NETWORK PLANNING REPORT - T002

BALLARAT (Timing)

March 2007

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Executive Summary

The increasing demand along the Brooklyn-Ballarat pipeline has raised the prospect of the minimum pressure obligation at Ballarat being breached during days of high demand. This report assesses the impact of increased demand on the maintenance of the minimum pressure obligation

This report presents a network planning assessment of minimum delivery pressures at the various city gates located on the Brooklyn-Ballarat pipeline. The report uses historical data, demand forecasts, and the Gregg Engineering model of the Principal Transmission System (PTS) to predict the year delivery pressures are likely to fall below the minimum pressure obligation.

The modelling results indicate that a breach in the minimum pressure obligation is likely to occur at the Ballarat City Gate (CG) under 1 in 20 peak day conditions in 2010.

Introduction

The increasing demand along the Brooklyn-Ballarat pipeline has raised the probability that shortfalls in gas deliveries will occur at the Ballarat City Gate (CG). Figure 1 shows the Ballarat system withdrawal zone (SWZ) schematic. Tariff V (residential) load in this SWZ is growing at 4% pa, which is significantly higher than the State average of 1% pa. Gas flowing to Ballarat can currently enter from two major junctions:

- Brooklyn, where gas from the Inner Ring main and the South West Pipeline (SWP) enters the Brooklyn--Ballarat pipeline; and
- Wandong, where gas from the Wollert-Culcairn pipeline enters the Wandong--Mt Franklin pipeline.

This report presents a:

- review of demand and delivery pressures along the Brooklyn--Ballarat pipeline for days when lowest delivery pressures occurred at the Ballarat CG; and
- brief analysis of the forecast demand and delivery pressures for the period 2007–2010.

The report also identifies a specific year beyond which delivery pressures on a winter peak day are likely to fall below the minimum pressure obligation.

