Amadeus Gas Pipeline Access Arrangement 2016/17 – 2020/21

Comments on APT Pipelines (NT) Pty Limited's Response to the AER's Draft Decision

4 April 2016



Contents

		Page
1.	Background	2
2.	Below Ground Station Pipework Recoating	3
3.	Channel Island Lateral Piggability Project	4



1 BACKGROUND

- 1.1 In August 2015, APT Pipelines (NT) Pty Limited (**APTNT**) submitted to the Australian Energy Regulator (**AER**) an Access Arrangement Proposal for the Amadeus Gas Pipeline (**AGP**) for the period 2016/17 to 2020/21.
- 1.2 I provided advice (**Initial Advice**) to the AER on the prudence and efficiency of capital expenditure forecasts for selected projects included by APTNT 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 APTNT's Access Arrangement Proposal.
- 1.3 In January 2016 APTNT 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 APTNT 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 BELOW GROUND STATION PIPEWORK RECOATING

- 2.1 In my Initial Advice I:
 - i) agreed that inspection and repair of below ground station pipework coating is prudent;
 - ii) noted however that, since inspection and repair work completed to date had revealed only minor metal loss with no threat to pipeline integrity, the inspection and repair programme need not be expedited; and
 - iii) recommended that the ongoing inspection and repair programme be progressed at a slower rate (4 per annum) than proposed by APTNT (25 over a 3 year period) in order to reduce the present value cost of the programme whilst ensuring the benefits of fixed cost tendering were still realised.
- 2.2 In its Response, APTNT has:
 - i) indicated that the benefits of fixed cost tendering will be compromised if the inspection and repair programme is prolonged. This is due to factors including equipment hire, mobilisation and supervisory costs; and
 - ii) submitted that the inspection and remediation programme needs to be completed as planned, rather than over an extended period, to achieve the lowest cost outcome.
- 2.3 I note that Power and Water Corporation (**PWC**), the principal user of the AGP, has advised¹ that:
 - i) deferral of the Below Ground Station Pipework Recoating project (Recoating Project) is no longer an option, with 50% of the project already complete by the end of 2015; and
 - ii) the fixed cost component of the project is only part of the total project cost quoted by APTNT, with the balance essentially comprising contingencies and project management costs.
- 2.4 APTNT has subsequently² clarified that the cost estimate for the Recoating Project includes an 'allowance for rock' (use of which is dependent upon the extent to which rock is encountered during field work), and has substantially reduced the estimated overall cost of the project (to \$8,941,364 as at February 2016).
- 2.5 I accept that completion of the Recoating Project in the timeframe as proposed by APTNT is prudent since this is the basis upon which the benefit of fixed cost contracting has been secured and the overall cost of the project minimised.

¹ Section 4 of *Submission to the AER* dated 4 February 2016.

² See APTNT Response to Information Request No. 13a, 18 March 2016.

