pipeline Extension ($k 2012)**

| Item | Cost |
|---|---|
| Preliminaries, Establishment, Project Management, Approvals, Land | c-i-c |
| Procurement, Materials | c-i-c |
| Pipeline construction | c-i-c |
| **Total** | **12,950** |

### 5.4.3 Assessment

APA provided a spreadsheet with details of costing which was reviewed and found to be reasonable. Materials costs were based on recent supplier data and the cost of construction is assessed as reasonable having regard to the local environment.

APA's estimated annual operating costs for the new pipeline and associated facilities of $103,700 are considered to be reasonable.

The capital expenditure is assessed to be justifiable in accordance with Rule 79(2)(c)(iv) as it is necessary to maintain the service provider's capacity to meet levels of demand for services.

In accordance with Rule 79 it is assessed that expenditure on the Anglesea Pipeline Extension project is conforming capital expenditure because it would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services.

## 5.5 Gas to Culcairn

### 5.5.1 Background

Some augmentation of the Wollert to Barnawartha Pipeline was approved in the earlier access arrangement period. Stage one, comprising installation of two Centaur 50 compressor units at Wollert compressor station, an increase in the MAOP from 7400 to 8800 kPag between Wollert and Euroa and conversion of the Springhurst compressor station to bidirectional flow, was completed in 2011. Stage two, comprising the installation of one Centaur 50 compressor unit at Euroa is scheduled for completion by winter 2012. Although export capacity from Culcairn is now 48TJ/day, 36TJ/day is already contracted so that spare capacity is only 12TJ/day.

Gas supply currently available from Iona far exceeds the current capacity of the South West Pipeline which is 353TJ/day. Hence, any additional gas to be sourced from Iona will require augmentation of the South West Pipeline.

### 5.5.2 Need

Shippers have advised APA of aggregate volumes to be shipped amounting to 53 TJ/day from Iona of which 45 TJ/day, would require transport to Culcairn. System augmentation to achieve this capacity would be as follows:

- a new compressor station on the South West Pipeline; and
- a total of 104.1 km of looping in 450 mm diameter. Class 600 MAOP 10,200kPag, comprising:
  - Wollert to Wandong (27.8 km);
  - Line Valve 12 to Euroa compressor station (30.0 km);
  - Euroa compressor station to Line Valve 17 (46.3 km).

#### *5.5.2.1 Site and Compressor Power Options*

APA considered two potential sites for the compressor station on the South West Pipeline: Stonehaven and Winchelsea. Two compressor unit sizes were considered for each location: a Centaur 50 (4200kW) and a Taurus 60 (5500kW). The cost estimates for these options are set out in Table 5.5.

**Table 5.5: Cost Estimate for Culcairn compressor options ($k 2012)**

| Item | Winchelsea Compressor Taurus 60 | Stonehaven Compressor Taurus 60 | Winchelsea Compressor Centaur 50 | Stonehaven Compressor Centaur 50 |
|---|---|---|---|---|
| Preliminaries, Establishment, Project Management, Approvals, Land | c-i-c | c-i-c | c-i-c | c-i-c |
| Procurement, Materials | c-i-c | c-i-c | c-i-c | c-i-c |
| Construction | c-i-c | c-i-c | c-i-c | c-i-c |
| **Total** | **40,524** | **38,328** | **36,975** | **34,871** |

A Taurus 60 unit at Stonehaven or either unit at Winchelsea would achieve the necessary incremental capacity of the South West Pipeline. A Centaur unit at Stonehaven would be inadequate. Although a Centaur 50 unit at Winchelsea would be the cheapest option, APA favours the Stonehaven site for two reasons:

- it has obtained the site at Stonehaven (although a planning permit is still required) whereas it has not acquired a site at Winchelsea. Hence, the Winchelsea site requires extra leadtime of up to a year with no certainty as to the outcome. Timing is important because the first additional gas from Iona is required in 2013.
- The Stonehaven site is better located for westbound flows on the pipeline for refilling of the Western Underground storage or export of gas to South Australia. (The station would be configured for bidirectional flow).

*5.5.2.2 Pipeline Looping Options*

APA considered pipeline diameters of 400 mm, 450 mm and 500 mm for the necessary looping of the Wollert to Barnawartha pipeline. The length of looping required and the estimated cost for each option is set out in

Table **5.6** below.

**Table 5.6: Cost Estimate for Culcairn looping options ($k 2012)**

| Item | Pipe Size | | |
|---|---|---|---|
| | 450mm | 400mm | 500mm |
| Preliminaries, Establishment, Project Management, Approvals, Land | c-i-c | c-i-c | c-i-c |
| Procurement, Materials | c-i-c | c-i-c | c-i-c |
| Pipeline construction | c-i-c | c-i-c | c-i-c |
| **Total** | **118,580** | **122,500** | **120,450** |

The 450 mm option offers the lowest cost solution at $118.58m. The 400 mm option requires an additional 10 km of looping to achieve the target pressure at Culcairn of 6000kPag whereas the 500 mm option requires 7 km less looping.

In order to consider the solution in a broader long-term framework, APA carried out analysis to determine the capacity of a fully looped Wollert to Barnawartha pipeline. Full looping of the 260 km pipeline in 450mm diameter would provide an additional 190 TJ/day (a total of 226TJ/day). This is consistent with AEMO's (formerly VENCorp's) 2009 study (Reference [9]).

A breakdown of the costs for the preferred option is set out in Table 5.7.

**Table 5.7: Cost Breakdown for Preferred Options ($k 2012)**

| Item | Stonehaven Compressor + 104.1km x 450 mm Looping | |
|---|---|---|
| | Pipeline | Compressor |
| Preliminaries, Establishment, Project Management, Approvals, Land | c-i-c | c-i-c |
| Procurement, Materials | c-i-c | c-i-c |
| Construction | c-i-c | c-i-c |
| **Total** | **118,580** | **38,300** |
| **Total Project** | | **156,900** |

The Operating Cost for the new assets is estimated in the order of $643,000 per annum.

### 5.5.3 Assessment

JP Kenny endorses APA's compressor site and compressor unit selections.

Details supporting the estimate in Table 5.5 were supplied in spreadsheets by APA. The estimates were reviewed and found to be reasonable. Major item costs were based on recent vendor quotes and experience with other recent projects.

We understand that the Gas to Culcairn project would only proceed if contracts for the incremental export flows are executed and that timing remains uncertain. Nevertheless, based on the location of available gas reserves in eastern Australia and the likely location of new gas-fired power generation capacity in NSW where a number of projects are under development, it seems highly likely that additional gas export demand of at least the magnitude indicated will occur in the next five years.

Even if the project to provide gas exports to Culcairn were not to receive approval, the Stonehaven compressor station confers considerable system benefits, which justify its construction. Combined with the WORM, the new station would facilitate the transfer of gas from Iona during any extended supply interruption at Longford. In addition, it allows more gas to be sourced from Iona during higher demand periods.

Furthermore, the new station enhances security of supply in the Western Transmission System. APA reports that the Otway Basin gas plants are usually shut down for a few weeks each year.

Once installed, Stonehaven compressor station would enable a minimum pressure of 4500 kPag to be maintained at Iona, which would allow sufficient compression to meet peak loads on the Western Transmission System. A further benefit of a Stonehaven compressor station is that it

facilitates the downgrading of the role of the Brooklyn compressor station because it is more strategically located to contribute to system security through its flexible role.

APA provided a copy of its financial analysis of the project (Reference [10]). This was reviewed and found to be reasonable.

The Gas to Culcairn project is assessed as justifiable in accordance with Rule 79(2)(b) i.e. the present value of expected revenue exceeds the present value of the capital expenditure.

In accordance with Rule 79 it is assessed that expenditure on the Gas to Culcairn project is conforming capital expenditure because it would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services.

# 6.0 OPERATING EXPENDITURE: 2008 -2012

## 6.1 Governing Provisions

### 6.1.1 National Gas Rules

Rule 91 specifies that operating expenditure

> … must be such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of operation.

The AER's discretion under this rule is limited such that the AER must not withhold its approval of proposed operating expenditure if it is satisfied that the proposal complies with the requirements of the law and is consistent with Rule 91. All forecasts and estimates must also comply with Rule 74.

### 6.1.2 Access arrangement fixed principle

The earlier access arrangement includes a fixed principle relating to the calculation of forecast operating expenditure in the access arrangement period. Clause 7.2(h) of the earlier access arrangement states:

> In calculating the allowable revenues for operations and maintenance expenditure for the Fourth Access Arrangement Period, the Regulator must:
>
> (i) comply with the requirements of the Code;
>
> (ii) take into account the actual operating costs in 2011, adjusted for the change in forecast operating costs between 2011 and 2012 and, to avoid doubt, not taking into account the efficiency gain (loss) made in 2012;
>
> (iii) take into account forecast changes in workload, taxes, Regulatory Events, insurance premiums and other relevant costs between 2011 and each year of the Fourth Access Arrangement Period; and
>
> (iv) take into account a percentage trend factor.

Transitional arrangements under the National Gas Rules provide that in deciding whether to approve an access arrangement revision proposal for a transmission access arrangement, the AER must take into account any provisions of the transitional access arrangement that were fixed principles under section 8.47 of the National Gas Code, for the period for which they were fixed (Reference [11]). This transitional provision is subject to Rule 99(4)(b), which states:

> If a Rule is inconsistent with a fixed principle, the rule operates to the exclusion of the fixed principle

APA GasNet has reviewed the former National Gas Code provisions relevant to the approval of forecast operating expenditure and considers that they are consistent with the Rules. The following provisions of the National Gas Code are also present in the Rules:

- section 8.49 of the Code – ability to infer through the operation of an incentive regime whether capital or operating expenditure is efficient and complies with other criteria prescribed by these rules (Rule 71); and

- section 8.37 of the Code – requirement for operating expenditure to be consistent with that which would be incurred by a prudent Service Provider, acting efficiently, in accordance with accepted and good industry practice, and to achieve the lowest sustainable cost of delivering the Reference Service Rule 91).

This fixed principle limits the scope of APA GasNet's discretion in developing its operating expenditure forecast and the AER's discretion in assessing APA GasNet's operating expenditure forecast.

APA GasNet advised that it has prepared its operating expenditure forecast in accordance with this fixed principle and JP Kenny agrees that such as basis is reasonable.

## 6.2 Operating Expenditure Categories

Rule 69 defines operating expenditure for the purposes of price and revenue regulation as follows:

*… operating, maintenance and other costs and expenditure of a non-capital nature incurred in providing pipeline services and includes expenditure incurred in increasing long-term demand for pipeline services and otherwise developing the market for pipeline services.*[2]

For the purposes of its access arrangement revision proposal, APA GasNet classifies its operating expenditure in the following categories:

- Labour, comprising direct labour not otherwise capitalised to a particular capital expenditure project. This includes labour associated with operating and maintaining the VTS, engineering support, pipeline right of way, facilities, compressor stations, SCADA and communications systems, as well as non system labour such as local office support staff and local finance, compliance, and records management.
- Materials, comprising expenditure on system consumables and/or spares replacement associated with pipeline operations and maintenance, as well as head office materials (stationery, etc).
- Outside Services, comprising contracted services performing system and non-system specialist functions such as aerial patrols, management of dial before you dig services and maintenance of emergency response equipment.
- Fuel Gas, comprising expenditure on gas used to operate facilities such as compressor stations.
- Corporate, comprising head office charges for group services such as human resources, health, safety and environment, legal, finance, IT and accounting and the office of the chief executive.
- Other, comprising expenditure that does not fit into one of the other categories, such as licence fees and charges, travel, property costs, communications, training, insurance, motor vehicles and consultants/legal.

[2] This definition differs in important respects from that in clause 8.36 of the former National Gas Code which defines non-capital costs as:
… the operating, maintenance and other costs incurred in the delivery of the Reference Service. Non Capital Costs may include, but are not limited to, costs incurred for generic market development activities aimed at increasing long-term demand for the delivery of the Reference Service.

These reporting categories are unchanged from the previous access arrangement period.

### 6.2.1 Changes in Allocation of Costs

Forecasts for the earlier access arrangement period were largely prepared on the basis of APA GasNet as a stand-alone entity. While the acquisition of the GasNet business occurred over the period that GasNet was preparing and the ACCC was assessing the earlier access arrangement revision proposal, only minimal changes were made to that forecast to reflect changing roles and responsibilities expected to come about because of the acquisition. No costs were allocated to the Corporate category but were generally reflected in the Labour category.

APA GasNet's reported operating costs include a corporate category as it is allocated corporate costs from APA Group. These are reported in actual expenditure in Table 6.2 below.

During the previous access arrangement period there has been a transfer of some costs from the Labour category to the Corporate category. For example, HSE, procurement, finance and IT staff costs were previously reported in the Labour category but now these functions are provided through the corporate business group and are reported under the Corporate category.

## 6.3 Previous Access Arrangement Period: 2008 - 2012

The ACCC's 2008 Final Approval of APA GasNet's revised access arrangement approved operating expenditure as proposed by APA GasNet (Reference [16]). APA GasNet's final revised access arrangement incorporated required amendments from the AER included in the AER's Final Decision, which were confined to the removal of transaction costs $8.84 million ($2006) associated with the purchase of GasNet by APA Group (Reference [17]).

The operating expenditure allowed by the ACCC in the earlier access arrangement period is shown in Table 6.1 below.