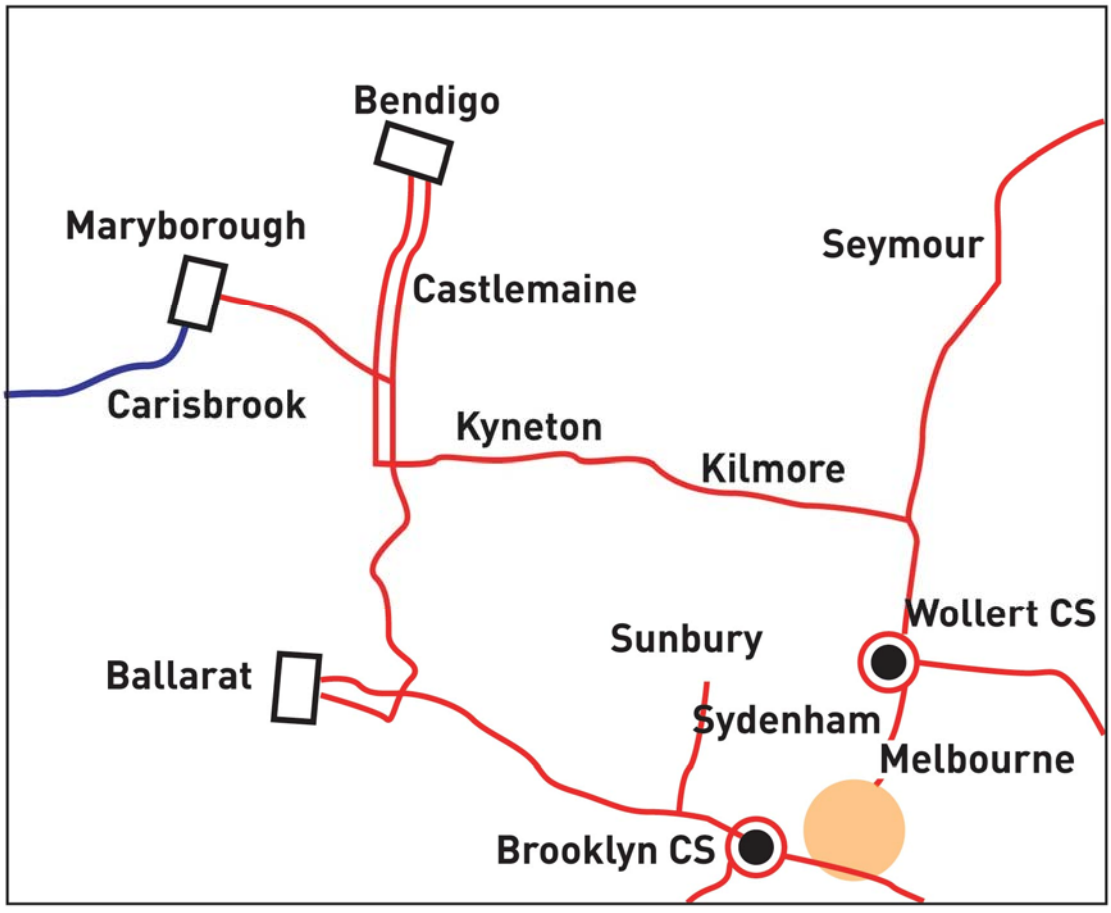
Planning Inputs

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

Table 1 - Key planning inputs

Item	Detail
Forecast demand data	Supplied by SP AusNet and 2005 Gas APR [1]
Historic 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

Figure 1 - Ballarat system withdrawal zone schematic



[1] The 2005 report represents 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.

Assessment

Historical Demand and Minimum Pressure Review

An investigation of the recorded delivery pressures at the Ballarat CG revealed occurrences of pressure approaching the minimum pressure obligation of 2,000 kPa. The lower pressure readings did not always coincide with peak system demand days, but appeared related to the management of linepack, and the operation of the Brooklyn Compressor Station.

Figure 2 shows the daily profile for the lowest recorded delivery pressure. Figure 3 shows the corresponding daily demand profiles. A search of the Ballarat SWZ demand data for 2001-2005 revealed significant demand increases along the Brooklyn-Ballarat pipeline with a steady growth in demand through Ballarat. In particular, high demand along the Sunbury lateral showed a marked effect on the delivery pressure at the Ballarat CG. Figure 4 shows the hourly pressure profile for 11 August 2003, when system demand was 930 TJ/d and delivery pressure at Ballarat was at its lowest for the winter.

