NETWORK PLANNING REPORT - P004

WARRAGUL (Planning)

March 2007

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Executive Summary

As indicated in VENCorp's Network Planning Report (T004) - Warragul (Timing), March 2007, the increasing loads along the Lurgi (Morwell-Dandenong) pipeline raises the prospect of delivery pressures falling below Warragul's 1,400 kPa minimum pressure obligation.

The modelling results indicate that a breach in the minimum pressure obligation is likely to occur at Warragul under 1 in 20 peak day conditions during 2009.

This report presents a network planning assessment of the available options to solve the identified constraint. Several augmentation options were considered, which include:

- a Morwell back-up regulator set pressure increase;
- duplicating the Warragul branch pipeline;
- Lurgi pipeline duplication;
- a new connection to Warragul from the Longford-Dandenong pipeline; and
- a new compressor at the start of the Warragul pipeline.

Based on current modelling, the preferred solution to this constraint involves duplication of approximately 4.8 km of the Warragul branch pipeline with 100 mm or 150 mm diameter pipe, required prior to winter 2009.

Introduction

The Warragul lateral is connected to the Lurgi pipeline approximately 67 km east of the Dandenong City Gate (CG). Figure 1 shows the Longford and Lurgi pipeline schematics. As well as being a residential area, Warragul is the site for a large commercial customer that uses a significant quantity of gas and has proposed to expand its production, which would lead to a subsequent increase in load.

This report presents a:

- discussion of the options for augmenting the system to solve the Warragul constraint; and
- detailed review of the most appropriate option.

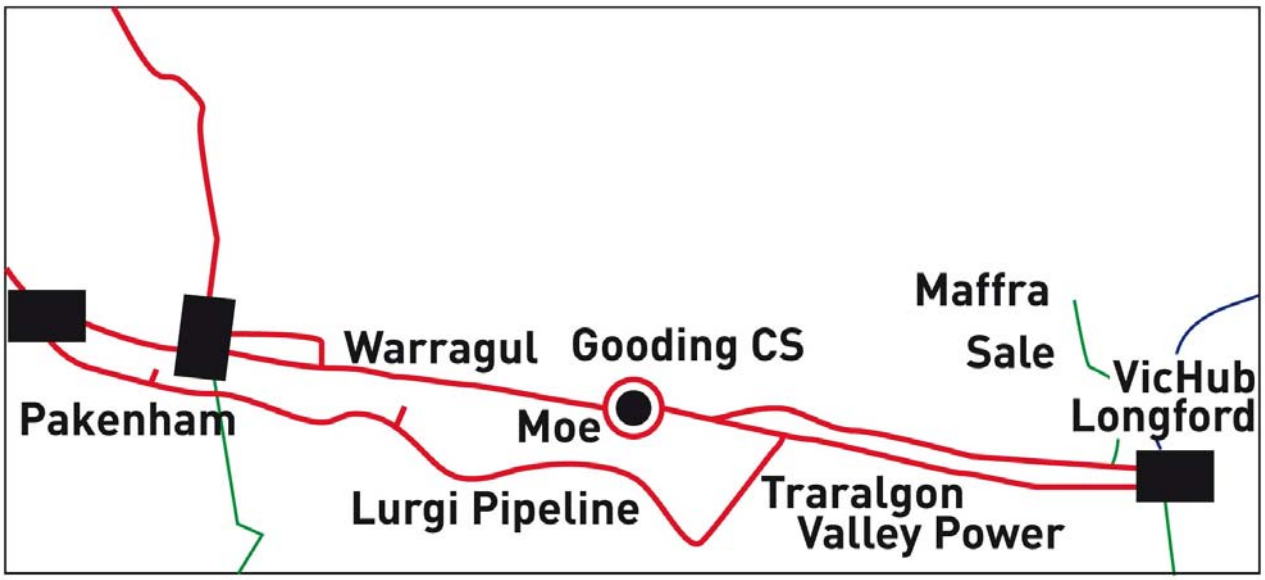
Planning Inputs

Table 1 lists the key planning inputs used in the modelling.

Table 1 – Key planning inputs

Item	Detail
Forecast demand data	Supplied by OEAM and 2005 [1] Gas APR
Historical data	Extracted from VENCorp's TADIS database
Modelling software	Gregg Engineering WinFlow version 4.060503.3081 Gregg Engineering WinTran version 4.060505.9089
Model of PTS used	Common Model version 2006
Network Planning Report – T004 Warragul (timing)	VENDocs # 180353
Warragul Loads to 2020	Letter from Origin to GasNet dated 27/10/05

Figure 1 - Longford and Lurgi pipeline schematics



[1] The 2005 report represented the latest information available at the time of the analysis. A later review of 2006 demand found that changes in the demand forecasts were minor and have no material impact on the timing and nature of the augmentations.