3 CHANNEL ISLAND LATERAL PIGGABILITY PROJECT

- 3.1 In my Initial Advice I:
 - i) noted that while intelligent pigging of gas pipelines is desirable, it is not mandated by Australian Standard AS2885;
 - ii) noted that alternatives to pigging (such as DC voltage gradient surveys (DCVGs) together with dig-ups and inspections) are available and should be assessed;
 - iii) noted that the short 200 mm diameter section of the Channel Island Lateral (**CIL**) that crosses the Channel Island Bridge can be readily visually inspected;
 - iv) concluded that the Capex proposed by APTNT to make the CIL piggable was neither efficient nor consistent with achieving the lowest sustainable cost of providing services; and
 - v) recommended that a pig launcher and a pig receiver be installed (at an estimated total cost of \$1.1m) to allow intelligent pigging of the 300 mm diameter pipeline from the Darwin City Gate Station (DCGS) to a location just upstream of the Channel Island Bridge and that the short section of pipeline on Channel Island be monitored by extrapolation of pigging results backed by excavations and inspections.
- 3.2 In its Draft Decision the AER adopted the recommendation set out at paragraph 3.1 v) above.
- 3.3 In its Response APTNT addressed subject matter as outlined below
 - 3.3.1 APTNT considers³ the CIL Piggability project must be assessed with consideration for "the risks and consequences of pipeline failure". APTNT:
 - i) notes that the Channel Island Power Station is critical infrastructure;
 - ii) comments that the consequences of a failure of the CIL are dependent upon factors including the failure location and nature (from pinhole to full bore rupture), gas pressure, whether ignition occurs and whether people are in the vicinity of any gas release; and
 - iii) suggests that a plausible worst case CIL failure scenario is a full bore rupture, with potential to cause fatal injuries to persons within 180 metres of the gas release site, hospitalisation injuries to persons within 300 metres and power supply interruption for a week or potentially significantly longer.
 - 3.3.2 APTNT outlines its understanding of obligations under AS2885, making the following key points:
 - i) AS2885 covers a broad range of pipeline sizes, lengths, design lives, functions and materials. APTNT considers the Standard to be

³ Section titled "Risks and Consequences", page 34 of Response.

pragmatic in respect of the need for in line inspection (**ILI**), recognising⁴ there are circumstances where it is not "possible or necessary" to carry out ILI. APTNT provides four examples of circumstances where, in its opinion, ILI might not be possible or necessary; and

- ii) APTNT misquotes⁵ AS2885 as stating that any decision not to run an ILI (including a decision to not modify a pipeline to make it piggable) "needs to be considered in the context of the requirements of" the safety management study. APTNT considers the clear intent of the Standard is that the CIL "should be made piggable unless there is a valid and compelling reason not to", and considers the AER has given insufficient weight to this requirement.
- 3.3.3 APTNT has acknowledged that:
 - i) visual inspection would be acceptable for the section of the CIL that is slung under the Channel Island Bridge; but
 - ii) DCVGs neither provide an indication that metal loss is occurring nor provide an indication of all types of coating defect (including disbonded coating);
 - iii) the soil to air interface (where the exposed section of CIL on the Channel Island Bridge enters the bridge abutment) is a location of potential accelerated corrosion but cannot be examined visually;
 - iv) extrapolation of results from ILI pipeline sections to non-ILI sections may be unreliable owing to differing construction practices, environmental conditions and effectiveness of cathodic protection; and
 - v) reliance on DCVGs and excavation inspections is not sufficient to address risks associated with corrosion of the CIL.
- 3.3.4 APTNT requires a practical solution to ensuring the integrity of the CIL and considers "good industry practice" will only be achieved by making the CIL piggable⁶.
- 3.3.5 Finally, APTNT submits that the cost estimate of \$1.1m, set out in my Initial Advice for installation of pig launching and pig receival facilities, is low (in part because installation of a pig receiver immediately upstream of the Channel Island Bridge would require extensive civil works). APTNT comments that it estimated a cost of \$10.7m for installation of two pig launching and two pig receival facilities and that my estimate should be increased to \$5.014m.

⁴ Page 37 of Response. APTNT has relied upon, but elaborated upon, advice received from GPA Engineering (December 2015).

⁵ Page 37 of Response. I note that a verbatim quotation of AS2885 appears at pages 7 – 8 of the report prepared by GPA Engineering, but that the Standard is subsequently misquoted.

⁶ Page 41 of Response.

