



NETWORK PLANNING REPORT - P002

BALLARAT (Planning)

March 2007

Disclaimer

VENCorp has prepared this report in reliance upon information provided by various third parties to it. VENCorp has not independently audited or verified the data or information provided, but has used its reasonable endeavours to ensure that this report accurately reflects the information provided to VENCorp by those parties.

This report also contains certain predictions, estimates and statements which are based on third party information and third party computer software that reflect various assumptions concerning amongst other things, economic growth scenarios, supply of gas, demand growth forecasts and developments in the Victorian Gas Market. These assumptions may or may not prove to be correct.

In view of the foregoing, VENCorp does not provide any warranty or representation as to the accuracy, reliability, completeness or suitability for particular purposes of the information in this Report. VENCorp and its employees, agents and consultants shall have no liability (including liability to any person by reason of negligence or negligent misstatement) for any statements, opinions, information or matter (expressed or implied) arising out of, contained in or derived from, or for any omissions from, the information in this report.

Contents

Executive Summary 4

Introduction 5

Planning Inputs 6

Constraint Timing 7

Augmentation Options..... 7

Discussion..... 7

Assessment 7

Conclusion 8

Recommendation..... 8

Definitions 9

Executive Summary

As indicated in VENCORP's Network Planning Report (T002) - Ballarat (Timing), March 2007, 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.

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

- additional compression at the Brooklyn Compressor Station;
- duplication of a section of the 200 mm Brooklyn-Ballararat pipeline; and
- duplication of the 150 mm Mt Franklin-Ballan bifurcation pipeline.

Based on current modelling, the preferred solution to this constraint involves duplication of the Mt Franklin-Ballan pipeline using 300 mm pipe, prior to winter 2010.

In relation to GasNet's Compressor Strategy Document, VENCORP has undertaken some preliminary modelling of the effects of that document's recommendations on the Principal Transmission System (PTS). Further detailed modelling will be conducted to identify whether there is any scope for system optimisation. This network planning report will be updated to reflect the results.

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. VENCORP's Network Planning Report (T002) - Ballarat (Timing), March 2007, indicated a high likelihood of breaches in the minimum pressure obligation at Ballarat under 1 in 20 peak day conditions in 2010.

This report presents a:

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

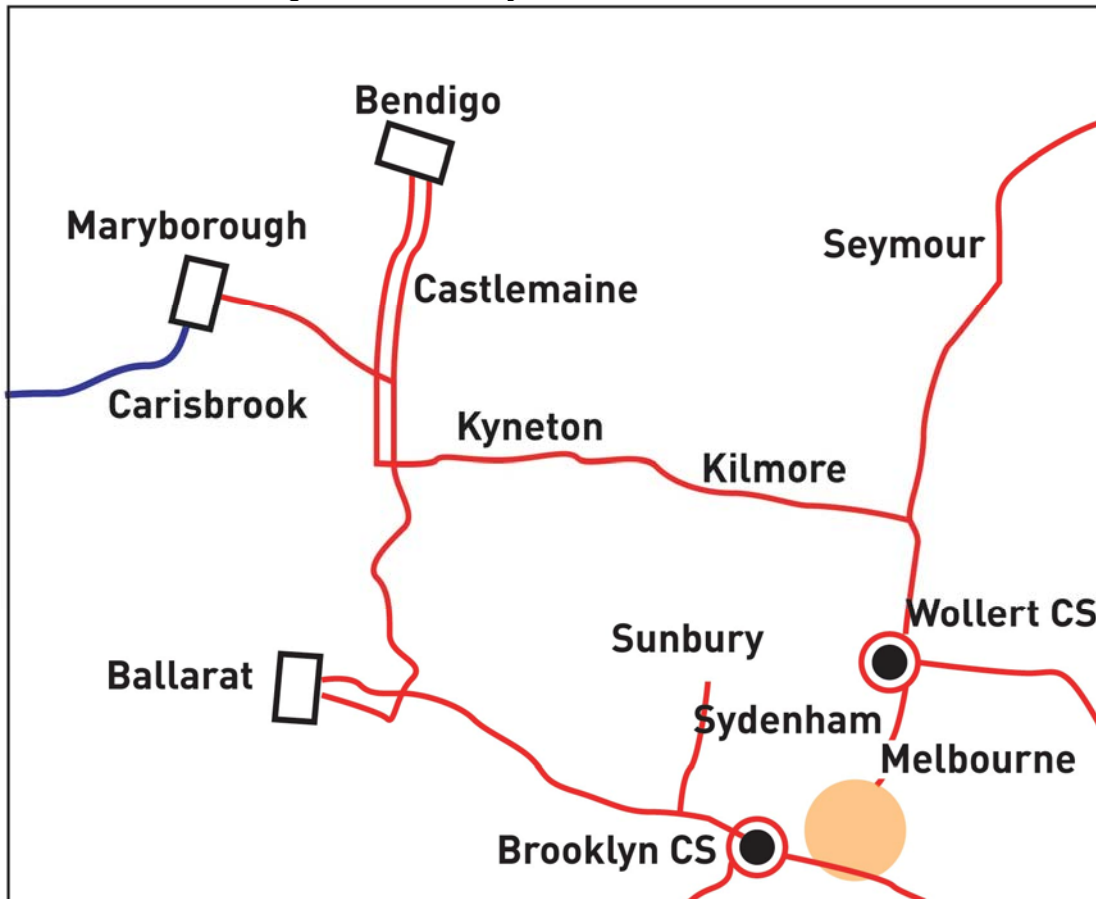
Planning Inputs

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

Table 1 - Key planning inputs

Item	Detail
Forecast demand data	Supplied by SP AusNet and 2005 Gas APR ¹
Historical data	Extracted from VENCORP's TADIS data base
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 - T002 Ballarat (Timing)	VENDocs #178656

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.