Constraint Timing

As indicated in VENCorp's Network Planning Report (T004) - Warragul (Timing), March 2007, the preferred solution to this constraint is required prior to winter 2009.

Augmentation Options

The augmentation options for solving the Warragul constraint include:

- a Morwell back-up regulator set pressure increase;
- duplicating the Warragul branch pipeline (4.7 km);
- Lurgi pipeline duplication;
- a new connection to Warragul from the Longford-Dandenong pipeline; and
- a new compressor at the start of the Warragul pipeline.

Discussion

Morwell back-up regulator set pressure increase

The Morwell back-up regulator is currently set at 1,800 kPa. Increasing its set pressure is a possible measure to avoid breaching the minimum pressure obligation at Warragul.

However, this is not the preferred option as it would:

- reduce the overall transportation capacity of the Longford-Dandenong pipeline; and
- require increasing the pressure to the point that the flow through the back-up regulator would exceed the regulator's capacity (38 kscm/h). This indicates a possible Morwell back-up regulator capacity issue within the forecast period.

Duplicating the Warragul branch pipeline

This option will be cost effective in increasing the capacity and pressure at Warragul.

Lurgi pipeline duplication

This option will require a long length of large diameter pipe to achieve the same benefit as duplication of the Warragul branch, and would be a substantially more costly option.

A new connection to Warragul from the Longford-Dandenong pipeline

Connecting a new pipe from the Longford-Dandenong pipeline to Warragul would be costly due to the:

- length of pipe required;
- extra expense involved in hot tapping a high pressure Class 600 pipeline; and
- installation and continuing maintenance of a new meter, regulator and heater.

A new compressor at the start of the Warragul pipeline

This option would require more expense and maintenance than duplicating the Warragul branch pipeline.

Assessment

Duplication of the Warragul branch pipeline is the preferred option for solving the Warragul constraint. This option will be analysed using diameters of 100 mm and 150 mm, with the entire length of the branch pipeline duplicated.

Modelling Methodology

The 1 in 20 winter peak day demands for 2006–2010 were established using forecast data provided by Origin Energy Assets Management (OEAM), together with the system demand forecasts included in the 2005 Gas APR. Demands beyond 2010 were then extrapolated using this data.

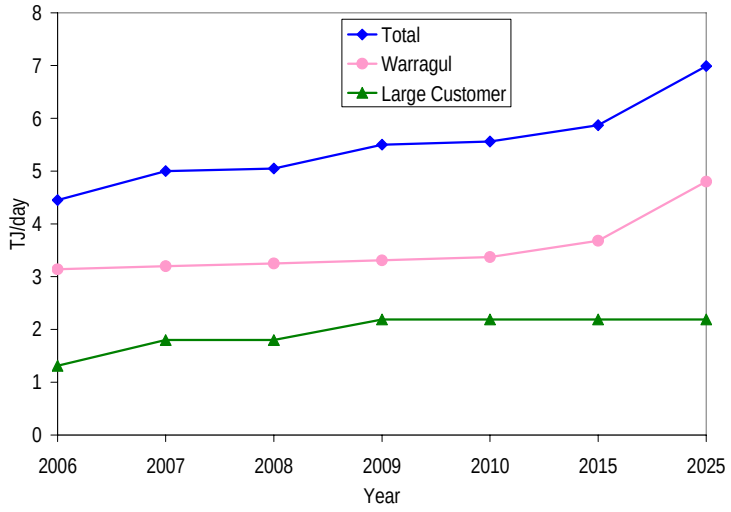
Table 2 lists the forecast load for the town of Warragul, with the proposed expansion of the large commercial customer. The outlook to 2025 was assessed for pipeline duplication options.

Table 2 - 1 in 20 peak day demand forecast, including expansion (TJ)

Year	2006	2007	2008	2009	2010	2015	2025
Warragul	3.14	3.20	3.25	3.31	3.37	3.68	4.80
Large Customer	1.13	1.80	1.80	2.19	2.19	2.19	2.19
Total	4.27	5.00	5.05	5.50	5.56	5.87	6.99

Figure 2 shows the forecast load under the same circumstances.

Figure 2 – 1 in 20 peak day demand forecast, including expansion (TJ)



To forecast the delivery pressures along the Lurgi pipeline, the Gregg Engineering PTS model's inputs were varied to reflect the demand growth.