- 3.4 In its submission⁷ to the AER, PWC has:
 - i) questioned the commercial viability of making the CIL piggable, noting that benefits that will flow from the project may not justify the costs of the project plus the costs (as yet unknown) of carrying out repairs;
 - suggested that the key corrosion related concern with the CIL (metal loss under failed heat shrink sleeves) is unlikely to result in a burst failure of the pipeline;
 - iii) advised that it is responsible for managing and paying for⁸ the project to make the CIL piggable; and
 - iv) expressed the view that there is no imperative for the CIL to be made piggable, and indicated that it proposes to investigate alternatives including undertaking dig ups to assess the present condition of the CIL and/or construction of an entirely new pipeline.
- 3.5 I note that Territory Generation (**TGen**) has also made a submission to the AER specifically regarding the proposed Channel Island Bridge Project. TGen comments that:
 - i) the project as proposed does not address risks associated with its requirements;
 - ii) the project as presently proposed is <u>not supported</u> by TGen as it does not align with TGen's gas supply plans, may cause disruption during construction and does not provide a second source of gas supply.
 - iii) TGen's preference is to construct a new gas supply lateral of its own, running from the Wickham Point Pipeline, and that the cost of its proposal will be of the same order as the cost of making the CIL piggable.
- 3.6 APTNT has subsequently⁹ asserted that TGen and PWC both support the CIL Piggability project. I am unable to reconcile the clear difference between APTNT's position and that expressed by PWC and TGen.
- 3.7 My response to the subject matter presented by APTNT in its Response is set out in the following paragraphs.
 - 3.7.1 Requirements of AS2885
 - i) I agree that it is desirable that ILI of gas pipelines be carried out.
 - ii) I consider it beyond doubt that, if the CIL was being constructed today, it would have a consistent diameter for its entire length and it would be piggable. However, since that the CIL is already in place the way in which AS2885 applies to <u>an existing pipeline</u> must be contemplated.

⁷ Section 5 of Attachment to letter dated 4 February 2016.

⁸ See footnote 6 (Confidential) to PWC submission for further detail.

⁹ Page 5 of APTNT Response to Information Request No. 13a, 18 March 2016.

- iii) Section 6.6.1 of AS2885.3 provides that "Where a pipeline (or section of a pipeline) is not capable of being inspected by an inline tool, the Licensee shall consider whether the pipeline needs to be modified to permit inspection..." [emphasis added].
- iv) I agree with APTNT's view that AS2885 is pragmatic in respect of the need for ILI and/or for modification of an existing pipeline to permit ILI. APTNT postulates limited circumstances in which it is "not possible or necessary" to carry out ILI.
- v) Since it is presently not possible to carry out ILI on the CIL, the matter to be determined is whether or not the CIL should be <u>modified</u> to permit ILI. A decision as to whether or not the pipeline should be modified should have regard for risks and consequences (addressed in section 3.6.2 below) and <u>also</u> for costs and benefits.
- vi) In my opinion, AS2885 does not go so far as to require replacement of a pipeline (or section of pipeline) that is not piggable.
- vii) In addition to the circumstances postulated by APTNT, for which ILI need not be carried out, it is my opinion that the pragmatism of AS2885 extends to circumstances in which the costs of carrying out ILI exceed the potential benefits of doing so. APTNT has provided no assessment of all possible costs associated with pigging of the CIL (see section 3.7.3.1.i) below), nor has it quantified the benefits that may be realised.
- viii)Contrary to APTNT's suggestion¹⁰ (paragraph 3.3.2.ii) above) that a decision not to make the CIL piggable must be considered in the context of the requirements of the safety management study (**SMS**), the actual requirement¹¹ of AS2885 is that such a decision be "...consistent with the safety management study and PIMP...".
- ix) Rather than a decision not to make the CIL piggable being subservient to the SMS (and the PIMP), the two must be consistent with each other. In preparing the safety management study, the piggability of a pipeline should be taken into account. It is not the SMS that determines whether a pipeline must be piggable, or not.
- x) I note¹² that the present SMS for the AGP was prepared on the assumption that the CIL would be made piggable, but that the SMS is now due for review. It will be prudent for the forthcoming review of the SMS to have regard for actual circumstances so as to ensure consistency between the piggability of the CIL and the basis of the SMS.

3.7.2 Risks and Consequences

i) I agree with APTNT's view that the CIL piggability project should be assessed with consideration for the risks and consequences of pipeline failure.