**Table 6.1: Operating expenditure - ACCC 2008 Final Decision ($k 2012)**

| Category | 2008 | 2009 | 2010 | 2011 | F2012 | Total |
|---|---|---|---|---|---|---|
| Labour | 14,533 | 15,278 | 15,610 | 15,858 | 16,059 | 77,338 |
| Materials | 1,206 | 1,277 | 1,277 | 1,289 | 1,324 | 6,374 |
| Outside Services | 3,843 | 4,080 | 4,115 | 4,174 | 4,269 | 20,482 |
| Fuel gas | 3,276 | 3,252 | 3,418 | 3,583 | 3,772 | 17,301 |
| Other | 6,055 | 6,114 | 6,114 | 6,161 | 6,279 | 30,722 |
| Corporate | - | - | - | - | - | - |
| *Asymmetric risk* | 213 | 213 | 213 | 213 | 213 | 1,064 |
| *Equity raising costs* | 568 | 568 | 568 | 568 | 568 | 2,838 |
| *Other allowances* | 260 | 272 | 272 | 272 | 272 | 1,348 |
| **Total comparison forecast** | **29,954** | **31,054** | **31,586** | **32,118** | **32,756** | **157,467** |

Table 6.2 shows actual and forecast operating expenditure incurred over the earlier access arrangement period compared to that approved by the ACCC in its Final Decision in constant terms. Note that allowances for asymmetric risk, equity raising costs and other allowances are

included the operating expenditure variance (and costs against the Corporate category) as these allowances reflect costs expected to be borne by the business (for example equity raising costs in the corporate category).

**Table 6.2: Operating expenditure – actual and forecast ($k 2012)**

| Category | 2008 | 2009 | 2010 | 2011 | F2012 | Total |
|---|---|---|---|---|---|---|
| Labour | 7,285 | 7,213 | 7,788 | 8,654 | 8,943 | 39883 |
| Materials | 577 | 603 | 373 | 543 | 485 | 2581 |
| Outside Services | 1,890 | 1,294 | 1,626 | 2,330 | 3,350 | 10490 |
| Fuel gas | 1,802 | 651 | - | - | - | 2453 |
| Other | 6,783 | 5,885 | 5,126 | 5,928 | 5,784 | 29507 |
| Corporate | 7,427 | 9,352 | 9,788 | 10,046 | 10,434 | 47,048 |
| **Total actual** | **25,765** | **24,998** | **24,702** | **27,501** | **28,996** | **131,961** |

Other components of ACCC approved operating costs such as carry over amounts and reset costs do not relate to operating expenditure in the earlier period, and have been excluded from the variance analysis. Similarly, fuel gas costs need to be eliminated from the variance analysis as these costs were treated as a pass through in the early part of the period (2008 and 2009) and were removed from the forecast for the remainder of the period. Variance analysis with and with fuel gas are shown in Table 6.3.

**Table 6.3: Operating expenditure – variance ($k 2012)**

| Category | 2008 | 2009 | 2010 | 2011 | F2012 | Total |
|---|---|---|---|---|---|---|
| Labour | (7,248) | (8,066) | (7,821) | (7,204) | (7,116) | (37,455) |
| Materials | (629) | (674) | (904) | (746) | (840) | (3,793) |
| Outside Services | (1,954) | (2,786) | (2,489) | (1,845) | (919) | (9,992) |
| Fuel Gas | (1,473) | (2,601) | (3,418) | (3,583) | (3,772) | (14,847) |
| Other | 729 | (228) | (988) | (233) | (495) | (1,216) |
| Corporate | 6,387 | 8,300 | 8,736 | 8,994 | 9,381 | 41,797 |
| **Total variance** | **(4,189)** | **(6,056)** | **(6,884)** | **(4,616)** | **(3,761)** | **(25,506)** |
| **Total variance with fuel gas impact removed** | **(2,715)** | **(3,455)** | **(3,467)** | **1,033** | **(11)** | **(10,658)** |

### 6.3.1 APA GasNet Restructure

As noted, forecasts for the earlier access arrangement period were largely prepared on the basis of APA GasNet as a stand-alone entity. In 2007, the APA Group started integrating the APA GasNet business into the wider corporate structure.

Figure 6.1 demonstrates the impact on costs as APA GasNet made the transition from a stand-alone entity in 2006 to full integration with APA Group in the 2011 base year. Direct operating and

maintenance costs incorporate APA GasNet's Labour, Materials, Outside Services and Other operating expenditure categories (removing odourant costs). These categories represent those that are likely to be impacted by efficiencies associated with moving from a stand-alone entity to a larger group.

Comparison of APA GasNet overheads in 2006 ($9.620m in $2012) with APA GasNet overheads in 2008 ($7.427m in $2012) demonstrates clearly the impact of economies of scale from the larger APA Group. By 2012, this impact had diminished due to the factors discussed in section 6.3.3 below.

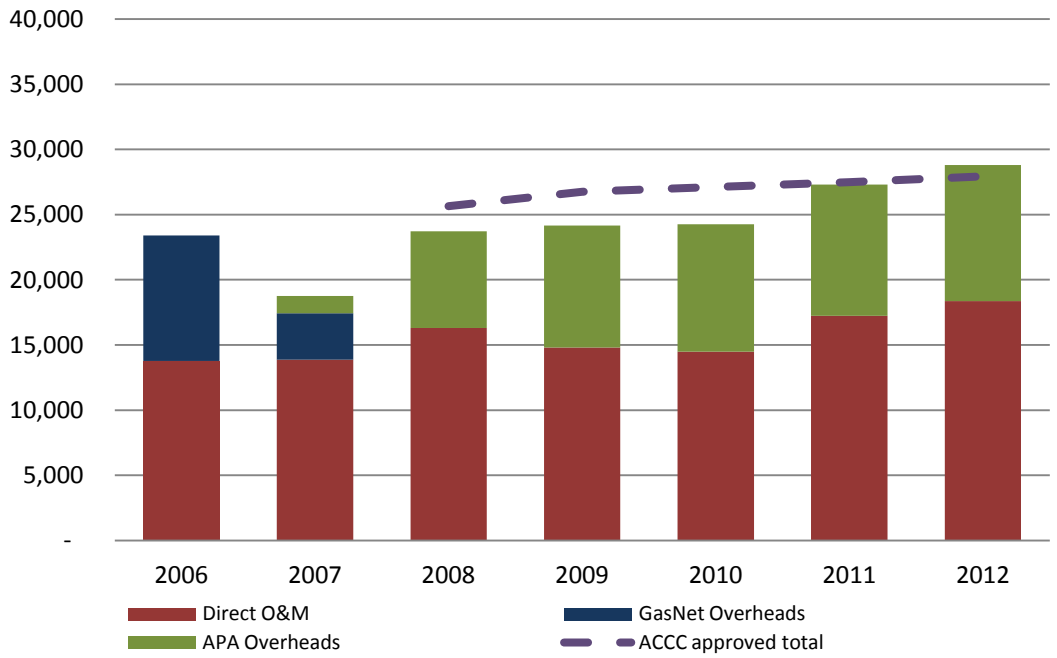


**Figure 6.1: Impact of APA GasNet integration into APA Group on local and overhead costs ($k 2012)**

### 6.3.2 Change in regulatory approach to fuel gas

APA GasNet's forecast costs included in the 2008 proposal (and those approved by the ACCC) included an allowance for fuel gas to run the various compressors and heaters on the VTS. The earlier access arrangement also included scope for tariff variation associated with any variance between forecast and actual fuel gas costs to be reflected in tariffs. This cost treatment was essentially because fuel gas usage is highly volatile and APA GasNet did not have operational control of compressors and heaters on the VTS and so was unable to manage the cost risk.

### 6.3.3 Increased Corporate Costs

APA Group has acknowledged a significantly increase in corporate costs in recent years. The company points out that most corporate entities have experienced increasing regulatory and financial reporting demands, more rigorous governance requirements and changes in market conditions in the period.

APA Group commissioned a report by KPMG (Reference [14]) to investigate and report on the significant policy and business environment changes that are impacting businesses generally, and driving increases in corporate costs.

KPMG found that significant changes in obligations have been driven by federal and state government legislation, changes in taxation regimes and new regulatory conditions. The Carbon Tax, new national occupational health and safety laws), international regulatory or legislative changes (such as the introduction of new International Financial Reporting Standards) as well as changing market conditions, particularly the Global Financial Crisis, are cited as the most significant impacts.

The impact of these factors on Overheads is reflected in the increase from $7.427m in 2008 to $10,046m in 2011 and $13.617m (forecast) in 2012, expressed in 2012$. This represents an increase of 26%%.

### 6.3.4 Increased Labour Costs

There have been two major influences which have increased labour costs between 2008 and 2012. The first has been an increase in the number of staff employed from 98.8 to 104.8 full time equivalents. Most of the increase occurred in Operations Support and Asset Management and Engineering. The second is the impact of wage increases as reflected in the increase in Average Weekly Earnings.

### 6.3.5 Base year for forecast operating expenditure

As part of the review JP Kenny must also make a recommendation on the appropriateness of 2011 as the base year for forecasting operating expenditure in the 2013-17 period.

The 2011 year is the last in the 2008-12 access arrangement period for which a full year of actual operating expenditure is available. Currently data for 2012 is only a forecast. To reach a conclusion it is necessary to consider whether 2011 is a valid representative year. Due to the unusual expenditure restraint in the earlier years, those years are clearly not representative. Examination of actual expenditure in constant 2012 dollars over the 2008-12 period reveals relative stability in expenditure in the categories of Labour, Materials and Other. Outside Services exhibits an increase in 2011 over the preceding three years but as discussed earlier, this is largely attributable to short-term deferral of expenditure. It therefore reflects some ‘catch up’ element by comparison with those years. The 2011 OPEX is however at a similar level to 2007 in real terms. Moreover, the Corporate category is relatively stable between 2011 and the 2012 forecast.
A further check on the total operating expenditure in 2011 shows that it is very close to the level approved by the regulator when adjustment is made for fuel gas. This implies that prudency is reflected in the OPEX level for 2011.

## 6.4 Conclusions on 2008-2012 Operating Expenditure

One conclusion to be drawn from analysis of operating expenditure over the 2008-2012 period is that in aggregate ($132.0 m in 2012$), it was significantly below the level approved by the AER in its Final Decision ($157.5m in 2012$). However, when the distorting influence of fuel gas is removed from the comparison, the aggregate variance is reduced to only $10.7m over the period. 2011 expenditure was approximately $1m over the AER approved level for that year but that outcome followed three years when expenditure was less than approved levels. Moreover, forecast 2012 expenditure will approximately match the approved level despite the unforeseen rise in corporate overheads.

It is noteworthy that the Outside Services category shows an aggregate shortfall of $10.0m over the five year period compared to approved levels. This is concentrated in the first four years and peaked in 2009. Expenditure in this category is easier to curtail in the short-term.

In drawing conclusions about operating expenditure for the period it is more important to take the bigger picture into account. In that regard it is concluded that in the highly unusual operating environment APA GasNet's operating expenditure decisions reflected sound business practice. This comment is made notwithstanding that the deferral of some expenditure has now created a need to accelerate some activity in the short-term to catch up on tasks that if not carried out, are likely to adversely impact on the long term sustainability of the company's assets.

In the circumstances it is the conclusion of JP Kenny that APA GasNet's operating expenditure for the period 2008-2012 was conforming operating expenditure and in accordance with Rule 91, such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of operation.

It is further concluded that 2011 is an appropriate base year for forecasting operating expenditure for the period 2013-17.

# 7.0 FORECAST OPERATING EXPENDITURE: 2013 - 2017

## 7.1 Operations and Maintenance expenditure

### 7.1.1 Forecast Methodology

In order to generate its forecast Operations and Maintenance expenditure APA GasNet has adopted the following methodology:

- used 2011 as the base year;
- adjusted the base year as necessary;
- applied for step and scope changes; and
- applied a percentage trend factor.

### 7.1.2 Use of 2011 Base Year

JP Kenny accepts that 2011 is an appropriate base year on which to base forecast future O&M costs, noting that the benefit sharing allowance acts so as to provide an equal incentive on APA GasNet to make efficiency gains in each year, and no incentive to back-end costs. Moreover, the market provides a strong incentive to keep costs at the most efficient level consistent with sustainable operations as any inefficient costs would serve to reduce its profit. Not to do so detract from the APA Group's financial performance.

### 7.1.3 Calculation of base operating and maintenance costs

Consistent with the Fixed Principle, APA GasNet has made adjustments to base operating costs for changes in forecast costs between 2011 and 2012 by:

- adjusting labour costs by a relevant escalator;
- adjusting for step and scope changes.

### 7.1.4 Step Changes

A step change in O&M expenditure typically results from the introduction or removal of an obligation, or changes in the operating environment that are otherwise not controllable by the regulated business. Such changes are reasonable if the change in the upwards or downwards direction are expected to be permanent, whether annually or periodically.

Step changes to the 2011 operating and maintenance base year costs are summarised in Table 7.1 below and discussed in detail below.

**Table 7.1: Summary of Operations and Maintenance Step Changes ($k 2012)**

| Step Changes | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Environmental net gain obligations | 120 | 200 | 220 | 220 | 220 |
| Safety Management Studies | 180 | 180 | 180 | 180 | 180 |
| Maintenance of Hazardous Area Dossiers | 250 | 250 | 250 | 250 | 250 |
| Energy Safe Victoria levy rises | 28 | 61 | 61 | 61 | 61 |
| Increases in electricity costs | 30 | 62 | 98 | 137 | 181 |
| Carbon costs | 2,154 | 2,285 | 2,470 | 2,704 | 2,823 |
| Expanded apprenticeship program | 160 | 240 | 240 | 240 | 240 |
| Western District Depot | 80 | 80 | 80 | 80 | 80 |
| Gas Heating facilities | 200 | 200 | 100 | | |
| Line valve actuator overhauls | | 145 | 95 | 40 | 20 |
| Pressure vessel inspections | 50 | 25 | 40 | | 20 |
| Restoration of hard stand | 40 | 80 | 80 | 80 | 80 |
| Reset costs [1] | | | | 660 | 440 |
| **Total Step changes** | **3,290** | **3,806** | **3,914** | **4,652** | **4,595** |

Notes:

1. These only relate to reset costs for the next access arrangement period. Reset costs associated with the current access arrangement revision proposal are discussed below in relation to allowances.