Figure 2 - Pressure profiles, Ballarat 2001-2005

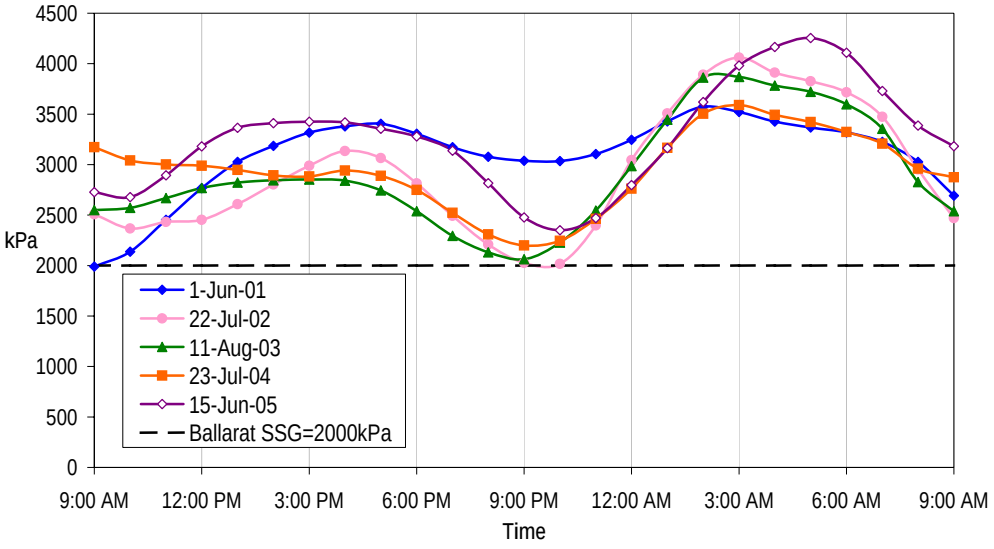


Figure 3 - Demand profiles, Ballarat 2001-2005

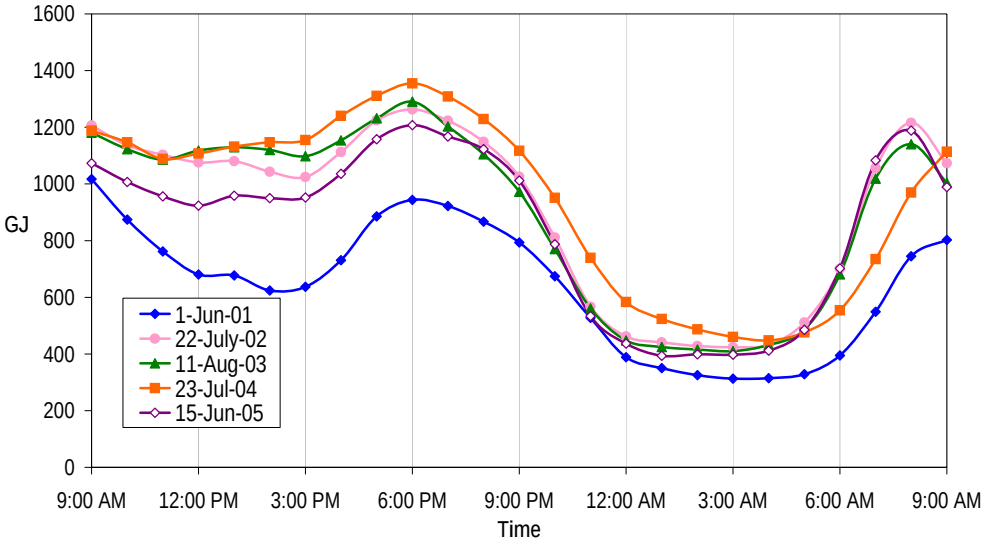
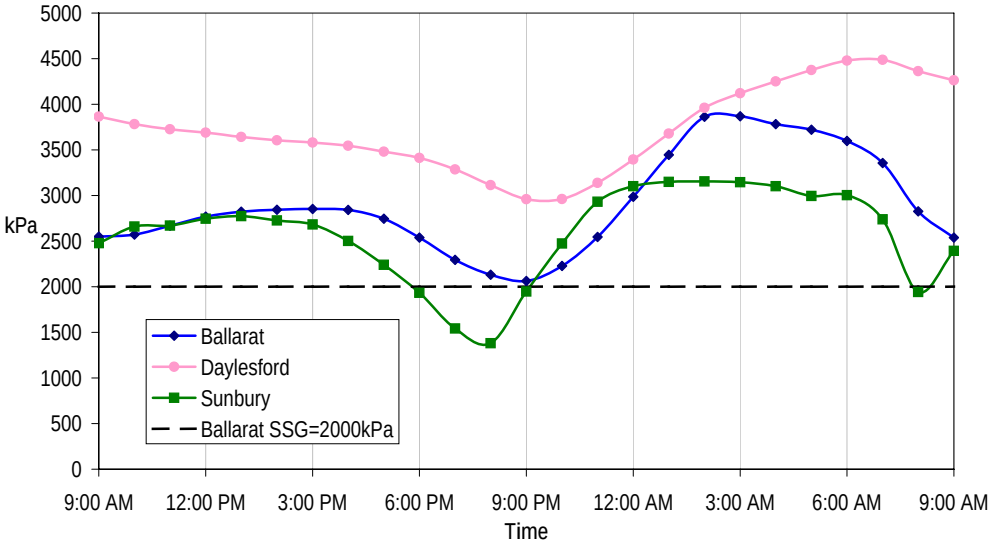


Figure 4 - Pressure profile, Ballarat SWZ 11 August 2003



Forecast Demand

The winter peak day demand for 2006–2010 was established using forecast data provided by the relevant Distribution Business (DB), together with the system demand forecasts included in the 2005 Gas APR (listed in Table 2). Table 2 also lists the 2002–2005 historical demand, weather normalised to the 1 in 20 winter peak day demand standard.

