Australian Gas Networks
Access Arrangement 2016-21
South Australian Natural Gas Distribution Network

Comments
On
Australian Gas Networks' Response
to the
AER's Draft Decision

28 March 2016

Sleeman Consulting

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1. Background

1.1 In June 2015, Australian Gas Networks (**AGN**) submitted to the Australian Energy Regulator (**AER**) an Access Arrangement Proposal for the South Australian Gas Distribution Network (**Network**) for the period 2016/17 to 2020/21.

1.2 I provided advice (**Initial Advice**) to the AER on the prudency and efficiency of capital expenditure forecasts for selected projects included by AGN in its plans for the Network over the period 2016/17 to 2020/21. The AER considered my Initial Advice in preparing its November 2015 Draft Decision on AGN's Access Arrangement Proposal.

1.3 In January 2016 AGN submitted to the AER its Response to the AER's Draft Decision (**Response**).

1.4 I have been asked by the AER to consider and comment upon those aspects of the Response that relate to projects reviewed in my Initial Advice and for which AGN has not accepted the position of the AER as set out in the Draft Decision.

1.5 My review and comments are set out in the following sections of this Report.

2. Augmentation Capex

2.1 Southern Transmission Line (Pipelines M21 and M53)

2.1.1 In my Initial Advice I:

i) noted that, although there is a widespread problem of pitting corrosion under heat-shrink sleeves fitted to the Southern Transmission Pipeline, the wall thickness of the pipeline material remains adequate for the pressure at which the pipeline is operated; and

ii) recommended that statistical analysis be carried out to quantitatively identify the probable range of pitting corrosion depths, and a programme implemented to monitor pipeline condition so as to reliably determine when replacement is justified.

2.1.2 In its Response[1], AGN has:

i) provided findings from a detailed review of the depths of pitting identified to date, the purpose of such review being to predict the likely deepest pitting condition at a 95% confidence level;

ii) utilised the abovementioned prediction as a basis for forecasting the remaining life of the Southern Transmission Pipeline;

iii) concluded that replacement of the pipeline could potentially be deferred to 2021/22 but that this would necessitate a rigorous monitoring programme (to monitor the ongoing corrosion problem);

iv) recommended that replacement take place in 2019/20 (two years later than originally proposed) to ensure safety and to avoid the need for a monitoring programme (the cost of which, in present value terms, would exceed the benefit associated with further deferring the replacement); and

v) further recommended that replacement of the section of the M53 pipeline that crosses Christies Creek (the integrity of which has been compromised following wash away of concrete covering) should take place in 2016/17, in the absence of replacing the pipelines in the next AA period.

2.1.3 Having regard for the information presented by AGN in its Response, I understand and comment as follows:

i) At a 95% confidence level, the estimated maximum corrosion pit depth is 2.4 mm on pipeline M53[2]. This estimated depth happens to correspond to the maximum depth observed in exploratory excavation work undertaken to date.

ii) AGN has applied an industry-standard corrosion rate of 0.4 mm pa[3] to estimate the remaining life of pipelines M21 and M53 as being the time it will

[1] See section 1.3.2.1 of AGN "Attachment 8.9: Response to Draft Decision on Capital Expenditure", January 2016 and "Addendum to Business Case SA21" (provided in Attachment 7.1A to the Response).

[2] See "Attachment A" to AGN "Response to AER Australian Gas Networks 038", 12 February 2016.

take for the remaining wall thickness to be reduced to 20% of the original pipe wall thickness[4].

iii) I note that the 0.4 mm pa figure is recommended for use in determining reinspection intervals. I also note however that corrosion rates are unpredictable and may be higher under disbonded coating than in the case of bare steel. The manner in which the 0.4 mm pa figure has been used by AGN is not unreasonable for planning purposes.

iv) The remaining wall thickness assumption (referred to in paragraph ii) above) is reasonable and prudent. It corresponds with the point at which it is recommended[5] that replacement of a gas pipeline be considered.

v) AGN has estimated the remaining life of pipelines M21 and M53 to be 8 and 6½ years, respectively, from mid 2015[6]. Since pipeline M53 accounts for 80% of the combined length of the two pipelines, replacement of both pipelines by the end of 2021 is recommended. AGN seeks to replace the pipelines during 2019/20 following front end engineering and design work in 2018/19.

vi) Regarding the remainder of the length of pipelines M21 and M53, there is considerable uncertainty regarding actual remaining life. The uncertainty is attributable to a combination of factors including uncertainty regarding actual depth of corrosion and uncertainty regarding ongoing corrosion rates.