*7.1.4.1 Environmental net gain obligations*

The Department of Sustainability and Environment and the Department of Primary Industries requires that where remnant native vegetation is impacted by a pipeline “operation”, a Net Gain Offset Management Plan must be developed and approved before pipeline construction activities can commence. APA GasNet must offset any removal of native vegetation undertaken in its pipeline operations by obtaining and protecting another piece of land to deliver a ‘net gain’ to protected native vegetation. This is generally achieved by purchasing or leasing land with native vegetation and ensuring that such land is protected by fences.

The native vegetation requirements apply to both greenfield pipeline routes and new pipelines within existing easements. It can also affect the operation of existing pipelines if significant ground disturbance is required for a maintenance purposes.

These obligations have developed after the commencement of the Pipelines Act in 2007 i.e. after APA GasNet’s previous access arrangement revision proposal was lodged and approved.

Net gain obligations incurred at Wollert, chiefly associated with rectification works have not been included in 2011 base year expenditure. There are similar obligations expected for the proposed Anglesea Pipeline extension. Ongoing management of this protected land also leads to costs not included in the base year. The annual cost of $120,000 for the Wollert Offset Management Plan is based on advice from APA’s environmental consultants. The increment of $80,000 to apply from

2014 is for an annual lease for native grasses. The cost assumed for the Anglesea Pipeline is modest at $20,000 per year from 2015.

Having regard to the additional requirements and their timing, step changes in O&M expenditure of $120,000 in 2013, rising to $200,000 in 2014 and $220,000 thereafter is assessed as reasonable. In accordance with Rule 91 it is concluded that the additional expenditure for environmental net gain obligations would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of delivering pipeline services.

*7.1.4.2 Safety Management Studies – monitoring and rectification*

AS 2885.3 has been reviewed since the start of the earlier access arrangement period and now includes new obligations associated with undertaking Safety Management Studies (SMS) and integrity reviews.

Pipeline SMS outcomes recently carried out have identified the need for increased inspections and vegetation management that are not currently included in the base year. Furthermore, future annual surveys will incur an additional cost to APA GasNet.

Aerial photography of the company's pipeline easements is now required on a more frequent basis to ensure safety management reviews can be more effectively carried out. Due to rapid development within the urban growth boundary, to meet obligations for SMS reviews, APA GasNet considers it will need to purchase aerial photography for affected pipelines every time a review takes place. Photography will show land developments within those areas in between system-wide aerial photography purchases. New aerial photography of the entire system every 10-15 years (or every 2-3 SMS reviews) is required to capture all changes to the easement and surrounding area for rural areas. VicMap property and planning datasets that are also used as a part of a SMS will also need to be purchased.

Facilities SMS recently carried out have identified the need to have up to date imagery of all facilities. A single additional aerial survey of all facilities will therefore need to be taken at additional cost prior to the SMS along with an annual roadside photography survey of each site.

Forecast costs associated with this step change of $180,000 per year are set out in Table 7.1 above. These are based on current costs of aerial photography carried out by Oberon Air.

In accordance with Rule 91 it is concluded that the additional expenditure for Safety Management Studies monitoring and rectification would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of delivering pipeline services.

*7.1.4.3 Maintenance of Hazardous Area Dossiers*

APA GasNet is required to ensure all the electrical equipment installed in hazardous areas is in a safe working condition and meets legal requirements to comply with all relevant standards. In particular, APA GasNet must demonstrate appropriate control measures are implemented and managed in accordance with AS60079 which is mandated through the Victoria Regulation 401 of the Electrical Safety (Installation) Regulation 1999.

The company advised that it had considered alternative ways to comply with its hazardous area obligations and has found that relying on an external inspection service (as opposed to employing more staff) is costly and inefficient. This is because:

- The external inspectors are not familiar with APA GasNet assets and operations and must be accompanied by an APA GasNet Permit Issuing Office on a full time basis to perform electrical isolation, provide site induction and issue permits to work.

- The external inspectors do not take on responsibility for preparatory work in identifying and obtaining copies of drawings and documentation necessary for the inspection verification process. The information collation and searching work must be performed by APA GasNet personnel.

- The external inspectors are not familiar with APA GasNet assets and the necessary knowledge of the AS60079 requirements to maintain and update the site Hazardous Area Verification Dossiers. The updating and maintenance of Hazardous Area Verification Dossier will have to be performed by an APA GasNet personnel or another short term contractor suitably trained.

APA GasNet has therefore decided that the most efficient way to meet its regulatory obligations in respect of hazardous area assessments is to appoint two additional staff to carry out this ongoing function. The first will be appointed in 2012 and the second in 2013.

Hence APA has proposed to use the staff member appointed in 2012 in the capital expenditure project Hazardous Area Rectification. From 2013 it proposes to use the two staff members in on ongoing maintenance role. This proposal is estimated to cost $250,000 per year from 2013 and is considered reasonable.

In accordance with Rule 91 it is concluded that the expenditure for Hazardous Area Dossiers Maintenance would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of delivering pipeline services.

#### *7.1.4.4 Energy Safe Victoria levies*

Energy Safe Victoria has notified APA GasNet that their levies will increase by 20 per cent each year from 2011 to 2013. The rationale for the increase is to recover the full costs of safety regulation from the regulated industry, such that the cost of safety regulation is ultimately borne by consumers (Reference [20]).

The first increase in levies applying to the 2011/12 financial year is partially reflected in the 2011 base year. The full increase for 2012 has been applied to the base year in accordance with clause 7.2(h)(ii) of the access arrangement. The remainder increase has been applied to 2013 (full year) and 2014 (half year levy increase).

APA GasNet has assumed that after these rises, Energy Safe Victoria will revert to CPI increases and therefore has not forecast further escalation of levy costs after 2014.

Forecast costs associated with this step change are set out in Table 7.1. This amounts to an increase of $27,500 in 2013 and a further $33,000 in 2014. The proposed step changes in O&M costs for increases in are assessed as reasonable. In accordance with Rule 91 it is concluded that the additional expenditure for Energy Safe Victoria levies would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of delivering pipeline services.

*7.1.4.5 Electricity costs*

APA GasNet incurs considerable electricity costs in operating its assets, in particular maintaining constant temperatures through air conditioning at stations with electrical and measurement equipment.

Electricity costs are expected to rise from in the forecast period in excess of CPI, both associated with increases in network and transmission charges, but also through the imposition of carbon pricing from July 2012.

APA GasNet has forecast its electricity cost increases based on movements in standing offer prices for Victorian customers over the past three years. On average, these movements have been greater than 10 per cent (Reference [21]). APA GasNet anticipates price rises of similar magnitude will continue into the future, particularly after the Commonwealth's Government's carbon pricing scheme commences. APA GasNet has therefore applied a 10 per cent nominal annual price rise to its electricity costs for the forecast period.

Forecast costs associated with this step change are set out in Table 7.1.

The assumption of continuing electricity price rises is consistent with most views of the market although quantifying the rises is necessarily speculative. Nevertheless, an objective of the scheme is to induce behavioural change towards reduction of usage. Major investment in electricity distribution infrastructure has been the major driver of price increases in recent times. As this is to overcome a prolonged lack of sufficient replacement of ageing infrastructure, further investment over the next few years also seems likely. It is considered that APA is more likely to have been more proactive in reducing energy consumption where it can because it is better informed in this area than most companies. Having regard to all of these factors, it is not possible to suggest that the assumption of a continuing 10% per annum rise in electricity costs is not reasonable.

In accordance with Rule 91 it is concluded that the additional expenditure for electricity price increases would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of delivering pipeline services.

*7.1.4.6 Direct carbon costs*

The Clean Energy Act 2011 introduces a carbon trading scheme in Australia designed to impose a price on carbon emissions from 1 July 2012. Substantive provisions of this Act particularly sections 3 to 303, take effect on 2 April 2012. The first three years of the carbon pricing scheme has a fixed price path after which the price will float. Under the floating price period the price path forecasted by the Australian Treasury is the price path required to meet the emission reduction target of 5 per cent by 2020 on 2000 emission levels.

APA GasNet and AEMO have jointly sought a declaration from the Greenhouse Energy Data Officer as to which entity has operational control over the VTS and therefore liability under the carbon pricing scheme (Reference [13]).

If the obligation is not deemed to apply to APA GasNet, forecast costs associated with this step will need to be removed from the step changes set out in Table 7.1. JP Kenny notes that the AER recently decided that Multinet was entitled to a pass-through on direct carbon costs (Reference [22]) associated with the introduction of carbon pricing.

*7.1.4.7 Expanded apprenticeship program*

APA reports that since the start of the earlier access arrangement period, problems with skills shortages and an ageing workforce have increased. This is consistent with the experience of other companies in the gas industry which has resulted in initiatives taken on an industry-wide basis to address the issue.

The company plans to continue its successful apprenticeship program by increasing its intake to four full-time apprentices in electrical and mechanical trades. Currently there are two full-time apprentices and two part-time. All current apprentices will have completed their indenture period in the current access arrangement period, with three now in their final year.

Costs associated with the additional apprentices represent a step change to current labour costs as the current apprentices are already included in base year costs and are expected to remain with APA GasNet in the forecast period but will move on to tradesmen's wages.

Forecast costs associated with this step change are set out in Table 7.1. These costs, amounting to $160,000 in 2013 and $240,000 thereafter are assessed as reasonable.

In accordance with Rule 91 it is concluded that the additional expenditure for the expanded apprentice program would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of delivering pipeline services.

*7.1.4.8 Western District Depot*

A new depot is proposed to be set up in Warrnambool Western Victoria to accommodate existing workers in the region.

APA GasNet's three staff based in the Warrnambool area that currently work from individual home offices. The company proposes establishing a Western Victoria regional base from which the technicians would work. This will also allow for deliveries and storage of APA GasNet plant and equipment within the town rather than having deliveries being made to private homes. Damage to driveways from delivery trucks has already occurred. APA also considers it more appropriate to have the necessary audits under occupational health and safety legislation conducted at the new premises rather than private homes.

Advice from a local agent is that premises equipped with suitable storage and parking is likely to cost $35,000 to $45,000 per annum. Initial infrastructure costs are estimated at $5,000. Additional annual operating costs are expected to be as follows:

- telecommunications - $[redacted]
- APA IT network access - $[redacted];
- electricity - $[redacted];
- cleaning - $[redacted];
- HSE management - $[redacted]; and
- staff amenities - $[redacted].

APA's proposal is assessed as reasonable with a step change in operating costs of $70,000 to $80,000. In accordance with Rule 91 it is concluded that the additional expenditure for the Warrnambool District Depot would be incurred by a prudent service provider acting efficiently, in

accordance with accepted good industry practice, to achieve the lowest sustainable cost of delivering pipeline services.

#### *7.1.4.9 New gas heating facilities*

During the earlier access arrangement period, APA GasNet installed four new water bath heaters at Brooklyn City Gate and one at Wollert City Gate.). Over the forecast period, these new heaters will each be scheduled for first internal inspection as part of APA GasNet's regulatory obligations. These costs are therefore not included in the 2011 base year.

Water bath heaters are used to heat high pressure gas prior to pressure reduction to ensure safe minimum operating temperatures. They must be routinely inspected in accordance with APA policy OPS 509 and the requirements of AS1210. The heat exchanger tube bundles are removed and inspected, and any necessary repairs are undertaken.

Forecast costs associated with this scope change are set out in Table 7.2. The estimated costs are based on the cost of undertaking such inspections for similar heaters in the VTS. They amount to $200,000 in 2013 and 2014 and $100,000 in 2015 and are assessed as reasonable.

In accordance with Rule 91 it is concluded that the additional operating expenditure for the water bath heater internal inspections would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of delivering pipeline services.

#### *7.1.4.10 Restoration of Hard Stand*

Hard stand is the crushed rock surface used at stations and facilities. The deterioration that occurs in the hard stand over time is inevitable. Movement of vehicles and other activities on site such as dig-ups have an impact as does the growth of weeds and other vegetation.

APA GasNet has identified the need to reinstate the hard stand at a number of sites during the access arrangement period to ensure that they are suitable for the longer term. Low spots, typically due to subsidence or heavy vehicle traffic are proposed to be filled in and repaired.

In addition to the large sites at Gooding and Brooklyn Compressor Stations, a further 33 sites have been identified where hard stand replacement will be required over the next few years. These comprise mostly city gates throughout the state as well as a number of line valve sites. On that basis the company has estimated that an average of $80,000 per year will be required, based on an average of 4 sites per year.

Relevant costs to consider for this work are say, $800 per truckload of material, a truck hire rate of $150/ hour, backhoe hire of $100/hour, equipment float hire of $150/hour and additional labour of $65/hour. In addition, local tip fees will need to be paid for waste material.

Having regard to the size and location of the sites involved, the costs estimated by APA GasNet are considered reasonable.

#### *7.1.4.11 Line valve actuator overhauls*

APA GasNet advises that it will be required to overhaul line valve actuators on the following pipelines and facilities in the forecast period:

- Longford to Dandenong Pipeline;

- Pakenham to Wollert Pipeline and Wollert Actuated station valves;
- Murray River to Culcairn Pipeline; and
- Iona to Lara Pipeline

Valve actuators on these pipelines have gas-over-oil actuators. They have soft-seated components at the interface between the driving mediums which occasionally require dismantling and a replacement of many of these components, followed by rebuilding of the actuators to ensure they are reliable. While this work is a maintenance task, it is also a major rebuilding task and can be expected only at intervals of around 20 years. The estimated costs are assessed as reasonable.

*7.1.4.12 Pressure vessel inspections*

Registered pressure vessels must be inspected on a routine basis to ensure they are fit for purpose. This inspection is usually carried out by an independent party to ensure compliance with the applicable code. Inspections check for corrosion, that appropriately rated components are attached to the vessels and where appropriate, checking for cracking within the material.

JP Kenny considers that this work would cost around $1,200 per day and therefore that the cost estimated by APA is reasonable.

*7.1.4.13 Reset Costs*

These relate to estimated costs for the 2013-2017 access arrangement period. They have not been subject to this review and are included in the table only for completeness.

*7.1.4.14 Conclusion on Step Changes*

The costs estimated by APA for the step changes outlined in this section have been assessed as reasonable.

