# Roma-Brisbane Pipeline
# Access Arrangement 2017-22

# Review of Capital Expenditure Forecasts

**Report to**
**Australian Energy Regulator**


**Prepared by 4ei**
www.4ei.com.au


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# 1. SUMMARY

APT Petroleum Pipelines Pty Limited ("APTPPL") has submitted to the Australian Energy Regulator ("AER") proposed capital programs for the Roma to Brisbane Pipeline ("RBP") for the upcoming 2017-22 regulatory period, as well as actual and forecast expenditure for the current 2012-2017 regulatory period. AER has requested 4ei undertake a high-level review of certain of these programs. This report sets out those preliminary comments.

Three key factors underpin the majority of activity, in both type and level, on the RBP: the age of the original pipeline; its location, such as in relation to urban encroachment; and its relatively flat market outlook, with potential for a near-term significant reduction.

Based on the information provided by APTPPL, most of the activities presented by APTPPL for approval appear to be efficient and prudent, satisfying Rule 79 of the National Gas Rules. However, one proposal (the Dalby compressor overhaul) does not appear to satisfy Rule 79 and a further two key programs each have matters unresolved and/or require further detail and therefore an unqualified statement as to whether they appear to satisfy Rule 79 cannot be made at this time:

1. A substantial pipeline integrity management upgrade consisting primarily of In-Line Inspection and an ongoing program of excavations and repairs; and
2. The addressing of urban encroachment in the metropolitan area via a combination of operating pressure reduction and the installation of physical barriers along part of the pipeline.

Questions remain as to whether the activities outlined under each of these programs has been optimised to present the lowest cost effective solution, both in terms of the details of the factors APTPPL used to make its optimisation as presented, and the degree to which the potential for a reduction in market was considered by APTPPL.

Specifically in relation to the Pipeline Integrity Management program, detail to support the proposed unit rates for excavation and repairs is required, as well as clarification and detailing of assumptions relating to the anticipated effect of ILI data expected to be collected during the AA period, and clarification of potential overlapping of activity between Access Arrangement periods.

With regard to urban encroachment, a modification to APTPPL's approach may prove more appropriate, subject to clarification over market requirements for capacity in the Metro area and the feasibility and cost of changing the supply point for some loads currently on the original pipeline to the new loop.

# 2. BACKGROUND

APT Petroleum Pipelines Pty Limited ("APTPPL") has submitted to the Australian Energy Regulator ("AER") its proposal for capital programs for the Roma to Brisbane Pipeline ("RBP") for the upcoming 2017-22 regulatory period, as well as actual and forecast expenditure for the current 2012-2017 regulatory period.

AER has requested 4ei review certain of these programs and provide commentary on the prudency and efficiency of the proposed programs, consistent with the principles of the economic regulation of gas transmission assets. This report sets out this commentary based on a high-level review of information provided to 4ei by AER up to 28 October 2016.

This report is preliminary in nature, focused on identifying areas of further enquiry for the AER.

In reviewing the proposed and actual capital expenditure, 4ei has reviewed APTPPL's reasoning for the expenditure especially in light of alternative courses of action that may have been available and, consequently, to what degree the expenditure's prudency and efficiency as per Rule 79 of the National Gas Rules (NGR) has been demonstrated by APTPPL.

# 3. PROPOSED CAPITAL PROGRAMS

The proposed capital programs for 2017-2022 are categorised as replacement capital expenditure and stay-in-business capital expenditure. No expansion capital is forecast for the period.

| Asset Driver | 2017/18 | 2018/19 | 2019/20 | 2020/21 | 2021/2022 | Total |
|---|---|---|---|---|---|---|
| **Expansion** | - | - | - | - | - | - |
| **Replacement** (Integrity Mgmt Upgrade) | 8.70 | 10.25 | 5.46 | 6.81 | 6.38 | 37.59 |
| **Stay In Business** | 17.23 | 5.66 | 1.39 | 1.5 | 3.27 | 29.05 |
| **Total** | **25.92** | **15.91** | **6.84** | **8.31** | **9.65** | **66.64** |

Source: 2017-2022 RBP Access Arrangement revision submission – updated version submitted 16.09.16, Table 5.10, page 94

Many decisions required to be made in designing a capital program rely heavily on judgement, made in the context of industry-standard approaches and often on data requiring expert technical interpretation. Therefore, more than one set of activities can be judged as satisfying a pipeline owner's various obligations, with the overlay of prudency and financial efficiency refining the range of acceptable outcomes.

