Victorian Transmission System

Addendum to
Review of
Gas to Culcairn Project
and
Western Outer Ring Main Project

18 December 2012

Sleeman Consulting

Contents

1 Executive Summary

This Addendum has been prepared to assist the Australian Energy Regulator with an assessment of the following two aspects of a revised access arrangement proposal submitted by APA GasNet Australia (Operations) Pty Ltd for the Victorian Transmission System:

- the programme of work proposed to increase the capacity for export of gas at Culcairn; and

- upgrading work proposed for the Brooklyn Compressor Station.

The key observations and conclusions made within this Addendum are:

1.1 Gas to Culcairn Project

The programme of work now proposed is designed to increase Culcairn gas export capacity from its present level[1] of 42 TJ/d to 68 TJ/d. The required increase in export capacity is based upon incremental shipper requirements, as previously accepted by Sleeman Consulting[2], less the amount of present export capacity that is uncontracted.

The proposed programme of work has been modelled by Sleeman Consulting and confirmed to be appropriate. To achieve the required level of gas export capacity it is necessary to install 35.4 km of 450 mm diameter pipeline looping to the north of Wollert, upgrade the maximum allowable operating pressure ('MAOP') of Pipeline Vic:101 between Euroa and Springhurst, and install a gas compressor at Winchelsea on the South West Pipeline.

The required length of pipeline looping to the north of Wollert is greater than was set out in Sleeman Consulting's Report to the AER dated 25 July 2012 since the required increase in gas export capacity has gone up by just over 44%.

To facilitate the increased MAOP of the pipeline section between Euroa and Springhurst APA GasNet proposes to:

- relocate an existing mainline pressure reduction station ('PRS') from Euroa to Springhurst;
- install a new PRS at the inlet to the Euroa – Echuca lateral so that lateral can continue to operate at present pressure levels and, by means of a short pipeline extension, to supply gas to the Euroa city gate; and
- upgrade four gas offtake stations between Euroa and Springhurst.

[1] The present export capacity as modeled by AEMO has been revised from 48 TJ/d to 42 TJ/d. Of the 42 TJ/d of available capacity, 38 TJ/d is already contracted.
[2] See page 7 of Sleeman Consulting Report dated 25 July 2012.

As a consequence of the MAOP upgrading initiative, it is essential that the integrity of all interconnected infrastructure (laterals, city gates, etc) be protected. The works outlined above are considered to be prudent in that they achieve required technical outcomes safely and at least cost.

Finally, the proposed installation of a Centaur 50 compressor at Winchelsea is appropriate. It is consistent with recommendations made in Sleeman Consulting's Report to the AER dated 25 July 2012.

1.2 Brooklyn Compressor Station Works

APA GasNet has accepted that the Western Outer Ring Main ('WORM') Project will not be undertaken during Access Arrangement Period 4. In the absence of the WORM, and on the basis that gas can not be scheduled for receipt at Iona to meet requirements of the Ballarat and Geelong Zones, the Brooklyn Compressor Station ('BCS') must be available to operate as and when required, for example to compress gas to Ballarat during peak periods.

To ensure BCS is capable of safe, reliable operation APA GasNet proposes to:

- replace damaged station isolation valves;
- upgrade back-up generation equipment; and
- replace gas and oil coolers on compressors 10 and 11.

The total cost of the proposed work is $5.49m.

The requirements for replacement of damaged station isolation valves and for upgrading of back-up generation were previously accepted by Sleeman Consulting as being necessary[3].

The requirement for upgrade of cooling systems on compressors 10 and 11 is, for the following reasons, also accepted:

- the existing water-cooled heat exchange system is no longer best practice and is unreliable; and
- removal of the existing system will remove risk of Legionella disease outbreak, and will free up space at the BCS.

The works as proposed by APA GasNet are prudent and consistent with achieving the lowest sustainable cost of providing services.

[3] See Column 4 of Table 10 on page 37 of Sleeman Consulting's Report dated 25 July 2012.