In accordance with Rule 91 it is concluded that the additional operating expenditure for the step changes discussed in this section would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of delivering pipeline services.

### 7.1.5 Scope Changes

A scope change in operations and maintenance expenditure typically results from the addition or removal of assets to the regulated capital base.

Scope changes to the 2011 operating and maintenance base year costs are summarised in Table 7.2 below and discussed in detail in the following sections.

**Table 7.2: Summary of Operations and Maintenance Scope Changes ($k 2012)**

| Step Changes | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Compressor Stations | 453 | 752 | 1,051 | 1,051 | 1,051 |
| Pipelines | 191 | 225 | 722 | 764 | 764 |
| **Total Scope changes** | **644** | **977** | **1,773** | **1,815** | **1,815** |

*7.1.5.1 New Compressor stations*

Operating expenditure associated with two new compressor stations to be commissioned after the 2011 base year must be added to the operating and maintenance base year.

The Euroa Compressor Station is expected to be commissioned in 2012. The Stonehaven Compressor Station is expected to be commissioned in 2015. In addition, a new compressor unit is forecast to be required at the existing station at Wollert from 2014. Each of the new sites is reasonably distant from the Melbourne metropolitan area, so the travel time will impact on operating costs. The company has made allowance for site attendance by a technician two days per week as well as three technicians for a five day site visit for each 4,000 hour service on the gas turbine. The travel and accommodation costs are therefore estimated at $16,000 per site per year.

APA Gasnet provided detailed spreadsheet setting out the itemised costs underlying the cost estimate for this item and these costs were reviewed in detail (Reference [23]).

Based on an estimated equivalent running time of 6,000 hours per year, an annual allowance of $68,000 per unit has been made for engine overhaul and $60,000 for seals replacement. These items usually occur at 40,000 hour intervals so the annual allowance is the relevant proportion of the current major overhaul cost.

The annual allowance made for replacement electrical and mechanical parts and fittings, including instrumentation is $20,000 per station. The same amount was assumed for communications and SCADA. Electricity costs are estimated at $80,000 p.a. per station. These costs are understood by JP Kenny to be based on APA GasNet costs for existing stations. Solar field support is estimated at $13,500 p.a. per station. Other items included in the estimate are fuel and servicing of the DEA ($4,000 p.a), maintenance of fire suppression system, grounds, fire extinguishers, air conditioning and cleaning.

In aggregate the operating costs for the new stations are estimated by APA to be $328,000 per station per year.

For the new unit at Wollert the aggregate annual increment is costs is estimated at $230,000. The lower cost compared to the new stations arises from the fact that the infrastructure is already in place and it is also close to the metropolitan area. A further $40,000 per year was estimated for the maintenance of the Wollert pressure limiter.

These estimates are comparable with costs associated with similarly configured compressor stations and are therefore assessed as reasonable.

The incremental labour requirement generated by the two new stations is estimated by APA to be equivalent to an additional field worker, estimated at $125,000 per annum. This is assessed as reasonable.

Forecast costs associated with this scope change are set out in Table 7.2.

In accordance with Rule 91 it is concluded that the additional expenditure for the two new compressor stations would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of delivering pipeline services.

*7.1.5.2 New pipelines*

The following new pipelines are scheduled to be commissioned after 2011:

- Sunbury loop (Rockbank to Plumpton) – 2012;
- Remainder of Western Outer Ring Main – 2015;
- Kalkallo lateral from the Western Outer Ring Main – 2015;
- Warragul looping – 2015;
- Northern looping – 2015; and
- Anglesea Pipeline extension – 2016.

Forecast costs associated with this scope change are set out in Table 7.2. APA provided a breakdown of estimated additional costs attributed to each of these pipelines as set out in Table 7.3

**Table 7.3: Summary of new pipeline operating costs ($k 2012)**

| Items | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Sunbury loop | 66.5 | 66.5 | 66.5 | 66.5 | |
| Remainder of Western Outer Ring Main | | | 185 | 185 | 185 |
| Kalkallo lateral | | 15.7 | 31.2 | 31.2 | 31.2 |
| Warragul looping | | 13 | 26 | 26 | 26 |
| Northern looping | | | 235 | 235 | 235 |
| Anglesea Pipeline | | | 26.3 | 52.6 | 52.6 |
| Additional field staff | 125 | 125 | 125 | 125 | 125 |
| **Total** | **191** | **225** | **722** | **764** | **764** |

The estimate that one additional staff member is required for the additional workload is considered reasonable as is the estimated additional annual cost of $125,000. It is noted that the cost per kilometre of this additional component will reduce over the five year access arrangement period as more new pipeline easement is included.

Gas transmission industry practice is to capitalise the initial incremental costs associated with site restoration work on new pipelines, typically two to three years after construction. The first few years of operation tend to be more labour intensive as vegetation on the easement is re-established. The easement can also be more prone to washouts following heavy rain during the early years.

The incremental cost of the new pipeline scope changes will amount to around $4,000 per kilometre per year. The use of benchmarking for assessment of operating costs for the VTS is fraught with difficulty because the VTS is a unique system in Australia (and in any case, benchmarking with overseas pipeline systems introduces other comparison issues). Unlike most

other transmission systems in Australia, the VTS is mostly not in remote areas. Much of it is in urban or semi-urban areas where patrolling needs to be more frequent. Travel to sites in Victoria involves less remote area driving but relatively more driving on roads with more traffic so that times to reach sites vary. Another factor to consider is that relatively short additional lengths of pipeline introduce more valve sites and offtake sites per kilometre on average. Each new site adds additional mechanical and electrical maintenance workload.

APA Gasnet provided detailed spreadsheet setting out the itemised costs underlying the cost estimate for this item and these costs were reviewed in detail (Reference [23]).

The following items were allowed for in the detailed estimates: monthly aerial patrol, quarterly road patrol, monthly CP inspection, biannual CP survey, annual calibrations of CP equipment, easement maintenance, landowner and community liaison, scraper and line valve checks, valve actuator overhauls, pressure vessel inspection, meter and regulator station quarterly inspections (where relevant), annual maintenance of regulators and an annual allowance for the additional operations labour required for a pigging run (which will normally be conducted every 10 years).

Having regard to the known operating costs of comparable pipelines and taking locational factors into account, the estimated additional operating costs for these new pipelines are assessed as individually reasonable and therefore reasonable in aggregate.

In accordance with Rule 91 it is concluded that the additional expenditure for the new pipelines would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of delivering pipeline services.

### 7.1.6 Percentage Trend Factor

Clause 7.2(h)(iv) of the earlier access arrangement makes provision for incorporation of a percentage trend factor.

APA GasNet's operating costs in the earlier access arrangement period have been fairly stable but underlying labour costs as reflected in the labour, outside services and corporate subcategories, has been trending upwards. This is to be expected due to the significant labour pressures currently facing the energy industry as it competes for skilled labour with the resources sector.

To reflect this trend in the base year, APA GasNet has applied a labour escalation factor to the base year from 2011, as discussed below.

### 7.1.7 Real Cost escalation

To calculate the forecast operating costs over the 2013 – 2017 access arrangement period, actual costs for the base year were escalated annually using productivity-adjusted real Average Weekly Ordinary Time Earnings (AWOTE) escalators. Relevant escalators applied to the following labour groups were as follows:

- Electricity, Gas and Water (EGW); Gas Network Related, Real Adjusted Productivity EGW Average Weekly Ordinary Time Earnings (AWOTE) – Victoria; and

- General Labour (made up of administrative and professional services): Real Adjusted Productivity Weighted Index AWOTE – Victoria.

APA provided a spreadsheet setting out the escalation process. The methodology adopted by APA is considered reasonable. JP Kenny considers the use of AWOTE for escalation of labour costs to be more valid than the Labour price Index (LPI). The LPI measures only pure price changes and changes in skill level of employees are not reflected. Higher skill levels give rise to promotion and higher pay. Because AWOTE reflects this aspect it is considered a more appropriate escalator for the purpose.

## 7.2 Other allowances

### 7.2.1 Self-insurance

As insurance arrangements have changed with APA GasNet as part of the APA Group, there is no self-insurance allowance in forecast operating costs.

## 7.3 Summary of operating expenditure

Components making up APA GasNet's forecast operating expenditure are set out in Table 7.4 below.

**Table 7.4: Components of forecast operating expenditure ($k 2012)**

| Category | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|
| Labour | 10,527 | 11,704 | 12,789 | 13,648 | 13,420 |
| Materials | 446 | 446 | 446 | 446 | 446 |
| Outside services | 4,734 | 5,320 | 6,010 | 6,296 | 6,457 |
| Fuel Gas | - | - | - | - | - |
| Other | 6,824 | 6,872 | 6,792 | 6,702 | 6,700 |
| Corporate | 10,046 | 10,812 | 11,353 | 11,470 | 11,541 |
| **Total** | **32,577** | **35,154** | **37,390** | **38,562** | **38,564** |

In summary, the operating costs for the forecast period have been reviewed and have been found to be reasonable.

In accordance with Rule 91 it is concluded that the forecast operating expenditure for would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of delivering pipeline services.

## 8.0 CAPACITY TO ACHIEVE FORECAST CAPITAL EXPENDITURE

In view of the deferral of a large number of capital projects due to the GFC, APA GasNet now faces an ambitious program of capital works. There is now a program of significant new projects combined with normal stay-in-business projects as well as catching up on deferred stay-in-business projects.

This raises the question of whether the company has the capacity to carry out that ambitious program. The question was put to the company in the process of assessing its CAPEX program. Upon request the company provided data which provided support to its belief that it has the necessary capacity. Scrutiny of this data and discussions with company managers provides could not identify any likely deficiency in that regard. A benefit of having large resources is that APA can combine its in-house expertise with contracted resources to achieve greater output as required.

## 9.0 REFERENCES

[1] ACCC, "*Draft Decision*", 2008.

[2] VENCorp, "Annual Planning Report Victoria 2009", p167.

[3] APA GasNet, "*letter",*27 March 2006",

[4] APA GasNet, "*Spreadsheet*"

[5] APA GasNet, "Email from W. Holden to A. Burt", 20 February 2012

[6] Australian Standards, "AS 3814-2009: *Industrial and commercial gas-fired appliances*", 2009.

[7] APA GasNet, "VTS NPV Analysis – Warragul",

[8] APA GasNet, "VTS NPV Analysis – Kalkallo",

[9] VENCorp, "*Vision 2030 Update", VENCORP 2009*", Section 4.5.3, Figures 73 and 74.

[10] APA GasNet, "VTS NPV Analysis Culcairn 45TJ",

[11] National Gas Rules, Schedule 1, Rule 5(1)(b)

[12] Australian Energy Regulator, "Decision Multinet change in taxes event pass-through application", March 2012.

[13] APA Group and Australian Energy Market Operator 2009, "*Letter to Greenhouse Energy and Data Office*", 24 September

[14] KPMG, "*Changes to corporate business costs since 2006*", March 2012

[15] Australian Energy Regulator, "*State of the Energy Market"*, p 114

[16] ACCC, "Final Approval", p 9

[17] ACCC, "Final Decision", p 84

[18] Australian Standards, "AS 2885.1-2007: *Pipeline – gas and liquid petroleum. Part 1: design and construction*", 2007.

[19] Australian Standards, "AS 2885.3-2001: *Pipeline – gas and liquid petroleum. Part 3: operations and maintenance*", 2001.

[20] Energy Safe Victoria, "*Letter to APA GasNet*",15 June 2011

[21] Australian Energy Regulator, "*State of the Energy Market – 2011"*, p 114

[22] Australian Energy Regulator, "Decision Multinet change in taxes event pass-through application", March 2012

[23] APA GasNet, “Step and scope changes costings” and “AA VIC OM Step Changes revised as per current step changes”, 23 March 2012.

[24] Australian Standards, “AS 3814-2009: *Industrial and commercial gas-fired appliances*”, 2009.

# Appendix A:

# Expert Consultant Terms of Reference

## Engineering review of Victorian Transmission System capital and operating expenditure

## Scope of consultancy

## 14 December 2011

### Overview of consultancy

APA Group seeks the services of a suitably qualified consultant to conduct an independent review and assessment of APA GasNet's capital and operating expenditure for the Victorian Transmission System (VTS), and provide advice on whether capital and operating expenditure is prudent and efficient as required under the National Gas Rules (Rules).

### Background

APA GasNet is owns and operates the VTS. Parts of the VTS are regulated under the National Gas Law and Rules and under those rules APA GasNet must submit revisions to its access arrangement to the Australian Energy Regulator (AER) by 31 March 2012. These revisions must include:

- Information and justification for capital expenditure undertaken in the previous access arrangement period (2008-2012)
- Information and justification of expenditure forecast for the upcoming access arrangement period (1 January 2013 – 30 December 2017);
- Details of operating expenditure in the previous access arrangement period, in particular the efficiency of the 2011 base year for forecast operating expenditure; and
- Forecast operating expenditure for the upcoming access arrangement period, derived using the base year methodology.

In order to be approved by the AER, the AER must conclude that the expenditure is consistent with the relevant provisions of the Rules (discussed below).

### Scope of consultancy

The expert consultant will review APA GasNet's capital and operating expenditure, as well as associated planning documents and procedures, and form a view as to whether each part of that expenditure meets the requirements under the Rules. The expert consultant will prepare a report, suitable for submission to the AER by APA GasNet with its access arrangement proposal, setting out the expert consultant's advice and opinion as to whether expenditure meets the requirements under the Rules.
The expert consultant should assess whether the cost of services is reasonable based on benchmarking against industry practices, and with consideration of the following:

- Asset condition;
- Technical risks;
- Commercial risks;
- Technical compliance; and
- Specifics of asset location.

**Compliance with governing rules**

It is expected that the expert consultant will place a particular focus on APA GasNet's expenditure compliance with National Gas Rules.