Modelling Assumptions

The latest Gregg Engineering model was used to forecast delivery pressures incorporating all proposed new connection points.

The modelling assumptions include the following:

- Forecast loads as per the VENCorp customer transfer meter (CTM) peak day forecast.
- Hourly demand profiles for Warragul are based on the actual demands recorded during 10 August, the peak day for 2005 (see Appendix 1).
- Jeeralang is assumed to be operating at a flat rate throughout the day (although this is unlikely on a 1 in 20 day, it is nevertheless included as a worst-case scenario).
- Morwell City Gate (CG) pressure is set to 2,760 kPa and the Morwell back-up regulator is set to 1,800 kPa.
- Full availability of transmission assets is assumed, with no forced outages.

Results Analysis

Table 3 lists the modelling results for the period 2009–2025.

Table 3 - 1 in 20 winter peak day forecast Warragul pressures (kPa)

Duplicate pipe diameter	Minimum Pressure Obligation (kPa)	2009	2010	2015	2025
No duplication	1,400	1,339	NA	NA	NA
100 mm	1,400	2,017	1,974	1,877	1,644
150 mm	1,400	2,150	2,111	2,051	1,913

Conclusion

The assessment shows either a 100 mm or a 150 mm duplicate pipeline will ensure that Warragul pressures are maintained above 1,400 kPa until 2025. Duplication using a bigger diameter pipe would extend this timing and avoid a possible further duplication beyond 2025. Economic analysis would be required to determine the most cost-effective option.

Recommendations

It is recommended that the Warragul branch pipeline be duplicated with 100 mm or 150 mm diameter pipe prior to winter 2009.

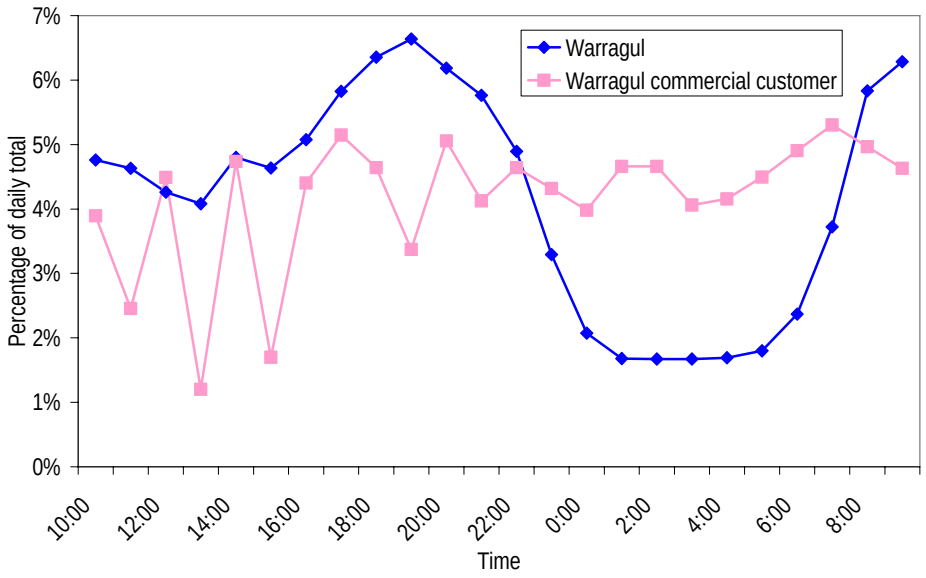
Definitions

CG	City Gate.
DB	Distribution Business; a distribution pipeline network operator.
DB Connection Deed	An Agreement between VENCorp and a Distribution Business.
DCG	Dandenong City Gate, from which gas leaves the transmission system and enters the distribution system at Dandenong.
Gas APR	Gas Annual Planning Report, published by VENCorp by 30 November each year.
Minimum Pressure Obligation	The minimum pressure obligation stipulated in the System Security Guidelines and/or Distribution Business Connection Deeds that VENCorp must operate the system to maintain.
OEAM	Origin Energy Assets Management
PTS	The Principal Transmission System, serving Gippsland, Melbourne, Central and Northern Victoria, Albury, the Murray Valley region, Geelong, and the western region of Victoria. The PTS is owned by GasNet and operated by VENCorp.
SSG	System Security Guidelines, developed and maintained by VENCorp, for the operation and security of the PTS.

APPENDIX 1

Figure 3 shows the hourly demand profiles (expressed as a percentage of the daily total) for Warragul and Warragul's large commercial customer on 10 August 2005, as used for the modelling.

Figure 3 - Warragul profiles, Warragul town and large commercial customer



The two demand profiles do not generally appear to peak at the same time.