vii) I consider assessment of the need for replacement of pipelines M21 and M53 should also have regard for the possible consequences of failure of a pipeline. The most likely failure mode for either pipeline is pitting corrosion leading to a loss of containment, in turn resulting in a leak. I am concerned that a failure of this nature on a pipeline in a built up area could have major consequences, for example, if the path of gas leakage was through other infrastructure or conduits and ignition occurred.

viii) In view of the observation set out above, I consider pipelines M21 and M53 must be replaced in a timely manner.

ix) However I consider AGN's recommended inspection programme to be excessive.

x) Noting (as set out in paragraph iii) above) that the corrosion rate adopted by AGN in its analysis is intended for use in determining reinspection intervals, I consider the next series of inspections could be deferred until 2017/18, at which time (July 2017) the probable estimate of residual wall thickness will

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3 See page 3, section 3.1 and footnote 6, of AGN "Addendum to Business Case SA21" (provided in Attachment 7.1A to the Response), January 2016. The 0.4 mm pa figure is sourced from ANSI/NACE SP0502-2010 "Standard of Practice External Corrosion Direct Assessment Methodology (SP0502), clause C3.2.

4 See paragraph 1.b) of AGN, "AER Australian Gas Networks 044", 1 March 2016.

5 See Appendix L to ASME B31.8-2012 "Gas Transmission and Distribution Pipeline Systems". While this Appendix is not mandatory, it provides sound guidance regarding the remaining strength of a corroded pipeline.

6 See section 3.1 of AGN "Addendum to Business Case – SA21" (provided in Attachment 7.1A to the Response), January 2016.

be 3.15 mm[7]. This exceeds the overall wall thickness required for the operating pressure of the pipeline, and is more than double the minimum wall thickness referred to at paragraph ii) above.

xi) While a decision on the need for and timing of subsequent inspections will be influenced by the outcome of the 2017/18 programme, on the basis of the information set out above I presently concur that inspections will need to be carried out annually from 2017/18.

xii) I have assessed the impact of the change I suggest at paragraph xi) above and have determined that implementation of this change would decrease the present value of the Option 2[8] to $5,569k. This is still higher than the present value of Option 1 (two year deferral of replacement of pipelines).

xiii) Accordingly, I support AGN's proposed programme for replacement of pipelines M21 and M53.

2.1.4 In conclusion, in my opinion the pipeline replacement programme as now proposed by AGN is reasonable and prudent as it will ensure ongoing safety and reliability of service and is consistent with achieving the lowest sustainable cost of delivering services.

2.2 Murray Bridge Augmentation

2.2.1 In my Initial Advice I:

i) noted that the gas demand growth forecast adopted by AGN to justify the Murray Bridge Augmentation appeared excessive;

ii) noted that alternatives, such as increasing the operating pressure of the existing 50 mm pipeline supplying gas to Murray Bridge, should be considered; and

iii) concluded that construction of the proposed new gas pipeline to supply gas to Murray Bridge was not necessary during the period to 2020/21.

2.2.2 In its Response[9], AGN has:

i) clarified the gas demand outlook for Murray Bridge, explaining that the augmentation is required to meet an ongoing growth rate that reflects historic levels (rather than to meets the needs of possible new estate

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7 That is 6.35 mm original wall thickness less 2.4 mm maximum pit depth (as at mid 2015 at 95% confidence level) less 2 times 0.4 mm pa.

8 See Table 3.3 on page 5 of AGN "Addendum to Business Case – SA71" (provided in Attachment 7.1A to the Response), January 2016.

9 See section 1.3.2.2 of AGN "Attachment 8.9: Response to Draft Decision on Capital Expenditure", January 2016 and "Addendum to Business Case – SA71" (provided in Attachment 7.1A to the Response).

developments)[10] and to ensure potential requirements of 'Tariff D' customers can be satisfied[11];

ii) quantified the costs of, and capacity benefits achievable through, two possible regimes[12] for increasing the operating pressure of the existing pipeline supplying gas to Murray Bridge;

iii) concluded that the Murray Bridge Augmentation will be required during the forthcoming Access Arrangement Period, with the augmentation proposed for completion in 2019; and

iv) accepted that a one to two year deferral of the augmentation project, with associated time value of money benefits, may be possible through a modest (0.1 MPa) increase in the operating pressure of the existing pipeline, the cost of which will be 'relatively low'[13].

2.2.3 I consider that the gas demand growth scenario adopted by AGN for planning purposes (that is, annual peak demand growth of 50 m^3/hr) is fair and reasonable. The outlook reflects historic growth.