In respect to past and forecast capital expenditure, the expert consultant report should comment on whether capital and operating expenditure meet the definition of Conforming Capital Expenditure as per Rule 79:

***Rule 79 New capital expenditure criteria***

*(1) Conforming capital expenditure is capital expenditure that conforms with the following criteria:*

*(a) the capital expenditure must be such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services;*

*(b) the capital expenditure must be justifiable on a ground stated in subrule (2).*

*(2) Capital expenditure is justifiable if:*

*(a) the overall economic value of the expenditure is positive; or*

*(b) the present value of the expected incremental revenue to be generated as a result of the expenditure exceeds the present value of the capital expenditure; or*

*(c) the capital expenditure is necessary:*

*(i) to maintain and improve the safety of services; or*

*(ii) to maintain the integrity of services; or*

*(iii) to comply with a regulatory obligation or requirement; or*

*(iv) to maintain the service provider's capacity to meet levels of demand for services existing at the time the capital expenditure is incurred (as distinct from projected demand that is dependent on an expansion of pipeline capacity); or*

*(d) the capital expenditure is an aggregate amount divisible into 2parts, one referable to incremental services and the other referable to a purpose referred to in paragraph (c), and the former is justifiable under paragraph (b) and the latter under paragraph (c).*

*(3) In deciding whether the overall economic value of capital expenditure is positive, consideration is to be given only to economic value directly accruing to the service provider, gas producers, users and end users.*

*(4) In determining the present value of expected incremental revenue:*

*(a) a tariff will be assumed for incremental services based on (or extrapolated from) prevailing reference tariffs or an estimate of the reference tariffs that would have been set for comparable services if those services had been reference services; and*

*(b) incremental revenue will be taken to be the gross revenue to be derived from the incremental services less incremental operating expenditure for the incremental services; and*

*(c) a discount rate is to be used equal to the rate of return implicit in the reference tariff.*

*(5) If capital expenditure made during an access arrangement period conforms, in part, with the criteria laid down in this rule, the capital expenditure is, to that extent, to be regarded as conforming capital expenditure.*

In respect to past and forecast operating expenditure the finding should comment on whether these investments meet the rules of prudent service provider Rule 91:

***Rule 91 Criteria governing operating expenditure***

*(1) Operating expenditure must be such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of delivering pipeline services.*

In the assessment, the expert consultant should apply the following understanding when reporting their finding:

*Prudent,* in the ordinary sense, means "discreet or cautious in managing one's activities; practical and careful in providing for the future & exercising good judgments';

*Efficient*, in the ordinary sense of the word is "functional or producing effectively and with least waste of effort". For the purpose of this review, a test of efficiency requires an assessment of operating and maintenance and capital expenditure from the prudent perspective over the life cycle of the assets. It is expected that the expert consultant will review the Planning Procedures, Asset Management Life Cycle Policies, Project Management and Procurement Practices.

**Information input for assessment**
APA GasNet will provide the expert consultant all available relevant business data, including the following:

- Asset Management Planning Reports;
- Project Reports;
- Business Cases;
- Asset Performance Reports;
- Actual and Projected Capital and Operating Expenditure; and
- Contract Tendering Documentation.

The expert consultant will have access to interview APA GasNet staff to overcome any information or data gaps and to gain a thorough understanding of asset management systems, asset condition, asset performance, service standards and the long term management planning procedures.
The expert consultant is invited to challenge current APA GasNet systems and procedures with the aim to promote future improvement where practical.

Not withstanding the above, the expert consultant is welcome to suggest amendments to the proposed methodology in order to achieve more informed and constructive outcomes from this consultant project.

**Deliverables**
The expert consultant is expected to produce a Report and be able to present the findings of the Report to APA GasNet management. The Report will summarise the findings of the expert consultant's assessment in respect to:

1. the prudency and efficiency of capital expenditure for the period 1 January 2008 to 31 December 2012 in the context of Rule 79;

2. the appropriateness of APA GasNet's capital and operating planning processes and practices, in particular the scope for those processes to give rise to efficient and prudent capital and operating plans;

3. the efficiency and prudency of estimates of capital expenditure for the period from 1 January 2013 to 31 December 2017 in the context of Rule 79;

4. the prudency and efficiency of APA GasNet's 2011 operating expenditure (the operating expenditure forecast base year) in the context of Rule 91, including the appropriateness of any adjustments applied to that base year for the purpose of preparing forecast operating expenditure;

5. the efficiency and prudency of proposed forecast step and scope changes to be applied to the 2011 operating expenditure base year in the context of Rule 91; and

6. benchmarking of the APA GasNet business against readily available key performance indices from other gas transmission businesses.

The expert consultant will be expected to deliver a draft report to APA GasNet by mid January 2012, and a Final Report in the first week of March 2012 (dates to be finalised).

**Guidelines in preparing expert report**
The consultancy report must be prepared in accordance with the Guidelines for Expert Witnesses in the Federal Court of Australia.

Although this brief is not in the context of litigation, APA GasNet is seeking a rigorously prepared independent view for use in the context of regulatory decision making and you are requested to follow the Guidelines to the extent reasonably possible in this context.

In particular, within your report you are requested to:

- identify all persons contributing to the report, their relevant area of expertise and provide a curriculum vitae for each person setting out the details of their expertise (to be attached to your report);

- clearly set out the scope of matters which you have been asked to address (please attach this terms of reference letter to your report);

- only address matters that are within your expertise;

- where you have used factual or data inputs please identify those inputs and the sources;

- if you make assumptions, please identify them as such and confirm that they are in your opinion reasonable assumptions to make;

- if you undertake empirical work, please identify and explain the methods used by you in a manner that is accessible to a person not expert in your field;
- confirm that you have made all the inquiries that you believe are desirable and appropriate and that no matters of significance that you regard as relevant have, to your knowledge, been withheld from your report; and
- please do not provide legal advocacy or argument and please do not use an argumentative tone.

# Appendix B:
# Curriculum Vitaes

# Curriculum Vitae

Experience that Delivers

**Name:** Christopher John Carter **Born: 1965**

**Nationality:** Australian

**Qualifications:**

B.E. (Civil/Structural), Honours Class I, Wollongong University, 1988
Contract Management, Engineering Education Australia, 2000
Asset Management, Engineering Education Australia, 2004

**Professional Memberships:**

Graduate Member of Institute of Engineers, Australia

**Experience Summary:**

Chris has over 20 years experience in the design, construction and integrity management of oil and gas related facilities in Australia, South East Asia, Saudi Arabia and the North Sea. His responsibilities have included all aspects of conceptual, detail and installation engineering, cost estimating and construction of onshore/offshore pipelines as well as the design of associated facilities and subsea structures.

In more recent years, he has gained extensive experience in Asset Integrity Management and Engineering activities including system reviews, implementation of pipeline risk based integrity management systems, risk assessments, re-lifing & remedial engineering tasks and project management of inspection, maintenance and repair activities.

**Key Projects Summary:**

- **Project Manager Manifa Offshore Crude Gathering and Water Injection System – Indonesia / Saudi Arabia**
- **Project Manager Kikeh Gas Export Pipeline – Malaysia**
- **Project Manager Development of Pipeline Integrity Management System – Malaysia**
- **Engineering Manager Bream Gas Export Pipeline Project - Australia**
- **Lead Engineer/Project Engineer Åsgard Field Development – Norway**
- **Onshore Pipeline Design Engineer Saudi Strategic Storage and Pipeline System Project – Saudi Arabia**

**Work Experience:**

**J P KENNY AUSTRALIA PTY LTD (MARCH 2011 – ONGOING)**

**Pipelines Manager**

Responsible for all onshore and offshore pipeline engineering projects and business executed from JP Kenny Melbourne office.

**J P KENNY NORGE AS (JULY 2009 – MARCH 2011)**

**Project Manager**

**ConocoPhillips Norge:** Project Manager responsible for the Conceptual and FEED phases and subsequent award of Detail engineering phase of the Eldfisk II and 2/4V-B Subsea Water Injection System projects. Project includes multiple pipeline sizes and material requirements, multiple wye tie-in structures together with power cable and umbilical design.

**Marathon Oil:** Project Manager for all engineering support work provided to Marathon Oil for the Alvheim FPSO and subsea system facilities. Work included spool design and verification, third party tie-in designs and flow assurance analysis for future tie-ins.

**Marathon Oil:** Project Manager for Marihone Concept engineering studies. Work consisted of steady state and transient flow assurance for a 30km tie-back and Pipe-in-Pipe technical-economic evaluation for U-value concepts ranging from 0.5 to 2W/$m^2$K.

**SELF EMPLOYED, NSW AUSTRALIA (2004 – JUNE 2009)**

**Principal Pipeline Engineer**

Providing engineering services to owners, operators and contractors associated with offshore/onshore pipelines and related assets. Clients have included:

**Wood Group Indonesia (2008):** Project Manager for the Detail Engineering of the Manifa Offshore Crude Gathering and Water Injection Pipelines, Power Cables and Fibre Optic Cables associated with the 900,000 bbl/day Manifa development located offshore Saudi Arabia. Scope included the detail design of 42" to 12" high temperature/pressure pipelines in shallow water, HDD shore crossings, subsea valve skid structures and riser tie-in structures. Also included was the preparation of specifications, RFQ packages and bid evaluations for all mechanicals items and subsea cables.

**Alinta Asset Management (2007 – 2008):** Provision of specialist pipeline engineering support services, including:

- Preparation of pipeline quantitative risk assessments;
- Preparation of Pipeline Management Studies and Demonstration of ALARP (As Low as practically Possible) Studies.

**J P Kenny Malaysia (2007):** Project Manager for the Detail Engineering of the Kikeh Gas Export Pipeline, Malaysia's first deepwater development located in 1400m water depth, offshore Sabah, East Malaysia. Scope of detail design included all aspects of the 140km 12" export pipeline from Kikeh field to Labuan gas terminal, the deepwater manifold structure and associated tie-ins as well as preparation of procurement and installation specifications.

**J P Kenny Brisbane (2006):** Project Manager for Conceptual and Detail Engineering Phase of 500km 16" Gove Subsea Pipeline Project (QLD to NT), a location subjected to severe cyclonic conditions. Key engineering activities included dynamic FE stability analysis and trawl impact analysis.

**Agility Management (2004 - 2006):** Responsibilities encompassing the asset management of gas network assets owned by Australia Pipeline Trust (APT), AGL Gas Networks and ACTEW (over 20,000km of onshore gas pipelines and associated facilities) throughout Australia. Specific responsibilities have included:

- Development of probabilistic based condition assessments for high pressure gas pipelines subject to stress corrosion cracking;
- Development of risk assessment methodology in compliance with AS2885.1;
- Preparation of condition and risk assessments for over 2,500km of high pressure gas pipelines throughout NSW;
- Engineering design of specialised remedial works and new projects.

**J P Kenny Melbourne (2004 - 2008):** Provision of specialist offshore engineering, including:

- Technical audit of Papua New Guinea Gas Development Offshore Pipeline conceptual design;
- Preparation of construction procedures for subsea pipelines, risers, tie-in spools and subsea well facilities for the Esso Kipper Subsea Development;
- Spans rectification design for Duke Energy International, Tasmania Gas Pipeline, and Bass Strait. Specific work included evaluation and recommendation of rectification methods and development of rectification program.
- Preparation of Pipeline Management Plans.

## J P KENNY / WOOD GROUP SDN BHD / IONIK CONSULTING, MALAYSIA (2001 – 2003).

**Asset Integrity Manager**

Responsible for business development and project execution of all Asset Management and Engineering activities in the Malaysian region. Responsible for the award and successful execution of over A$3M asset engineering consulting work. Selected projects include the following:

**Petronas Reseach and Scientific Services Sdn Bhd:** Project Manager for Development of Pipeline Integrity Management System for Petronas Carigali Sdn Bhd (PCSB), Malaysia's primary oil & gas operator. Work included the review of the existing integrity management system, followed on by the development of a complete suite of risk based integrity management documentation, including managerial and technical guidelines and the implementation and integration of an information control and data management system.

**Petronas Dagangan Bhd:** Project Manager for Kuala Lumpur International Airport fuel hydrant system impressed current cathodic protection system site survey and detail design.

**Petronas Carigali Sdn Bhd:** Project Manager for the pipeline condition assessment and risk based inspection planning of the PCSB Sarawak Pipeline Network, totalling 180 pipelines. Condition assessment accounted for internal and external corrosion, freespaning and lateral movements.

**Cabot (Malaysia) Sdn Bhd:** Asset Integrity Manager responsible for providing total asset management services for their oil offloading system and onshore facilities. Specific responsibilities included system reviews, preparation of Integrity Management Strategies, project management of repair works, preparation of IMR budgets, risk based inspection plans, remedial engineering and management of all operational pigging and in-line inspection works.

**BP Indonesia:** Asset Manager for engineering tasks associated with the Offshore North West Java Field. Activities include engineering assessments and development of inspection plans for Single Buoy Moorings and pipeline/riser evaluations due to field subsidence effect.

## GCI – J P KENNY, MELBOURNE, AUSTRALIA (2001)

**Engineering Team Leader**

**Esso Australia Ltd:** Engineering Team Leader for Bream A to Shore Gas Pipeline design. Responsible for all preliminary/detail engineering for the project which included a 46km 14" offshore pipeline, riser, platform modifications, SSIV structure, Horizontal Directional Drilled shore crossing and pipeline management plans.

## J P KENNY PERTH, AUSTRALIA (1999 – 2001)

**Project Manager – Asset Management Group**

Specific tasks include management of inspection works, development of inspection plans, pipeline and structure re-lifing and engineering assessments and decommissioning studies for various clients within Australia and SEA. Selected projects include the following:

**Cabot (Malaysia) Sdn Bhd:** Project Manager for offshore pipeline and onshore facilities remedial works including offshore trenching, installation of scour prevention measures, onshore slope stabilisation and tank repairs. Project management responsibilities included all aspects of SOW definition, cost estimation, tendering, contract negotiations and contract management.

**Chevron Australia:** Project Manager responsible for fitness for purpose assessments of a corroded pipeline system and definition of repair/rejuvenation methods. Scope of Work included definition of remaining life, technical evaluation of repair/rejuvenation alternatives and preparation of cost estimates.