2 Introduction

On 25 July 2012 Sleeman Consulting provided the Australian Energy Regulator ('AER') with an assessment of the Gas to Culcairn Project and the Western Outer Ring Main (or 'WORM') Project. The projects had been proposed by APA GasNet Australia (Operations) Pty Ltd ('APA GasNet') as necessary augmentations of the Victorian Transmission System ('VTS') to be taken into account in setting tariffs to apply for use of the system over the period 2013 to 2017.

On 11 September 2012 the AER released its Draft Decision on APA GasNet's access arrangement proposal for the period 2013 to 2017. In response to the Draft Decision, on 9 November 2012 APA GasNet submitted a revised access arrangement proposal. While the revised access arrangement proposal adopted the thrust of the AER's recommendations in relation to the Gas to Culcairn Project and the WORM Project, it also incorporated refinements to accommodate updated capacity demand forecasts, revised system modelling and impacts associated with continued operation of the Brooklyn Compressor Station.

This Addendum has been prepared to assist the AER with review of APA GasNet's revised proposals for expansion of Culcairn gas export capacity and for works to be carried out at the Brooklyn Compressor Station.

3 Gas to Culcairn Project

3.1 History

APA GasNet's original proposal of March 2012 was designed to increase Culcairn gas export capability by 33 TJ/d (from 48 TJ/d to 81 TJ/d). APA GasNet proposed:

- a total of 104.1 km of 450 mm diameter pipeline looping at locations between Wollert and Barnawartha; and

- expedited installation of a Taurus 60 compressor at Stonehaven on the South West Pipeline.

In reviewing the original proposal, and with regard for shippers' submissions, it was determined that the Culcairn gas export capacity needed only to be increased by 18 TJ/d (to 66 TJ/d), and that timing requirements were not as onerous as previously indicated. This, together with a revised approach to better utilise existing pipeline infrastructure, allowed the following alternative expansion proposal to be formulated, as set out in the AER's Draft Decision:

- installation of 27.2 km of 450 mm diameter pipeline looping to the north of Wollert; and
- installation of a Centaur 50 compressor at Winchelsea, or midway between Winchelsea and Iona.

It was also recommended that consideration be given to re-rating of the maximum allowable operating pressure ('MAOP') of Pipeline Vic:101 to the north of Euroa

3.2 Revised Proposal

APA GasNet's revised proposal has been prepared with regard for the following new information:

a) The present capacity for export of gas at Culcairn, as modelled by the Australian Energy Market Operator[4], has been reduced from 48 TJ/d to 42 TJ/d;

b) Commitments for use of Culcairn gas export capacity have, since APA GasNet's original proposal in March 2012, increased to 38 TJ/d, meaning only 4 TJ/d of uncontracted gas export capacity is presently available. The net export capacity increase now required is just over 44% more than was previously modelled; and

[4] See page 2 of APA GasNet Business Case BC175-Rev1, dated 7 November 2012. AEMO's updated, October 2012, modeling takes into account revised load profiles and modeling assumptions.

c) The requirement for receipt of gas at Iona has increased from 30 TJ/d to 49 TJ/d following receipt of two new shipper requests in August 2012.

To achieve the required increase in gas export capacity APA GasNet's revised proposal incorporates:

- installation of 35.4 km of 450 mm diameter pipeline looping to the north of Wollert;
- upgrading of the MAOP of Pipeline Vic:101 between Euroa and Springhurst; and
- installation of a Centaur 50 compressor at Winchelsea.

3.3 Review of Proposal

3.3.1 Revised Culcairn Export Capacity

The downward revision (from 48 TJ/d to 42 TJ/d) of the present capacity for export of gas at Culcairn, as modelled by AEMO, is supported by Sleeman Consulting.

The revised capacity more closely aligns with pipeline performance as modelled on a steady-state basis by Sleeman Consulting for a 1 in 20 peak demand day using typical pipeline performance assumptions.

3.3.2 Vic:101 Capacity Expansion Proposal

The programme of work proposed by APA GasNet to increase Culcairn gas export capacity from 42 TJ/d to 68 TJ/d has been modelled by Sleeman Consulting. The modelling confirms that a total of at least 35.4 km of 450 mm diameter pipeline looping is required to the north of Wollert, together with re-rating of the MAOP north of Euroa.