¹⁰ And also the repeated suggestion of GPA Engineering throughout its AER Draft Decision Review of December 2016.

¹¹ Section 6.6.1 of AS2885.3-2012

¹² Section 4.3 of AER Draft Decision Review, GPA Engineering, December 2015.

- ii) I note that GPA Engineering refers¹³ to an assessment (conducted for the existing SMS) of the risks and consequences of undetected metal loss in an unpiggable section of pipeline. While the referenced scenario does not deal with supply of gas to critical infrastructure, it was concluded that the consequence was 'minor', the frequency was 'unlikely', and the overall risk was 'low'.
- iii) GPA suggested that an extended gas supply interruption is plausible in the case of the CIL, in which case (having regard for the critical infrastructure status of the Channel Island Power Station) the consequence could be 'severe' or 'major'. For the reason set out below, I consider the likelihood of an extended gas supply interruption to be at worst 'remote' (ie not anticipated), meaning the overall risk rating is 'negligible' to 'low' or, at worst, 'intermediate'.
- iv) The prospect of an extended gas supply interruption is remote since the principal concern with the condition of the CIL relates to disbonding of heat shrink sleeves applied in field when the CIL was constructed. Pitting corrosion can occur beneath disbonded sleeves, potentially resulting in leakage of gas. As noted below, this type of corrosion is highly unlikely to result in a pipeline rupture.
- v) By way of comparison, the 45 year old Southern Transmission Pipeline, that forms part of Australian Gas Networks' Adelaide gas distribution system, has widespread problems with disbondment of heat shrink sleeves and associated pitting corrosion. Australian Gas Networks accepts that the risk of a burst rupture is highly unlikely¹⁴. The Adelaide distribution system is operated by the APA Group, the parent company of APTNT.
- vi) It is also relevant to consider TGen's position, particularly since it is the sole recipient of gas from the CIL. Construction by TGen of a new pipeline to Channel Island will reduce the consequence of failure of the CIL to a 'trivial' or 'minor' level. With the likelihood of such failure being 'remote', the overall risk rating will be 'negligible'. TGen's intended approach (discussed further in section 3.7.3.4 below) will have a material impact upon the consequences of failure of the CIL.
- 3.7.3 Cost considerations
 - 3.7.3.1 APTNT Proposal
 - APTNT's estimated \$11.1m cost for making the CIL piggable for its <u>entire length</u> does not make provision for remedial work, if any, that may be required, including at locations already in need of attention - as identified though DCVGs but delayed pending development of pigging facilities.

¹³ Threat ID 1051, page 9 of Review of AER Draft Decision, GPA Engineering, December 2016.

¹⁴ See page 3 of "Addendum to Business Case – SA21", included in Attachment 7.1A of "Response to Draft Decision" for the AGN Access Arrangement, January 2016.

- ii) Depending upon remedial work requirements, overall costs incurred by proceeding with the project as proposed by APTNT may be higher, and potentially considerably higher, than the upfront \$11.1m estimate.
- iii) In my view it would be prudent to carry out a preliminary assessment of the condition of the CIL prior to committing to the CIL Piggability project (if such a commitment is to be made). This is discussed further in paragraph 3.7.3.3.