APTPPL prefaces its description of proposed capital programs with context that the forecast demand will not increase significantly during the forecast Access Arrangement ("AA") period[1]. Indeed, the potential for a decrease in demand is noted via recognition of the uncertainty surrounding the continued operation of the Incitec Pivot plant at Gibson Island, given that its existing gas contracts terminate in 2018, reduced profit margins and uncertainty over its ability to secure future gas supplies at the price it needs[2].

The impact of this demand outlook is that there is no forecast capacity expansion proposed by APTPPL. In addition, it places a different context on expenditure on the pipeline in general – where the market outlook for a pipeline's services is increasing over the foreseeable future, this provides prima facie justification for expenditure on maintaining (and possibly expanding) capacity. However, when faced with potentially declining demand, reducing pipeline capacity (for example, by operating the pipeline at lower pressures) may be prudent if it removes or reduces expenditure that would otherwise have to be made.

Market analysis is outside the scope of this report. 4ei assumes that the continuation of supply to Incitec Pivot has an essentially binary outcome – either it will continue at approximately historic levels or cease completely – although the timing of a ceasing of supply may be less clear, with the ending of current gas supply contracts in 2018 perhaps only indicating the current "best estimate" of a potential trigger. It has not been assessed whether capital expenditure is justified to maintain supply to Incitec Pivot (or, for that matter, any current customers) or, alternately, whether ceasing to supply Incitec Pivot assists in avoiding capital costs that would otherwise be incurred provides a greater benefit despite the lost revenue. However, general comments in relation to the proposed capital projects given the market outlook and the age of the pipeline can be made:

- Pipelines do require increasing expenditure as they age. In relation to the RBP, expenditure relating to excavations and recoating are increasing, a product of the construction techniques applied by the industry at the time the pipeline was originally constructed.

[1] APTPPL RBP AA submission, s5.1, page 75
[2] RBP AA submission, s3.5.2, page 33

- Given the magnitude of these expenses, analysis of the whole-of-life-cycle costs for the asset may be appropriate.
- Urban encroachment is an issue that needs to be addressed on the RBP on an ongoing basis, so it is appropriate for APTPPL to continue to monitor this and take action as needed. APTPPL's proposal reduces the potential cost by using targeted Maximum Operating Pressure (MOP) MOP reductions. Whether further MOP reductions can be achieved (and therefore lower expenditure than proposed), and the interaction of such a solution with the timing of a possible closure of Incitec Pivot, provides uncertainty as to whether the solution proposed by APTPPL is most appropriate.
- Trends in the expenditure on IT systems can be harder to identify, given that replacement of hardware, for example, may exhibit lives beyond two regulatory periods. APTPPL's extensive network of pipelines and its approach to standardising systems should yield a lower whole-of-life cost, subject to appropriate cost allocation between its pipelines.

# 4. PROPOSED REPLACEMENT CAPITAL EXPENDITURE

The RBP is a relatively old pipeline, with its original construction in 1969. Whilst it has been augmented subsequently (being looped in its entirety outside the Metro section, and partially along the Metro section), the original pipeline is known to exhibit characteristics consistent with similarly-aged pipelines, notably issues arising from the "over-the-ditch" application of its coating.