It is also accepted that re-rating of the MAOP to the north of Springhurst is not necessary to achieve the required increase in gas export capacity.

3.3.3 Work to Accommodate Vic:101 MAOP Re-rating

To accommodate the proposed higher operating pressure of the pipeline section between Euroa and Springhurst APA GasNet has:

a) proposed that the gas pressure reduction station ('PRS') presently located at Euroa be relocated to Springhurst;

b) proposed that the operating pressure of the Euroa to Echuca lateral be retained at its present level of 7.39 MPa; and

c) identified that work will be required to upgrade the MAOP of gas offtake stations ('city gates') between Euroa and Springhurst.

Sleeman Consulting supports the initiatives outlined above for the following reasons:

a) Following re-rating of the MAOP of the pipeline section between Euroa and Springhurst, installation of a mainline PRS at Springhurst is unavoidable[5]. It is preferable in terms of cost that the existing Euroa PRS (which will become redundant) be relocated to Springhurst rather than a new PRS constructed.

b) By installing a new PRS at the inlet to the Euroa – Echuca lateral it is possible to avoid need for:
   - replacement or upgrading of city gate stations at Shepparton, Tatura, Merrigum, Kyabram, Tongala and Echuca;
   - re-rating of the MAOP of the lateral itself; and
   - upgrading of the Euroa city gate (noting that this initiative requires installation of 20 metres of pipework to connect the city gate to the low pressure side of the new PRS instead of the re-rated mainline).

   In order of magnitude terms, Sleeman Consulting considers cost savings of at least $2.0m will be realised by installing a new PRS at the inlet to the Euroa – Echuca lateral. The proposal is therefore considered prudent.

c) To facilitate re-rating of the MAOP of the pipeline section between Euroa and Springhurst, upgrading of city gates at Benalla, Monsbent, Wangaratta and Wangaratta East is unavoidable[6].

APA GasNet forecasts total costs of $7.9m for re-rating of the MAOP of the pipeline between Euroa and Springhurst, inclusive

[5] Because the MAOP of Pipeline Vic:101 to the south of Springhurst will be 8.8 MPA while to the north of Springhurst it will remain at 7.39 MPa, a PRS is required at Springhurst. The PRS (referred to by APA GasNet as a class break) will ensure that the pipeline to the north of Springhurst is not exposed to gas pressures in excess of its allowable operating pressure.

[6] This is because the allowable operating pressure of gas pipeline and associated facilities must either have an allowable operating pressure not less than that of the pipeline from which it is supplied or, alternatively, there must be gas pressure regulation facilities between the respective pipelines.

of the items set out above. This compares favourably with the order of magnitude estimate[7] set out in Sleeman Consulting's Report of 25 July 2012.

3.3.4 SWP Capacity Expansion Proposal

The proposed installation of a Centaur 50 compressor at Winchelsea is in line with previous recommendations[8] and is supported. The northward gas transportation capacity increase available through installation of a Centaur 50 compressor at Winchelsea is estimated[9] to be 65 TJ/d, which comfortably meets the new forecast requirement.

3.4 Conclusion

APA GasNet's revised programme for expansion of Iona gas receipt capacity and Culcairn gas export capacity is consistent with Sleeman Consulting's recommendations of July 2012, modified as appropriate to take account of both AEMO's updated modelling of system performance and new requests / commitments for receipt / export of gas.

The revised programme is considered to be prudent and consistent with achieving the lowest sustainable cost of providing services.

[7] At page 23 an estimate of $5m was made for the costs of re-rating the pipeline MAOP between Euroa and Barnawartha. This was a preliminary estimate that did not include specific provision for consequent work on pipeline laterals, or for relocation of the Euroa PRS.
[8] See page 25 of Sleeman Consulting Report dated 25 July 2012.
[9] See page 11 of Sleeman Consulting Report dated 25 July 2012. Sleeman Consulting's estimate of the capacity increase is 65 TJ/d. APA GasNet's estimate of the capacity increase is 69 TJ/d.