3.7.3.2 Draft Decision

- i) APTNT has suggested that the cost estimate set out in my Initial Report for establishment of a pig launcher at the Darwin City Gate Station and a pig receiver upstream of the Channel Island Bridge is too low. APTNT considers the estimate should be closer to half of what it provided¹⁵ for its third option (which involved installation of two launch and two receival stations). APTNT appears to have overlooked that its third option also included:
 - hot taps at either side of the bridge, and temporary bypass of existing pipework across and on either side of the bridge;
 - excavation and removal of existing 300 mm pipeline in the western abutment of the bridge, to allow tie in of a new 200 mm diameter pipeline from the bridge to a new pig receiver at the Channel Island Power Station;
 - construction of the new 200mm pipeline on Channel Island;
 - relocation of the bypass to allow excavation and removal of pipework in the eastern abutment of the bridge, and installation of new 200 mm pipework from the bridge to a new pig launching facility;
 - civil works to support construction of both pig receival and launching facilities immediately upstream of the Channel Island bridge;
 - design and management of the abovementioned works.
- ii) I do not accept APTNT's cost estimate of \$5.014m for a pig launcher at Darwin City Gate and a pig receiver to the east of the Channel Island Bridge. For the following reasons I consider this estimate to considerably overstated:
 - If APTNT's estimate is valid then the cost of a pig launcher to the east of the Channel Island Bridge and a pig receiver at the Channel Island Power Station (as also included in APTNT's third option) would be even higher, because the scope of work at Channel Island exceeds that at Darwin City Gate¹⁶.

¹⁵ APTNT provided \$10.7m for the third option, as referred to at page 42 of the Response.

¹⁶ There is already a riser at Darwin City Gate to which a pig launcher may be connected.

- After allowing for some economies that should be realised through coincident construction of both a pig launcher and a pig receiver to the east of the Channel Island Bridge, the total cost of the four pigging facilities (as included in APTNT's third option) would account for almost all of APTNT's \$10.7m cost estimate.
- APTNT's third option also includes replacement of the 300mm pipeline on Channel Island, and part of the 300 mm pipeline to the east of the Bridge) with 200 mm diameter pipeline. This will involve installation of bypass pipeline, excavation and removal of the existing pipeline (which is encased in stabilised sand), traffic management and extensive road repair.
- iii) For the following reasons I do however accept that the cost of installing a pig receival facility <u>immediately</u> upstream of the Channel Island Bridge is likely be higher than was set out in my Initial Advice:
 - I have visited the location in question and agree that civil works would be required to establish a suitable pad for the pig receival facility. Alternatively, the facility could be located further to the west (to where land is available for construction) but this would reduce (by around 1 km) the overall length of pipeline that can be pigged. In my judgement it is preferable to incur costs associated with civil works so as to maximise the piggable length of pipeline. On a desktop basis I estimate the cost of civil works to be of the order of \$350,000.
 - I also note that, in view of the proximity of the CIL to the Channel Island Road, traffic management requirements will be important and will add to the cost of the project.
 - Finally, enquiries regarding recent costs of sourcing/mobilising equipment to, and undertaking construction activity in, Darwin indicate a cost premium applies.
- iv) My revised estimate of the cost of a pig launching facility at Darwin City Gate and a pig receival facility to the east of the Channel Island Bridge is \$3.3m. I consider the accuracy of this estimate to be +/-50%.
- v) As an aside, I note that with my revised capex estimate (or, indeed, even with the \$5.014m capex figure proposed by APTNT) every field joint¹⁷ on Channel Island could be dug up and inspected and total discounted costs incurred would still be below the Capex provision sought by APTNT to make the CIL piggable. This suggests to me that APTNT has not adequately or prudently evaluated pipeline integrity management options available to it.

¹⁷ Based upon 30 dig-ups at a cost of \$10,000 each (as set out in paragraph 3.7.3.3.iv), and using a discount rate of 6%. Completing dig-ups remains lower in cost even if the cost <u>per</u> dig-up is as high as \$200,000.