2.2.4 In my Initial Advice[14] I noted that the extent to which the operating pressure of the existing pipeline to Murray Bridge might be increased would be subject to the capability of other components. I accept of course that the operating pressure of the pipeline must not exceed its licensed maximum allowable operating pressure (**MAOP**).

2.2.5 I have modeled the capacity of the existing Murray Bridge pipeline and I consider that the capacity increase achievable through consecutive 0.1 MPa and 0.09 MPa increases in the operating pressure of the pipeline will be of the order of 7.9% and 6.5% respectively. This confirms the estimates presented by AGN[15].

2.2.6 I agree that it would not be commercially prudent to take the existing pipeline off-line to allow it to be hydrostatically re-tested to achieve a 0.09 MPa upgrade in the MAOP[16]. I note however that AGN has made no reference to the option for seeking approval for an upgrade of the MAOP pursuant to section 9 of AS2885.1-2012. This section sets out a systematic process for upgrading the MAOP of a pipeline to a level higher than that for which it was originally approved.

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10 See pages 1, 2 and 4 of AGN "Addendum to Business Case – SA71" (provided in Attachment 7.1A to the Response), January 2016.

11 See page 5 of AGN "Addendum to Business Case – SA71" (provided in Attachment 7.1A to the Response), January 2016.

12 See pages 5 and 6 of AGN "Addendum to Business Case – SA71" (provided in Attachment 7.1A to the Response), January 2016. The first regime is low cost and involves increasing the operating pressure of the pipeline by 0.1 MPa. The second regime involves carrying out work to increase the licensed maximum allowable operating pressure of the pipeline by 0.09 MPa to 1.89 MPa.

13 Page 6 of AGN "Addendum to Business Case – SA71" (provided in Attachment 7.1A to the Response), January 2016.

14 See footnote 16 on page 6 of Initial Advice.

15 See page 6 of AGN "Addendum to Business Case – SA71" (provided in Attachment 7.1A to the Response), January 2016.

16 See pages 6-7 of AGN "Addendum to Business Case – SA71" (provided in Attachment 7.1A to the Response), January 2016.

2.2.7 Notwithstanding the above (paragraph 2.2.6), since the rating of sub-components of the Murray Bridge pipeline constrains any potential operating pressure increase to 0.9 MPa[17] (unless the pipeline can be taken out of service and expenditure is incurred to upgrade sub-components) I agree with AGN's view that an upgrade of the MAOP is not justified.

2.2.8 However, I consider that, in the interest of achieving the lowest sustainable cost of providing pipeline services, the low cost initiative of increasing the operating pressure of the existing Murray Bridge pipeline to 1.75 MPa should be implemented. This is likely to allow the Murray Bridge Augmentation project to be deferred by two years to 2020/21. I accept that this outlook is sensitive to changes in the gas demand of 'Tariff D' customers. If gas demand growth is higher than forecast, the need for the augmentation may be brought forward. Conversely, if growth is lower than forecast or if an existing 'Tariff D' customer was to close down, the need for the augmentation may be further delayed.

2.2.9 Having regard for the above, I accept that the Murray Bridge Augmentation is likely to be required during the forthcoming Access Arrangement Period and, in particular, by 2020/21.

2.2.10 In my Initial Advice I did not give consideration to AGN's estimated cost of completing the Murray Bridge Augmentation. This was because the augmentation was not considered to be necessary.

2.2.11 In its original Access Arrangement Proposal, AGN considered the following two options for supplementing the capacity of the existing Murray Bridge pipeline[18]:

Option 1: 150 mm diameter, cost $3.01m
Option 2: 100 mm diameter, cost $2.94m

2.2.12 AGN selected option 1, largely in view of the significant extra capacity available for minimal incremental cost. The 150 mm diameter pipeline has capability to service both long term growth and potential future supply of gas to Monarto.

2.2.13 AGN has advised[19] that the estimated cost of the new gas pipeline is based upon the cost of similar projects that were competitively tendered. I consider this cost to be reasonable and prudent having regard for the following factors:

i) The pipeline will largely run through a built up area, constraining construction activities and necessitating restoration costs; and

ii) There is a railway crossing and at least one major road crossing.

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17 See page 6 of AGN "Addendum to Business Case – SA71" (provided in Attachment 7.1A to the Response), January 2016.