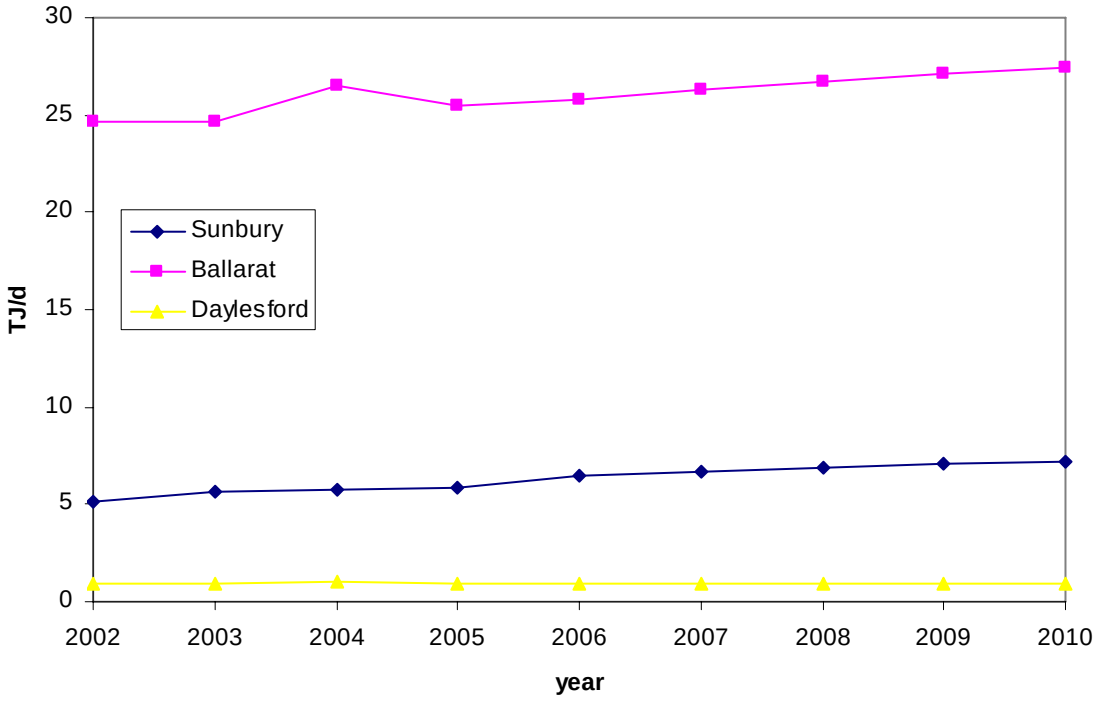
Table 2 - 1 in 20 winter peak day demand (TJ/day)

Location	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sunbury	5.18	5.69	5.72	5.81	6.44	6.63	6.86	7.09	7.24

Ballarat	24.61	24.62	26.46	25.48	25.79	26.35	26.75	27.12	27.47
Daylesford	0.96	0.91	0.99	0.96	0.94	0.95	0.96	0.97	0.97

Figure 5 shows the increase in winter peak day demand for the period 2002–2010.

Figure 5 - Yearly winter peak day demand (TJ/d)



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:

- The modelling uses the Gas APR standard approach that applies the 1 in 20 peak day with a beginning-of-day (BOD) linepack of 20 TJ below target with an initial forecast based on a 1 in 2 peak day that is rescheduled from 1300 hrs.
- Forecast demand for the Sunbury lateral is based on hourly peak loads provided by SP AusNet.
- Other loads are as per the 2005 Gas APR.
- Hourly demand profiles for Ballarat are based on the actual demands recorded during 10 August, the peak day for 2005.
- Compressor efficiency is assumed to be 67% (Brooklyn) and 70% (Wollert).
- Injection profiles are assumed to be flat.
- Liquefied natural gas (LNG) is to be used as required to maintain Dandenong CG inlet pressure.

- Full availability of transmission assets is assumed, with no forced outages.
- The maximum compressor power to Ballarat at the Brooklyn Compressor Station is equivalent to 1,700 kW.

Table 3 lists the modelling results, performed for the period 2007–2010.

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

Location	Minimum Pressure Obligation (kPa)	2007	2008	2009	2010
Sunbury	1,100	1,726	2,373	1,200	536
Ballarat	2,000	2,508	2,966	2,390	2,138
Daylesford	3,000	3,933	3,945	3,825	3,609

The higher pressure at Ballarat during 2008 can be attributed to the Brooklyn Compressor Station delivering higher pressure gas into the Ballan pipeline. The compressor station's ability to do this is due to the higher suction pressures that will exist with the larger injections of Otway Basin gas into the South West Pipeline (SWP). It is assumed that beyond 2008, these injections would have levelled out to the point were there is no significant impact on the Ballan pipeline. The modelling also indicates that the injections of Otway gas during 2008 will have no effect on delivery pressures along the Ballan-Mt. Franklin pipeline, north of Daylesford.

The modelling indicates that in winter 2010, the delivery pressure to Ballarat is just above the minimum pressure obligation. Considering modelling errors and the weakening delivery pressures along the Brooklyn-Ballarat pipeline, with the increase in demand from the Sunbury lateral, the assessment indicates a high likelihood of a breach in the minimum pressure obligation at Ballarat during winter 2010.

Conclusion

Delivery pressures at Ballarat will be affected by the increasing demand throughout the Ballarat SWZ. The modelling results conclude that a breach in the minimum pressure obligation is likely to occur at Ballarat under 1 in 20 peak conditions in 2010.

Definitions

CG	City Gate
DB	Distribution Business; a distribution pipeline network operator.
DB Connection Deed	An Agreement between VENCorp and a Distribution Business.
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.
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.
SWZ	System withdrawal zone.
SWP	The South West Pipeline, comprising the transmission pipelines between Iona and Lara.