Constraint Timing

As identified in VENCORP's Network Planning Report – T002 Ballarat (Timing), the augmentation for the Ballarat constraint is required prior to winter 2010.

Augmentation Options

The augmentation options considered include:

- additional compression at the Brooklyn Compressor Station;
- duplication of a section of the 200 mm Brooklyn-Ballarat pipeline; and
- duplication of the 150 mm Mt Franklin-Ballan bifurcation pipeline.

Discussion

Additional compression at the Brooklyn Compressor Station

A new dry-seal Centaur compressor set (Compressor Unit 12) is currently being installed at Brooklyn, which is capable of compressing from Melbourne to either Geelong or Ballarat. The new compressor provides increased compression capacity (allowing the existing units to be used for redundancy), and is scheduled for commissioning in late 2007.

Any further compression at Brooklyn is not a preferred long-term option, due to the increased risk of compressor failure.

Duplication of the Brooklyn-Ballarat pipeline

The easement for the Brooklyn-Ballarat pipeline between Brooklyn and Mt Cotterell will be fully utilised by the existing pipeline and the proposed Corio Loop (to be constructed by winter 2008). A new pipeline in this location would require new easement acquisition. Pipeline duplication west from Mt Cotterell towards Ballarat could use the existing easement.

Duplication of the Mt Franklin-Ballan pipeline

The 200 mm Brooklyn-Ballarat pipeline has twice the capacity of a 150 mm Mt Franklin-Ballan pipeline. However, greater incremental benefit derives from duplicating a smaller diameter pipeline than a larger diameter pipeline, because a pipeline's pressure loss is proportional to its total cross-sectional area. As a result, the preferred option is to duplicate the Mt Franklin-Ballan pipeline.

This duplication will:

- solve the Ballarat constraint; and
- add to the security of supply to Ballarat (from the Wollert-Wodonga pipeline) and to Bendigo (by increasing the system's capacity to supply from Brooklyn-Bendigo if required).

Assessment

Duplication of the Mt Franklin-Ballan pipeline is considered the most appropriate option. This option was assessed in detail using the Gregg Engineering software.

Modelling Assumptions

The modelling assumptions include the following:

- The modelling uses the Gas APR standard approach that applies a simulation over two days. The first day is a 1 in 2 peak day with forecast error such that the end-of-day (EOD) linepack is 20 TJ below target. The second day is a 1 in 20 peak day with an initial forecast based on a 1 in 2 peak day that is rescheduled from 1300 hrs to the 1 in 20 peak day demand.
- Liquefied natural gas (LNG) is used as required to maintain the pressure at Dandenong.
- Forecast demand for the Ballarat SWZ is based on hourly peak loads provided by SP AusNet.
- Loads as per the VENCORP customer transfer meter (CTM) peak day forecast.
- Hourly demand profiles for Ballarat off-take 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).
- 1,700 kW of duty compression compressing from the Geelong pipe (header) at Brooklyn.
- 1,700 kW of duty compression at Wollert.
- Injection profiles are assumed to be flat.
- There is no load for gas power generation (GPG).
- LNG is to be used as required to maintain Dandenong CG inlet pressure.
- Full availability of transmission assets is assumed, with no forced outages.

Results Analysis

Gregg Engineering modelling was performed for the years 2010, 2015 and 2020, to assess the proposed duplication. Table 2 lists the modelling results.

Table 2 - Forecast Ballarat pressures (kPa) for a 1 in 20 winter peak day

Augmentation	Minimum Pressure Obligation (kPa)	2010	2015	2020
Duplication with 300 mm pipe	2,000	2,819	2,356	2098

The modelling results show that duplication of the existing 40 km of 150 mm Mt Franklin-Ballan pipeline with 300 mm pipe would:

- solve the Ballarat constraint until at least 2015; and
- reduce the need for operation of the Brooklyn compressors.

Conclusion

The duplication of the Mt Franklin-Ballan pipeline with 300 mm pipe is the preferred solution to the Ballarat constraint.

Recommendation

It is recommended that the 40 km of 150 mm pipeline between Mt Franklin and the Ballan bifurcation be duplicated with 300 mm pipe prior to winter 2010.

Definitions

Ballan bifurcation	The location (near Ballan) where the Brooklyn-Ballarat pipeline splits to feed Ballarat and Bendigo.
BoD	Beginning-of-day, as used in relation to a linepack target.
CG	City Gate.
DB	Distribution Business; a distribution pipeline network operator.
DB Connection Deed	An Agreement between VENCORP and a Distribution Business.
EoD	End-of-day, as used in relation to linepack target
Gas APR	Gas Annual Planning Report, published by VENCORP by 30 November each year.
GasNet's Compressor Strategy	GasNet's document dated September 2006, which sets out the compressor strategy to support GasNet's Corporate Plan. The document provides details about the current and proposed operations at existing compressor stations, and details the facilities and proposed augmentations.
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