**Apache Energy Pty Ltd:** Project Manager for various asset engineering activities including rationalization of inspection plans, development of RBI plans and engineering assessments.

**J P KENNY NORGE A/S, STAVANGER, NORWAY (1993 – 1999)**

**Manager / Engineer**

**Statoil – Secondment to Åsgard Field Development Project Team (1996 – 1999)**:

Seabed Intervention Works Manager (Sept 1997 – 1999). A member of the Åsgard Subsea project team, with overall responsibility for contracts, construction engineering and offshore construction work related to the flowline and umbilical trenching, graveldumping and pre-sweeping. Responsible for contracts with total value in excess of A$50M.

Senior Flowlines Engineer (1996 – 1997). A member of the Åsgard Subsea project team, reporting to the Engineering Manager, providing engineering support to the project. Direct responsibilities and tasks included preparation of material purchase orders, management of route surveys, control of interface between engineering contractor and flowline installation contractor and management of verification activities.

**J P KENNY A/S (1993 - 1996)**

**Senior / Project Engineer**

Responsible for numerous pipeline and subsea structure design projects. Key projects were:

**Statoil:** Project Engineer. Responsible for conceptual engineering of Åsgard Infield flowlines involving approximately 30 flowlines with a total length approx. 300 km and ranging in size from 10" to 26". Flowline design conditions are characterised by high temperatures and pressure ($140^0$C, 500 bara), corrosion resistant alloy steels and extremely rough seabeds. Project activities included wall thickness design, flowline material and coating selection, flowline routing with 3D seabed modelling (IMPRESS), development of strain based design criteria, detail spans analysis, 3 dimensional flowline operational (buckling and expansion) analysis, flowline installation analysis, and tie-in design covering J-Tube and seal tube pull ins, deflect to correct tie-ins and spool tie-ins.

**Amoco:** Project Engineer for the Valhall Export Pipelines Rejuvenation Project. This project involved the rejuvenation engineering and preparation of cost estimates associated with an increased internal pressure and design life. Simultaneously with this detailed analysis, a new pipeline option with a subsea tie-in to an existing export pipeline was designed to a conceptual level.

**Statoil:** Project Engineer responsible for Ekofisk Contingency Bypass Study, involving evaluation of hot tapping methods, and development of installation methods, tie-in layouts and protection structures.

**J P KENNY PTY LTD, PERTH, AUSTRALIA (1993 – 1993)**

**Senior Engineer**

**West Australian Petroleum:** Senior Engineer on the Roller/Skate Pipeline Installation Project Responsibilities included the detail design of a subsea post trenching plough, capable at ploughing a 1 m deep trench for a 20"/6" bundle. Included in this phase was the design, fabrication and field trials of a 1 in 4 scale model plough.

**J P KENNY AG, RIYADH, SAUDI ARABIA (1991 – 1993)**

**Project Engineer**

Employed within a multiple onshore Pipeline and Storage System Project. The project work has involved the development of a number of refined project distribution systems, from pre-conceptual through to conceptual design stage. Responsibilities included Front End Engineering (FEED) of a 250km pipeline route through Abha Mountains, system sizing and associated facilities (tank farm, pumping stations, civil works) concept definition.

**J P KENNY PTY LTD, SYDNEY & PERTH, AUSTRALIA (1989 – 1991)**

**Structural / Pipeline Engineer**

Responsible for numerous pipeline and structure design projects. Key projects were:

**Woodside Offshore Petroleum:** Design Engineer in the J P Kenny Subsea International Joint Venture, responsible for structural design of Remote Intervention Systems, for diverless maintenance of subsea valves.

**Woodside Offshore Petroleum:** Design Engineer on the detailed design and analysis of the Goodwyn 'A' subsea valve protective structures.

**West Australian Petroleum:** Design Engineer on the detailed design of the Yammaderry and Cowle dual flowline systems, including spanning and stability design of pipeline under severe environmental loading. Responsible for detail design of the Yammaderry, Cowle and Saladin 'C' offset spoolpieces.

**Woodside Offshore Petroleum:** Design Engineer on Goodwyn 'A' to North Rankin'A' Interfield Pipeline project. Responsibilities included monorail for RESDV maintenance design, expansion analysis, Goodwyn 'A' thermal offset design, pipeline stability analysis, and detailed design of Subsea Valve Station protection structure.

**Olex Cables:** Engineer on them MGCC project in Bombay, India, involving the installation of fibre optic cable across the 11.5 km Thana and 7.5 km Dharamtar creeks. Responsibilities included route selection, installation analysis, reel design and plough modifications.

## PUBLICATIONS / PAPERS

- "A Risk Based Approach to Pipeline Decommissioning" presented at the State of the Art Pipeline Risk Management Conference, Perth, Western Australia 22 & 23 November 1999.
- "Cost Effective Pipeline Risk Based Inspection" presented at 4th Asia Pipelines Tech and Projects, Bangkok, 17 & 18 September 2002.
- "Offshore Pipeline Risk Based Inspection – A Practical Approach" presented at Asia Gas Storage and Transport, Kuala Lumpur, Dec. 2002.
- "Cost effective risk based inspection" published in Petromin, Asia's E & P and Pipeline Business Magazine, December 2002.
- Member Organising Committee, Petromin Pipeline Technology Conference, Oct 2003.
- Petromin Magazine Technical Consultant, 2003.

# Curriculum Vitae

Experience that Delivers

**Full Name:** Brian Humphreys

**Nationality:** Australian, British

**Qualifications:**

Bachelor of Engineering (Mechanical) - Honours 1991 - 1995
Monash University, Melbourne, Australia

**Computer Skills:**

Advanced level Microsoft Excel (Visual Basic)
Microsoft Word, Project, Powerpoint, Access
PIGTRAP - MFL Pipeline Inspection Data Analysis Program
RSTRENG, DNV, ASME - Pipeline Defect Analysis Programs

**Training Courses:**

Cert IV – Training & Assessment MRWED
Project Management PSMJ
Advanced Cathodic Protection ACA
MFL Data Analysis Training Magpie
Pipeline Pigging Operations Agility
Offshore Pipeline Engineering APA
Land Pipeline Engineering IBS
Transient Flow Modelling WJT
Pipeline Fracture Control APIA
Introduction to Modern Safety Management DNV
Frontline Management Techniques AIM

**Professional Memberships:**

Chartered Professional Engineer (CPEng)
Member - Institution of Engineers Australia (#1325958)
Member - Professional Association of Diving Instructors (#487223)

**Technical Papers:**

Pipeline Integrity & Aging Assets, APIA WA Seminar - June 2008
An integrated approach to Pipeline Integrity Management, PIM for Oil & Gas, Kuala Lumpur (IQPC) - May 2004
Selecting the Right Pig, PIM for Oil & Gas, Kuala Lumpur (IQPC) - May 2004

**Experience Summary:**

Brian is a Mechanical Engineer with over 15 years experience in the Oil & Gas Industry, focusing on pipelines. International experience includes involvement on projects in Australia, Europe, Africa and Asia. He has experience in all aspects of pipeline lifecycle from Conceptual & Detailed Design, Construction & Project Management, Commissioning & Operations, Maintenance & Inspection, Repair & Rehabilitation.

Pipeline Integrity experience includes: Pigging, In-Line Inspection, Defect Assessment & Fitness For Purpose Reports, Corrosion Monitoring & Control, Data Management, Risk Assessment, PIM Planning.

**Key Projects Summary:**

Refer work experience

**Work Experience:**

**JP KENNY: AUGUST 2010 - CURRENT**

**Principal Engineer (Based in Melbourne)**

**Responsibility:** To provide pipeline consulting services to the oil & gas industry

**Expertise Include:**
- Onshore Pipeline Design & Engineering
- Pipeline Commissioning, Operations & Maintenance and Integrity Management;
- Project Management

**Projects:**

**Halladale Blackwatch Pipeline Design - Victoria**
**Client:** Origin Energy
**Position:** Project Manager
**Details:**
- Routing and Survey for 2 new pipelines;
- FEED Design for gas and MEG lines.

**Tasmanian Gas Pipeline Operations Support - Tasmania**
**Client:** Tasmanian Gas Networks
**Position:** Project Manager
**Details:**
- Project management of offshore diving inspection of 300km long Tasmanian Gas Pipeline

**Technical Due Diligence Report**
**Client:** Confidential
**Position:** Project Manager
**Details:**
- Technical Due Diligence of Sale / Purchase of Gas Distribution Business Assets

**PIE CONSULTING: MARCH 2007 – AUGUST 2010**

**Principal Engineer (Based in Melbourne)**

**Responsibility:** To provide pipeline integrity consulting service to the oil & gas industry.

**Expertise Include:**
- Operations & Maintenance and Integrity Management Plans;
- In-Line Inspection & general pigging services;
- Defect Assessment, Fitness for Purpose Reports & Repair Management;

**Projects:**

**QSN Pipeline – South Australia**
**Client:** Epic Energy
**Position:** Commissioning Manager
**Details:**
- Commissioning of 16” x 180 km gas pipeline; remote desert location;
- Operations Establishment, punchlist management and code / regulatory compliance;

**NQGP Pigging Project - Queensland**
**Client:** Energy Infrastructure Management (EIM)
**Position:** Project Manager
**Details:**
- On-line liquids removal from 12” x 370km pipeline, development and execution of pigging program;
- In-Line Inspection of 12” x 370km, 10” x 22km pipelines, management of contractor;

**Inner Ring Main Pigging Project - Victoria**
**Client:** APA Gasnet
**Position:** Project Manager
**Details:** In-Line Inspection of 18” x 82 km Inner Ring Main

## ORIGIN ENERGY (UPSTREAM): MARCH 2006 - MARCH 2007

**Senior Pipeline Engineer (Based in Brisbane)**

**Responsibility:** To provide technical support to Operations and Maintenance for Origin's oil & gas production pipeline across Australia.

**Including:**
- Operations, Maintenance and Integrity Management Plans; Risk Assessments;
- Inspection, Defect Assessment & Repair Activities;
- Regulatory and Code Compliance. Design support for new projects, Construction to Operations transitions

## T.D.WILLIAMSON ASIA PACIFIC: APRIL 2003 - MARCH 2006

**Pipeline Integrity Manager (Based in Singapore)**

**Responsibility**: Manage Pipeline Integrity Products and Services (PIPS) business for Asia Pacific region.

**Including:**
- Business Development & Planning, Sales and Marketing;
- Technical and Commercial proposal development;
- Project Management, Resource planning and development.

**Projects:**

**Unocal Indonesia ILI – Attaka Field, East Kalimantan**
**Client:** Unocal Indonesia Company
**Position:** Project Manager
**Details:**
- Fitness for Purpose Assessment on 2 x 18" oil & gas lines;
- Developed Pipeline Integrity Management System for 150 pipelines.

**PowerGas ILI – Singapore**
**Client:** Singapore PowerGas
**Position:** Project Manager
**Details:**
- First International MFL project for TDW outside USA; Inspected 4 x 24" gas lines, total 56 km;
- Completed FFP analysis and repair of the 1 significant defect found during the inspection.

## CORRPRO COMPANIES INC: MARCH 2001 - APRIL 2003

**Pipeline Integrity Engineer (Based in Jakarta)**

**Responsibility:** Provision of consultancy & project management services for:

- Pipeline pigging service; In-line Inspection services; Pipeline integrity data analysis;
- Defect assessment & repair strategies; Pipeline GPS surveys, defect locating.

**Projects:**

**TFE Intelligent Pigging - Maharaja Gas Field, Brunei**
**Client:** Total Fina Elf, Brunei
**Position:** Project Manager
**Details:**
- In-Line inspection of 2 lines, 18" x 85 km, 12" x 2 km, wet gas;
- Scope of Works; Managing contractor, Review of Inspection results & reports.
- Project Planning & Site Supervision;

**Top 21 Critical Pipeline Pigging - BP West Java, Indonesia**
**Client:** BP Indonesia
**Position:** Project Manager
**Details:**
- Progressive cleaning pigging of 21 lines, 6"- 28", 1 km - 100 km, gas & oil;
- Cleaning pigging and chemical batch treatment; wax removal and management
- Recommending ongoing pigging program & equipment; Training of operations personnel;

## AGILITY TEAM BUILD: OCTOBER 2000 - MARCH 2001

**Project Engineer (Based in Perth)**

**Responsibility:**
- Project scheduling and progress updates; Co-ordinating interface between construction & operations;
- Pipeline licence application & liaison with Regulator; Development of commissioning manual.

**Projects:** **Mount Magnet Gas Pipeline, Western Australia**
**Client:** Mid West Joint Venture
**Position:** Project Engineer
**Details:**
- Construction of 11 km, 6" gas pipeline; Installation of inlet and delivery station.

## GRANHERNE (A HALLIBURTON COMPANY): AUGUST 1998 - MAY 2000

**Pipeline Engineer (Based in London)**

**Responsibility:**
- Project definition and design basis, pipeline and gathering system route selection;
- Pipeline design to Algerian codes, ASME B31.4, ASME B31.8; material specs and MTO's;
- Construction specifications, scheduling and cost estimates;

**Projects:** **In Salah Gas, Algeria**
**Client:** BP / Sonatrach
**Position:** Pipeline Engineer
**Details:**
- FEED design for US$3b gas field development; 450km 48" export line, 60 wells in 7 fields;

**Qoubba, Algeria**
**Client:** Total / Sonatrach
**Position:** Pipeline Engineer
**Details:**
- FEED design for US$1b oil field development; 140 pipeline, 2 - 24", 48 wells in 7 fields;

## AGL PIPELINES: JANUARY 1996 - MAY 1998

**Pipeline Engineer (Based in Perth)**

**Responsibility:**
- Technical support to field operations and maintenance, procedure development, code compliance;
- Design and project management of minor projects, field supervision, weld procedure management;

**Projects:** **Commissioning of GGT Pipeline, Western Australia**
**Client:** GGT
**Position:** Commissioning Engineer
**Details:**
- Purging, pigging and pressurization of 1450 km, remote desert locations ;
- Commissioning of delivery stations and compressors;

**Cawse Offtake Hot Tap, Western Australia**
**Client:** GGT
**Position:** Pipeline Engineer
**Details:**
- Design, testing and qualification of in-service welding procedures for tee installation;
- Project management of hot tapping operations;

# Curriculum Vitae

**Experience that Delivers**

**Name:** Martin Wettenhall Born: 1948

**Nationality:** Australian

**Qualifications:**

Post Graduate Diploma - Logistics Management, Monash University, 1992.
Post Graduate Diploma Business Administration, Swinburne College of Technology, 1980.
Diploma of Farm Management (Honours) Marcus Oldham College, Geelong, 1973.
Certificate of Farm Management and Maintenance R.M.I.T., 1967.