18 See page 4 of AGN "Business Case – SA71" (provided in Attachment 7.1 to the Initial Proposal), July 2015.

19 See page 1 of AGN "Business Case – SA71" (provided in Attachment 7.1 to the Initial Proposal), July 2015

3. Other Distribution System Capex

3.1 Installation of Fire Safety Valves (FSVs)

3.1.1 In my Initial Advice I:

i) accepted that continuation of a programme of installing FSVs on domestic meters in bush fire prone areas is prudent;

ii) did not accept that installation of FSVs at locations (yet to be identified) adjacent to brush fences is justified;

iii) did not accept that installation of FSVs in new and changeover domestic meter installations is justified; and

iv) suggested that installation of 1,000 FSVs per annum (in bush fire prone areas) would be realistic, achievable and manageable, reflecting the annual installation rate most recently achieved by AGN.

3.1.2 In its Response[20], AGN has:

i) argued that installation of FSVs in bush fire prone areas should proceed at a higher rate than 1,000 per annum in order to expeditiously reduce public exposure to property damage or personal injury;

ii) provided information to justify the proposed installation of FSVs at locations adjacent to brush fences;

iii) accepted that FSVs not be installed at new domestic sites or at existing sites when meters are changed; and

iv) proposed an overall average installation of 2,345 FSVs per annum (in bush fire prone areas and adjacent to brush fences), with the total number of FSVs in bush fire prone areas slightly increased from the previously proposed level to reflect updated data.

3.1.3 In consideration of the information provided by AGN I now accept that installation of FSVs at locations adjacent to brush fences is prudent. I previously considered the risk of a brush fence fire causing damage to a gas meter to be very low, since a convergence of factors (brush fence close to meter and brush fence catching fire) needed to exist. I accept AGN's view that, in the event these factors do converge, the risk that the fire may escalate for an undetermined period is best (ie prudently) avoided.

3.1.4 I also accept that it is prudent for the installation of FSVs in bush fire prone areas to be expedited, the key issue (as noted by AGN[21]) being the rate at which installations may be completed.

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[20] See section 1.3.6.2 of AGN "Attachment 8.9: Response to Draft Decision on Capital Expenditure", January 2016 and "Addendum to Business Case SA31" (provided in Attachment 7.1A to the Response).

[21] See section 3.1 of AGN "Addendum to Business Case – SA31" (provided in Attachment 7.1A to the Response), January 2016.

3.1.5 I note again[22] that AGN originally proposed to install in excess of 13,000 FSVs over two years (2011/12 and 2012/13) but, by the end of 2015/16, will have completed only 4,800 FSV installations, the historic rate of installation of FSVs being as follows[23]:

2013/14: 2,294 installations
2014/15: 1,453 installations
2015/16: 1,053 installations[24]

3.1.6 While AGN has not explained why the rate of installation of FSVs has declined, I accept that capability has been demonstrated to complete around 2,300 installations per annum.

3.1.7 Recognising the desirability of completing the FSV installations, I therefore consider AGN's proposed rate of installation of FSVs (2,345 per annum) to be reasonable. The proposed rate of installation is of the same order as was achieved by AGN in 2013/14.

3.2 Sleeved Railway Crossings

3.2.1 In my Initial Advice I:

i) accepted as being prudent an ongoing programme of inspecting sleeved railway crossings (to ensure safe and reliable operation of the transmission pressure pipeline system into the long-term);

ii) noted that, since the programme to date has not identified any major corrosion problems, there is no compelling need for the programme to be expedited; and.

iii) recommended the programme be continued at a rate of 5 inspections per annum, reflecting the average rate achieved by AGN over the period 2011/12 to 2015/16.

3.2.2 In its Response[25], AGN has clarified the historic rate at which inspections have been completed. Specifically, AGN completed 25 inspections over a three year period (rather than a five year period that I had understood to be the case), representing eight inspections per annum.

3.2.3 Given the clarification presented by AGN, I accept an ongoing inspection rate of eight per annum is achievable. I consider this rate of completion of inspections to be reasonable and prudent.

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22 This is as noted at paragraphs 4.2 i) and 4.2 ii) of my Initial Advice.

23 See AGN "AER Australian Gas Networks 007_AGN response", 4 August 2015 p. 5.
See also section 3.1 of AGN "Addendum to Business Case – SA31" (provided in Attachment 7.1A to the Response), January 2016.

24 AGN provided that 3,747 FSVs were installed in 2013/14 and 2014/15. See section 3.1 of AGN "Addendum to Business Case – SA31" (provided in Attachment 7.1A to the Response), January 2016. The number of installations for 2015/16 is the difference between the 4,800 FSVs AGN expects to install in the current AA period and the 3,747 FSVs installed in 2013/14 and 2014/15.

25 See section 1.3.6.1 of AGN "Attachment 8.9: Response to Draft Decision on Capital Expenditure", January 2016.