3.7.3.3 PWC Initiatives

- i) PWC's proposal to undertake dig-ups to allow the condition of the CIL to be reliably predicted has merit.
- ii) In the event that dig-ups reveal material corrosion problems there would in turn be justifiable concern that, on top of the cost of making the CIL piggable (all or in part) significant remedial costs may be incurred. Accordingly, better options (such as that proposed by TGen) may be available.
- iii) In the event that dig-ups confirm that the integrity of the CIL is not compromised, arguments in favour of incurring significant expense to make the CIL piggable (all or in part) will be weakened.
- iv) APTNT has made provisions¹⁸ of \$300,000 for ILI of the CIL and \$50,000 for 5 verification dig-ups¹⁹ (carried out to verify ILI findings and improve data analysis, irrespective of whether repairs are required).
- v) I understand²⁰ the costs set out above are based upon historical costs. I consider the estimated unit cost of dig-ups to be acceptable, albeit with a risk that it may in some cases prove to be low²¹.
- vi) I have investigated²² the cost impact of undertaking a comprehensive dig-up programme and delaying the CIL Piggability project until at least 2021/22 or, alternatively, not undertaking the project at all. Two clear benefits of such an approach are that the need for the CIL Piggability project to be undertaken can be prudently assessed with regard for both:
 - the impact of TGen's proposed new pipeline, if constructed; and
 - the condition of the CIL and the need for / benefits of undertaking ILI.
- vii) On the basis that APTNT's full \$350,000 provision (for ILI and dig-ups) is immediately utilised to carry out nominally 35 dig ups²³ along the CIL, deferral of the CIL Piggability project will deliver the lowest cost of service. Having regard for the observations set out in paragraph 3.7.4 below, I consider this approach to be sustainable.

¹⁸ Source: APTNT's Response to Response to Information Request No. 13b, 21 March 2016.

¹⁹ Source: Table 7, page 17 of "Pipeline Integrity Management Plan, Northern Territory APA Group Assets", undated.

²⁰ See Item 4 of Appendix C to "Amadeus Gas Pipeline, Asset Management Plan, FY 2016-2020), 27 July 2015.

²¹ Depending upon dig-up locations, costs will be incurred for traffic management and/or for removal of stabilised sand from around the pipeline.

²² My investigation was carried out on a present value basis at a range of discount rates.

²³ Based upon APTNT's estimated cost of dig-ups.

3.7.3.4 TGen Alternative

- i) TGen has indicated that instead of making the CIL piggable its preference is to construct a new TGen owned lateral running from the Wickham Point Pipeline to the Channel Island Power Station.
- ii) I have not reviewed the cost of TGen's proposed pipeline lateral.
- iii) If TGen proceeds with construction at its cost of the proposed pipeline lateral then the risks and consequences associated with operation of the CIL (as discussed in section 3.7.2) will be materially impacted and the need for pigging of the CIL reduced or avoided.
- iv) TGen's decision regarding its proposed new pipeline lateral needs to be taken into account before a commitment is made to modification of the CIL to allow it to be pigged (either all or in part).

3.7.4 Timing

- i) In making a decision regarding the need for work to be carried out to make the CIL piggable, it is prudent to consider whether such work (if any) is urgent.
- ii) Information from dig ups to date of the CIL²⁴ and of below ground station pipework (discussed in section 2 above) showed that, while the problem of disbondment of heat shrink sleeves may be widespread, the consequent metal loss is **not material**.
- iii) While the ongoing practical solution to ensuring the integrity of the CIL needs to be confirmed, in my opinion there is time available to fully and prudently assess²⁵ whether or not this requires existing practices to be changed and/or work carried out to make the CIL piggable (all or in part).

3.8 Conclusions

Having regard for the subject matter set out above, my conclusions are as follow:

- i) No provision should be made for the cost of making the CIL piggable (either all or in part) in the period to 2020/21.
- ii) Provision should be made for dig-ups and inspections to allow an assessment of the present condition of the CIL. I recommend APTNT's \$350,000 provision (for ILI and dig-ups) be utilised for a programme of dig-ups.
- iii) TGen's intention regarding construction of a new lateral to supply gas to Channel Island Power Station must be ascertained.
- iv) Having regard for the findings from dig-ups and the intention of TGen, all options for ongoing prudent management of the integrity of the CIL should be considered with regard for costs, benefits, risks and consequences.

²⁴ Page 25 of the Pipeline Integrity Management Plan records that inspections carried out in 2011 did not detect any significant corrosion.

²⁵ The assessment should have regard for factors including but not limited to available alternatives (including the possible TGen initiative), costs and benefits, and risks and consequences.