**Professional Memberships:**

Australian Pipeline Industry Association

**Experience Summary:**

Martin has thirty one years experience in the processes involved with the legal acquisition of interests in land, conveyancing and loss assessment. He has been involved in all steps associated with securing access or formal rights for facilities such as gas pipelines, power lines, communications facilities, seismic survey and well drilling. He has been a leader in developing consultation plans and has a sound understanding of the Victorian Pipeline Approval process. Fieldwork includes route selection, local authority and landowner liaison, community consultation, indigenous people's negotiations, land remediation and loss assessment. Office work includes desk top pipeline studies, environmental and agricultural specifications, due diligence work, and cost estimates.

**Technical Papers:**

- "Real Property Interests Within the Gas Industry, Victoria" prepared for the Victorian Government as a support document describing the operational real estate interests held by the Victorian gas distribution businesses.
- Landowner guidelines VFF / APIA.

**Awards:**

- Rural Press Graduate of Excellence Award, for services to agriculture and the pipeline industry 2004.

**Key Projects Summary:**

- Yarra Glen to Lilydale reinforcement transmission pipeline, stakeholder manager and land access services.
- CO2CRC Compensation agreements pursuant to the Petroleum Act for extraction and injection facilities, monitoring and seismic survey activities.
- Brooklyn to Lara Transmission Pipeline compulsory acquisition resolution management.
- Power line upgrade easement acquisition work for a 66kV service from Doreen to South Morang, Epping and Kilmore.
- Dandenong South to Carrum augmentation pipeline involving all approvals and production of the first approved Victorian Consultation Plan pursuant to the Pipelines Act 2005.

**Work Experience:**

**J P KENNY PTY LTD (MAY 1999 - ONGOING)**

**Manager, Land Access & Project Support**

Responsible for the Land Section, which has the capacity to undertake easement and freehold acquisition projects from the route selection stage through to final documentation and registration on title of the required interest. Other services include Due Diligence, Approvals procedures, Consultation plans, Loss Assessment, Environmental Management Planning.

**Easement Services** - APA Group, Jemena and SP AusNet: Negotiation and registration of easements for gas and electricity supply on an ongoing as required basis. Provision of land access and environmental approvals advice.

**Jemena Pty Ltd –** Stakeholder Manager, Yarra Glen to Lilydale Pipeline, responsible for approvals and management of third parties associated with the project, including acquisition of easement rights.

**Jemena**– Prepare Environmental Management Plan for Powerful Owl habitat.

**APA Group** - Resolve compulsory acquisition claims associated with the Brooklyn to Lara pipeline and assist with the approvals for the Abbotts Road South Dandenong to Carrum Augmentation pipeline. Prepare Consultation Plan. Arrange environmental assessments for submission under EPBC Act for compressor station upgrade.

**SP AusNet** - Acquisition of easement for powerline upgrade, Doreen to South Morang, South Morang to Epping and Wollert to Kilmore.

**TruEnergy** – High level route selection and cost estimate for confidential pipeline.

**SEAGas**- Audit of easement management procedures and practices.

**CO2CRC** - Preparation and negotiation of Compensation Agreements and access for seismic surveys, well head lease agreements, and monitoring well agreements in connection with the Otway Basin geosequestration project.

**Australian Pipeline Trust** - Technical Due Diligence for the purchase of the Origin Energy gas networks business and Asset Management Services business.

**Australian Pipeline Trust** - Technical Due Diligence for the purchase of the Allgas (Qld) gas company.

**Karoon Gas Australia** - Preparation and negotiation of Compensation Agreements for 3 drill sites and camp site in West Gippsland.

**Cape Energy** - Entry, route selection, survey, valuation and optioning process for Golden Beach to Longford pipeline.

**Alinta Gas** - Due Diligence relating to heritage, land, environmental and OHS matters associated with the purchase of the Dampier to Bunbury transmission pipeline.

**Victorian Government** - Natural Gas Expansion Program Project manager which provided the Government agency with technical advice and analysis of bids submitted by tenderers for gas transmission and distribution systems.

**Woodside Energy Limited** - Adviser and assistance in route selection, easement acquisition and Permit for the Otway Gas Project Western Victoria.

**Project Lenders** - Lenders representative in approving progress payments of contractors Progress Claims Telfer pipeline project.

**UpStream Petroleum Pty Ltd** - Preparation of a Landowner Management Plan to address issues likely to arise from a well drilling and gathering line programme for the CO2CRC project.

**GasNet** - Project Lenders Due Diligence on behalf of the risks associated with the construction of a pipeline from Telfer to Nifty mine site in Western Australia.

**GasNet** - Project Lenders Due Diligence on behalf of the risks associated with the construction of a pipeline from Port Headland to Telfer in Western Australia.

**Enertrade** - Assistance with acquisition of access rights for the proposed Monbarah Townsville gas pipeline.

**Duke Energy International** - Due Diligence investigations into confirming the status of management procedures relating to the preparation for sale of Duke Energy's Australian interests.

**Gasnet Epic Energy** - Moomba Adelaide Pipeline Due Diligence investigations requiring a review of the land management systems associated with the pipeline.

**Gasnet-TXU** - Provision of problem solving services for difficult cases associated with the Southern Gas Pipeline Project.

**TXU Australia Pty Ltd -** Due Diligence investigations into Southern Gas Pipeline, requiring analysis of progress-to-date, evaluation of progress, identification of major issues and costs estimates.

**Energex Limited** - Augmentation of gas supply to Brisbane, feasibility study involving route selection, environmental issues, approval process and cost estimates.

**Duke Energy International** - Permit and licence process for Vic Hub project in Central Gippsland.

**Esso Australia** - Feasibility study into route options on shore pipelines Gippsland.

**Shedden Uhde** - Review of Approval Process for Energy Infrastructure project in Victoria.

**Esso Australia** - Security of supply project, requiring analysis and selection of alternative easement routes with an emphasis on security issues.

**Duke Energy International** - Feasibility study and route selection for transmission pipeline in Gippsland region.

**Great Southern Energy Gas Networks -** Feasibility study and route selection and approval process for gas distribution systems in South East Gippsland.

**Great Southern Energy Gas Networks - Illabo to Tumut Transmission Pipeline** - Assisted the Design Engineer with initial route selection for the pipeline route. Arranged all landowner contacts necessary to obtain Survey Permits and Pipeline Licence including access arrangements, compensation assessments, easement negotiation and easement registration. Arranged the acquisition of freehold sites where necessary.

**PowerTel - Howlong to Craigieburn Fibre Optic Cable Central Victoria** - Arranged access for installation of cable in accordance with the Telecommunications Act, sub contracting to Fisher Stewart.

**TXU Western Underground Storage - Paaratte, South West Victoria** - The brief was to secure Damages Settlements arising from construction of gas gathering line. The project had a very tight schedule in order to meet the settlement of transfer contracts.

**GCI CONSULTING INTERNATIONAL (1997 - 1999)**

**Stratus Networks - Flynn to Loy Yang Transmission Pipeline** - Assisted the Design Engineer with initial route selection and arranged all landowner entry consents. Project deferred.

**Envestra Limited - Berri to Mildura Transmission Pipeline** - Assisted the Design Engineer with initial route selection for the pipeline route providing for environment and land use features. Arranged all Victorian landowner contacts necessary to obtain Pipeline permits and Pipeline Licence including access arrangements, compensation assessments, easement negotiation, easement registration, compulsory acquisitions, settlement of disputed claims through negotiations with landowners' lawyers. Arranged for the acquisition of the City Gate site. Provided advice on the best Native Title approach. Negotiated all Victorian construction Damages Settlements. In conjunction with the responsible Government Department developed the first Crown Land occupation agreement for pipelines.

**Envestra Limited - Mildura to Karadoc High Pressure Gas Main** - Assisted with Route Selection, arranged entry rights, negotiated easement rights, including provision for vineyard developments in the area and arranged registration of easements on title.

## GAS & FUEL CORPORATION OF VICTORIA (1995 - 1997)

**Stratus Networks - High Pressure Gas Mains to Murray Valley Border Towns** - Lead role in discussions with indigenous land groups, arranged several consents with Land NSW to cross Murray River and acquired licences and easement rights in Victoria and NSW. Organised registration of interests in Land Titles Office.

**Gascor - Rutherglen to Koonoomoo Transmission Pipeline** - Assisted the Design Engineer with initial route selection for the pipeline route taking into account environmental and land use factors. Arranged all landowner contacts necessary to obtain Pipeline permits and Pipeline Licences including access arrangements, compensation assessments, easement negotiation, easement registration and discussions with Regulatory personnel. Arranged for the freehold acquisition of the Off take Station site.

**Transmission Pipelines Australia - Rutherglen to Koonoomoo Transmission Pipeline** - Managed the settlement of Damage Releases arising from construction of the pipeline over farmland where grazing, intensive orchards, irrigation crops or dairying were commonplace. Arranged for the acquisition of a site for the installation of communications equipment.

**Westar Pty Ltd - High Pressure Gas Mains Ararat, Stawell & Horsham** - Assisted the client with route selection and arranged for access rights, easement compensation and negotiations, conveyancing and damages settlements. In one case, a claim for compensation in the order of $180,000 was settled for $2,000.00.

**Stratus Networks - High pressure gas supply to Bonlac, Darnum** - Assisted the Design Engineer with route selection, arranged survey access to private land and managed acquisition of easement rights including negotiations, and registration. Provided landowner liaison and support during pipeline construction under adverse winter conditions and assessed and negotiated Damages settlements over high production dairy farming enterprises.

**Stratus Networks - Chiltern to Howlong High Pressure Gas Supply** - Assisted Design Engineer with route selection, arranged survey access to private land and managed acquisition of easement rights including negotiations, and registration. Provided landowner liaison and support during pipeline construction under adverse winter conditions, assessed and negotiated Damages settlements.

**Coastal Gas Australia - Carisbrook Ararat Stawell Horsham Transmission Pipeline** - This project is significant as it was the first undertaken by a private gas transmission company in Victoria and consisted of 400 easements over a distance of 180 km. Responsibilities included assistance with route selection, provision of survey access, easement acquisition, Native Title negotiations, compulsory acquisitions and resolution through formal channels. The project included easement registration and the first use of an in-house developed form of easement which significantly reduced paper work for all parties involved. Other work included advice regarding environmental treatments and restoration of agricultural land and advice to the client regarding damages settlements. In addition to the standard requirements the project demanded a “Due Diligence”process, transfers of interests to the client and complex contractual arrangements which came within the Easement Office’s obligations.

## GAS & FUEL CORPORATION OF VICTORIA (1981 - 1995)

**Gas and Fuel Corporation of Victoria - Codrington to Hamilton Transmission Pipeline** - Responsible for survey access, negotiation of easement rights, registration of easements, assistance with route selection, and provision of landowner liaison services during construction. Following construction Damage Settlements obtained and restoration works were implemented where necessary.

**Gas and Fuel Corporation of Victoria - Paaratte to Colac Transmission Pipeline** - Responsible for survey access, negotiation of easement rights, registration of easements, assistance with route selection and the location of above ground facilities. Project deferred.

**Gas and Fuel Corporation of Victoria Allansford to Portland Transmission Pipeline** - As Principal Easement Officer, responsible for completing easement registration, settling construction damages and attending to post construction remediation works. Responsibilities also included the resolution of compulsory acquisition cases which were settled by further negotiation and arbitration procedures involving instructions to solicitors, barristers and expert witnesses and representation as an expert witness.

Other projects in which the above was responsible for land and environment matters:

- Access to and drill site Stoneyford No1 Exploration drill site;
- Easement acquisition and property owner liaison during construction of the Wandong to Kyneton transmission pipeline;
- Easement acquisition and property owner liaison during construction of the Pakenham to Wollert transmission pipeline;
- Easement acquisition and property owner liaison during construction of the Ballarat to Ballan duplication transmission pipeline;
- Easement acquisition and property owner liaison during construction of the Bunyip to Pakenham duplication transmission pipeline;
- Property owner permitting for seismic survey activities in South West Victoria;
- Easement acquisition and property owner liaison during construction of the Mt Franklin to Kyneton transmission pipeline;
- Damage settlements associated with the construction of the Guildford to Maryborough transmission pipeline;
- Provision of advice to Ash Wednesday Bushfire Committee concerning provision of immediate aid to farmers affected by wildfire.

# Curriculum Vitae

Experience that Delivers

**Name: Luke Trakas**

**Nationality:** Australian

**Qualifications:**

RMIT Assoc. Diploma (Instrument Tech)

**Training:**

Honeywell Experion PKS Server Configuration & Engineering R310 2010

Solar Turbines Gas Compressor Applications 2009

Australian Electrical Wiring AS3001 2008

Emerson Foundation Feildbus Engineering 2006

**Professional Memberships:**

**Experience Summary:**

- Inst/Elec Project Engineer – Major Projects
- Commissioning Engineer
- Instrument Engineer
- Production Supervisor

**Key Projects Summary:**

- Esso LIP CPSU Project
- Jemena Compressor Upgrade project
- Various CommissioningProjects

**Work Experience:**

**ALINTA / JEMENA 11 NOVEMBER 2007 - PRESENT**

**Instrument/Electrical Projects Engineer – Major Projects**

As part of the Jemena expansion projects team which was involved the construction of 4 midline compressor stations across eastern Australia using Taurus solar Turbines at Mila NSW, Banana and Rolleston Qld and one end of line compressor station at Longford Vic.