4 Brooklyn Compressor Station Works

4.1 History

APA GasNet's original proposal of March 2012 included development of the Western Outer Ring Main ('WORM') as a means to mitigate the effects of a major interruption to gas supply from Longford, particularly in terms of the need for curtailment of gas supply to domestic customers.

The AER's Draft Decision had regard for the observation that, with installation of a gas compressor on the SWP, security of supply related benefits could be realised without need for development of the WORM. It was also noted however that, without the WORM, the Brooklyn Compressor Station ('BCS') would need to be retained in operation[10]. It was further noted that operating requirements for the Brooklyn Compressor Station would be dependent upon whether or not gas could be reliably scheduled for receipt at Iona in quantities to meet the requirements of the Ballarat and Geelong Zones.

4.2 Revised Proposal

Since APA GasNet has no control over scheduling of gas receipts at Iona it must ensure gas can be transferred from the Melbourne Zone via Brooklyn for delivery to the Geelong and Western Zones. This requires operation of the BCS.

To maintain safe, reliable ongoing operation of the BCS, APA GasNet proposes the following works:

- replacement of damaged station isolation valves (cost $0.91m);
- replacement of back-up generator (cost $0.35m); and
- replacement of gas and oil coolers for Brooklyn compressors 10 and 11 (cost $4.23m).

The estimated total cost of this work is $5.49m.

4.3 Review of Proposal

It is accepted that APA GasNet cannot rely upon gas being scheduled for delivery at Iona at rates and pressures to support gas supply to the Geelong and Western Zones. This is inherent in the design and operation of the Victorian gas market, and APA GasNet has provided relevant supporting evidence[11]. Accordingly, the BCS must be capable of reliable operations as and when required.

[10] See page 39 of Sleeman Consulting Report dated 25 July 2012.
[11] See page 2 of APA GasNet Business Case BC180, dated 26 October 2012.

In Sleeman Consulting's Report of 25 July 2012 it was accepted[12] that replacement of damaged station isolation valves (cost $0.91m) and the larger upgrade of back-up generation (cost $0.88m) would both be required.

It is understood APA GasNet now proposes to upgrade back-up generation by use of a diesel engine alternator ('DEA') rather than a more expensive gas engine alternator ('GEA'). This approach is considered prudent. While a DEA uses more expensive fuel than a GEA, fuel usage should be minimal since the unit is only required for back-up purposes. It is prudent to utilise the lower cost equipment.

The third item of work listed in paragraph 4.2 above (ie, replacement of coolers) was not specifically itemised by APA GasNet in its original access arrangement submission (March 2012). Rather, an upgrade to cooling systems was a component part of the modifications proposed[13] for the BCS in the event of the WORM Project not proceeding.

Sleeman Consulting accepts the cooling system upgrade is prudent for the following reasons:

- the existing water-cooled heat exchange system is no longer best practice, with air-cooling offering greater reliability. Water-cooled heat exchangers are susceptible to corrosion related failures as were experienced in 2010 on compressors BCS8 and BCS9. APA GasNet has already upgraded the cooling systems on other compressors to be retained in service; and

- removal of the cooling water tower will remove risk of Legionella disease outbreak, and will free up space on the congested Brooklyn site.

APA GasNet's forecast project cost is based upon specific experience with previous conversions of this nature, and is therefore considered reasonable.

4.4 Conclusion

The works proposed by APA GasNet for the Brooklyn Compressor Station are necessary and appropriate to ensure ongoing safe and reliable operation of the station. The works are prudent and consistent with achieving the lowest sustainable cost of providing services.

[12] See Column 4 of Table 10 on page 37. Information presented therein is applicable in the event compression is not installed on the SWP and also (as noted on page 39) in the event compression is installed but gas cannot be reliably scheduled for receipt at Iona.

[13] Refer to APA GasNet Business Case BC083, dated 3 March 2012, pages 9 and 17. Installation of new compressors BC12 and BC13 was proposed, along with upgrading work to existing compressors.