As part of construction and commissioning these new stations into the existing Jemena SCADA network (Honeywell Experion R310) role includes:

- Assistance in the preparation of scopes of works, for design contracts, construction contracts and sundry consultancies (Honeywell, IBM, Telstra Enerflex ect) Design and implementation of redundant communications solutions for remote sites using Next G / Satellite hardware.
- Monitor, direct and control activities of Instrument Engineers, graduate engineers as well as engineering consultants and construction contractors on a day to day basis
- Technical review of project documentation deliverables (e.g. technical documentation, drawings, suppliers type test certificates)
- Perform design reviews and coordination to ensure proposed designs comply with Regulatory and Statutory requirements, Australian Standards, Gas Transmission South specification and design guides, Alinta policies, International Standards and good industry practice
- Preparation and Review of project management documentation as directed by the Project Director, including Project management Plans, Inspection and Test Plans and Project Quality Plans
- Site presence for critical works as client representative, FAT, SAT Engineer, design of Honey well SCADA screens
- Preparation of Alina / Jemena procedures and policies
- Sundry inspections and expediting
- Assist in ensuring that the Project Documentation management System and Process is complied with and kept up to date
- Assist in ensuring Project Quality Assurance Processes and Systems are met

**KBR / PSN 4 JULY 2005 – 23 SEPTEMBER 2007**

**Commissioning Engineer**

Employed by Kellogg Brown & Root as part of the commissioning team tasked with the upgrade of ESSO's gas fractionation plant control and protective systems (CPSU project) located at the Long Island Point facility south of Melbourne.

The upgrade included the installation of an all new control system (Emerson DeltaV) as well as complete replacement of existing analogue instrumentation with Foundation Fieldbus instruments on the control side and testing and commissioning of the new Triconics plant protective system and corresponding instrumentation for all 3 fractionation trains, as well as Truck loading facility, Refrigerated Storage Tanks, Jetty Terminal and associated areas.

- Ensure the cut-over of old pneumatic to new digital systems was carried out without disruption to plant process/production and to co-ordinate and manage relations between the client, construction team and vendors.
- Supervision of 6 commissioning technicians, including electricians instrument fitters, mechanicl fitters and final commissioning and signing off back to the client of commissioned areas when ready to handover to client
- Review of commissioning procedures, FAT/SAT procedures, carrying out of revised critical function testing and mark-up of as built drawings.

**EMERSON PROCESS MANAGEMENT MAY 1998 – JUNE 2005**

**Service Engineer May 1998 - June 2002**

- Project work, repair as well as commissioning of Emerson instrumentation. This service was provided both on local sites and also on interstate sites including Woodside Train 4(W.A), Mayne Pharmaceuticals (Qld) CSBP (W.A) as well as local industrial sites such as Orica, Air Liquide, Shell, ARA etc.

**Australia/NZ Service Co-ordinator, July 2002 – December 2003**

- Ensure the timely response and support for the Australian Service Centre and Customer Support division. In this role my responsibilities included scheduling of incoming service incidents and staff, technical assistance to interstate branches and end customers, training of staff, and operation of the Emerson Flow laboratory.

**Instrument Engineer January 2004 – June 2005**

- Specification and design review of new instrumentation projects in Australian/NZ. This included the producing and review of data sheets, documentation, delivery estimates, checking specified instrumentation against actual requirements and customer liaisons.

**GREENSPAN TECHNOLOGIES PTY LTD – QLD 19 FEBRUARY 1996 – 5 APRIL 1997**

**Development / Test Technician**

- Calibration, programming, testing, repair, quality assurance, installation and development of new water quality monitoring instruments including single and multi-parameter sensors.

These were used to monitor water quality levels in remote locations in North Queensland as well as along the DMZ in South Korea

**PRECISION POWER PTY LTD – QLD 16 MARTCH 1995 – 14 NOVEMBER 1995**

**Production Supervisor**

- Supervision of eight members of production staff
- Quality assurance
- Testing of equipment to ensure Australian and international Quality
- Assurance standards were met
- Ordering and sourcing of required parts
- Scheduling: staff rosters, assigning work orders and meeting deadlines for customer orders

**AUEENSLAND ALUMINA LIMITED – CLARIFICATION SECTION 15 JANUARY 1994 – 3 FEBRUARY 1995**

**Instrument Technician**

- Daily maintenance and breakdown work on a wide variety of industrial instrumentation

**STERN ELECTRONICS PTY LTD 14 APRIL 1993 - 10 SEPTEMBER 1993**

**Contract Instruments Technician**

Contracted by Stern Electronics to work on-site for Incitec Pty Ltd at their fertiliser plant on Gibson Island.

- Daily maintenance on Ammonia, Urea and CO2 Plants Instrumentation as well as shift work during plants shutdowns
- Project Work involving Honeywell TDC3000 system

**FISHER ROSEMOUNT PTY LTD, PERTH** **6 FEBRUARY 1989 TO 4 JUNE 1991**

**Apprenticeship in Instrument Fitting**

Successfully completed apprenticeship in February 1993.

**Curriculum Vitae**
**ROSS CALVERT**

## SUMMARY OF EXPERIENCE :

Well-qualified with extensive experience as an energy industry manager in both technical and commercial areas and in consultancy. Experience covers public and private sectors, particularly in gas but also electricity. Detailed knowledge of most aspects of gas industry.

## EMPLOYMENT HISTORY:

***Ross Calvert Consulting Pty. Ltd.*** ***From Oct 2003***

*Established own consulting firm in October 2003 to deal with technical and economic aspects of energy (particularly gas) and environmental issues.*

**Managing Director** **From Oct 2003**

- Pipeline capital and operating cost estimation and evaluation
- Regulatory processes, including third party access
- Environmental impact assessment processes
- Economic analysis of energy and resources markets, especially pipelines
- Project evaluation and approvals processes
- Negotiations with government and private sector organisations
- Pipelines and environmental legislation
- Policy development and strategic planning
- Pipeline route selection and landholder negotiations
- Pipeline hydraulic analysis – steady state and transient
- Due diligence processes.

Achievements:

- Participated in research for Energy Pipelines Co-operative Research Centre Program 4 (Public Safety and Security of Supply) on topic "The influence of remuneration incentives for senior executives on the safety outcomes of hazardous industry organizations".
- Provided technical advice on gas pipelines to Australian Competition Council in coverage assessment.
- Advised Aurecon (formerly Connell Wagner) on gas supply issues for reports to gas-fired power station proponents.
- Representated Energy Users Association of Australia in design of short term trading market for gas.
- Subcontractor to Connell Wagner in prefeasibility gas-fired power study for BHP Billiton Olympic Dam expansion.
- Expert Witness role with Australian Government Solicitor on pipeline matter - report instrumental in success of client.

- Awarded long term contract to advise Australian Competition and Consumer Commission on technical and economic issues relating to natural gas pipeline regulation.
- Advised NSW Independent Pricing and Regulatory Tribunal (as subcontractor to Energy Consulting Group) in Review of Access Arrangements of AGL Gas Networks and Country Energy Gas.
- Advised potential natural gas consumers in Tasmania on gas supply options and negotiating strategy (in association with ACIL Tasman).
- Appointed to Consultants Panel to provide advice to NSW Department of Energy Utilities and Sustainability on Gas Market Reform issues.
- Appointed to Expert Panel to provide strategic, commercial and regulatory advice to the Victorian Department of Innovation Industry and Regional Development in the implementation of a subsidy scheme to promote development of regional natural gas pipelines (as subcontractor to McLennan Magasanik Associates).

***Australian Greenhouse Office, Canberra*** ***July 2002 - Sept 2003***

*The Commonwealth Government's lead agency on Greenhouse Matters. Approximately 170 employees.*

**Assistant Manager, Emissions Analysis Team** **July 2002- Sept 2003**

- Economic research and analysis relating to projections of greenhouse gas emissions, particularly in stationary energy and fugitive sectors
- Provision of policy and general economic advice
- Assistance in managing Emissions Analysis Team activities
- Preparation of position papers, briefing material, and correspondence
- Participation in conferences, workshops, interdepartmental and other meetings
- Liaison with internal and external government and industry organisations and co-ordination of input
- Initiation and management of consultancies.

Achievements:

- Prepared 2003 emissions projections for stationary energy sector and reviewed emissions abatement measures
- Suggested and instituted improvements to process of developing emissions projections.

***ACIL Consulting Pty Ltd, Canberra*** ***2000-2002***

*Consulting company with around 50 employees (then) providing economic, policy and strategic analysis and advice to companies, government agencies and industry associations, particularly in the energy and resources sectors.*

**Senior Consultant** **August 2000- June 2002**

- Economic analysis of factors affecting energy and resources markets, especially pipelines
- Negotiations with Commonwealth, State and Local government
- Negotiations with private sector organisations
- Regulatory processes, including Pipeline Access Code
- Policy development and strategic planning
- Project evaluation and approvals processes
- Pipelines and environmental legislation.

Achievements:

- All projects completed to client's satisfaction
- Major contribution to *Australian Gas Market Review and Outlook 2001-20*
- Contributed to major development of *GasMark* model
- Expanded ACIL's potential client base.

***East Australian Pipeline Limited, Canberra*** ***1994-2000***

*Owner and operator of Moomba-Sydney Natural Gas Pipeline System, purchased from Commonwealth Government for $538 million in 1994 with annual revenue approximately $100 million and 85 employees.*

**Planning and Regulatory Affairs Manager** **1994-2000**

- Principal role in management of the company's Access Arrangement under new National Third Party Access Code
  - as member of Marketing team, developed policies for compliance with Code
  - engagement of consultants for specialist advice and coordination of their input
  - liaison with legal advisors
  - preparation of Access Arrangement documents for lodgment with ACCC
  - negotiation and liaison with ACCC prior to and following lodgment of Access Arrangement
  - Access Arrangement well received by regulator and the market
  - preparation of responses to ACCC information requests
  - preparation of responses to third party submissions
  - developed good working relationship with regulator.

- Successfully negotiated with state authorities regarding establishment of licensing regime in transition from self-regulating statutory authority to private company operating in SA, Qld, NSW and ACT.

- As member of the Marketing team,
  - co-ordinated capacity studies of existing system and proposed expansion
  - helped to develop marketing policies of the new company
  - number of customers increased.

- Key role in development of Interconnect Pipeline – 1995 to 1997
  - co-ordinated feasibility study with Gas Transmission Corporation (GTC)
  - supervised hydraulic analysis
  - enlisted Board support

- obtained licenses and approvals from Commonwealth and State agencies, including environmental impact approval
- participated in Project Management Committee with EAPL and GTC
- project completed on time and within budget.

- Key role in development of pipeline industry Code of Environmental Practice
  - suggested concept to senior management
  - participated in industry Environment Committee which produced the Code
  - assisted in promoting Code to industry and Government officials
  - Code seeks to reduce delays in pipeline approvals and to reduce administrative effort in demonstrating compliance with licensing requirements.

- Secondment to Australian Gas Association in 1997-98
  - provided advice during period of major gas industry restructuring
  - author of two major Research Papers sold as part of the gas industry's communications program
  - helped initiate Gas Quality Working Group to enable interstate trade in gas.

- Participated as pipeliner representative in industry cross-sectoral Gas Quality Working Group and Gas Quality Technical Working Group.
  - these groups developed solutions to problems posed by different gas specifications which applied in each state and which created a barrier to interstate trade in gas
  - favourable reaction by regulators
  - work led to publication as Australian Standard for natural gas specification.

***The Pipeline Authority, Canberra*** ***1983-1994***

*Commonwealth Statutory Authority, owner and operator of Moomba-Sydney Natural Gas Pipeline System with annual revenue of approximately $85 million and approximately 120 employees.*

**Development Engineer/Senior Development Engineer** **1983-1994**

- Feasibility studies of pipeline projects
  - network expanded from 1,488 km to 2,824 km over 11 years.
- Supply and demand studies including forecasting.
- Pipeline hydraulic analysis – steady state and transient
- Liaison with federal, state and local government agencies to facilitate approvals.
- Liaison with landholders to enable easement acquisition.
- Technical and economic studies of pipelines.
- Cost estimation for pipelines and pipeline facilities
  - all projects completed within budget
- Tender evaluation ($millions).
- Project planning and scheduling
  - all projects completed on time.

- Tariff calculations and documentation
- all tariff revisions completed accurately and on time.
- Completed numerous consultancy studies which satisfied clients.

***1980-1983***

***Department of Resources and Energy, Canberra***
**Fuel Technologist**

***Babcock Woodall-Duckham Ltd, Crawley, West Sussex UK*** ***1976-1979***
**Commissioning Engineer/Process Design Engineer**

***Australian Gas Light Co Ltd, Sydney*** ***1974-1975***
**Supervisor/Project Engineer**

***Australian Iron & Steel Pty Ltd, Port Kembla*** ***1969-1974***
**Trainee/Combustion Engineer**

## PERSONAL DETAILS:

*EDUCATION:*

- Master of Business Administration,
  Deakin Univ/APESMA (external study) completed 1994

- Graduate Diploma in Applied Economics,
  University of Canberra completed 1982

- Bachelor of Engineering (Chemical),
  University of NSW completed 1973

*PROFESSIONAL AFFILIATIONS:*

- Member of Australian Pipeline Industry Association
  (also member of Research and Standards and HSE Committees)

- Fellow of Australian Institute of Energy
  (President 1998-99; Vice President 1997, 2000 and 2003; Director on national board mid 1990s to 2008; various positions on Canberra Branch Committee since 1983, mostly as Chairman)

- Member of former Australian Gas Association
  (past member of Steering Committees of all 4 Australian Natural Gas Supply and Demand Studies)