For the 2017-2022 period, approximately two-thirds of Replacement Capital Expenditure is forecast for excavations primarily targeting corrosion-related anomalies.

| Replacement (Integrity Mgmt Upgrade) | 2017/18 | 2018/19 | 2019/20 | 2020/21 | 2021/2022 | Total |
|---|---|---|---|---|---|---|
| **ILI** | 2.05 | 2.90 | 0.34 | 1.84 | 1.15 | 8.27 |
| **Excavations** | 5.41 | 6.11 | 4.07 | 3.76 | 4.33 | 23.69 |
| **CP upgrade** | 1.03 | 1.04 | 1.05 | 1.05 | 0.90 | 5.07 |
| **Other** | 0.20 | 0.20 | - | 0.15 | - | 0.56 |
| **Total** | **8.70** | **10.25** | **5.46** | **6.81** | **6.38** | **37.59** |

Source: 2017-2022 RBP Access Arrangement revision submission – updated version submitted 16.09.16, Table 5.13, page 107

## 4.1. PIPELINE INTEGRITY UPGRADE

### 4.1.1. What's proposed?

APTPPL has proposed continued In-Line Inspection (ILI), a substantial program of dig-ups and associated remediation of the pipeline coating and upgrade of the Cathodic Protection (CP) systems for the RBP.

### 4.1.2. Why is it proposed?

ILI inspection at regular intervals is a statutory obligation. Similarly, direct inspection of features identified through ILI via excavation with appropriate remedial work (notably, in the case of the RBP, the replacement of pipeline coating) and the use of CP is integral to statutory obligations including the maintenance of safety and asset life.

The actual number of excavations that will be undertaken would ordinarily be refined over time, as results from initial excavations enable refinement of correlations between identified anomalies and observed artefacts. Therefore, a forward program can only be based upon information available at the time of its initial formulation.

APTPPL's stated process for developing the profile of excavations and repairs was essentially:

- Comparison of anomalies identified in ILI runs, on a feature-by-feature basis where possible;
- Calculation of the observed growth rate of each feature and statistical analysis to identify the P95 growth rate;
- For High Consequence Areas, the predicted corrosion growth rate was increased by a factor of 1.25;

- Modelling of future annual growth of each feature by applying this P95 rate to each observed anomaly[3]; and
- Calculation of when excavation and repair of each anomaly is required based on calculation of pressure-related triggers and percentage-of-wall-thickness triggers (ie the earlier of these triggers determines the required timing of the repair).

APTPPL also states that it then grouped anomalies requiring repair that were in close proximity where a single excavation could address them. The number of anomalies so combined was not stated.

Costs per excavation and repair have been based on unit rates[4] of $57,861 in the Metro area and $41,367 for non-Metro. These were described by APTPPL as having been formulated for the initial AA submission, based on the FY16 forecast costs.

### 4.1.3. What are the alternatives?

APTPPL presents two alternatives to its proposed solution. Firstly, a "do nothing" option which is inappropriate over any extended period of time for a gas transmission pipeline, being inconsistent with statutory requirements and substantially increasing the risk of pipeline failure.

Secondly, APTPPL considers the replacement of the older sections of the RBP, an option it estimates at approximately $920 million. Whilst noting that this would reduce operating costs somewhat, APTPPL considers that this option is not a realistic alternative to its proposed program. 4ei notes that, prima facie, this argument appears very sound. However, a whole-of-life analysis of new-vs-existing pipelines would be required to comprehensively answer this, including such considerations as the market outlook for the pipeline (including potential reductions from the existing demand base), the optimal design of a new pipeline and ongoing pipeline integrity works beyond the next regulatory period. More pertinently for the RBP, the existing looping of the pipeline provides for potential consideration of a greater reliance on the DN400 (ie newer) pipeline relative to the original DN300 line, especially in the context of flat or reducing market demand.

APTPPL has assumed a reduction in excavations following the proposed ILI in 2019, consistent with typical improvements in data leading to more accurate (or less conservative) extrapolation to other parts of the pipeline. The methodology used to calculate the reduction has not been set out.

### 4.1.4. Commentary and conclusions

APTPPL's approach to estimating the number of repairs required generally appears sound. The manner of estimating growth rates of identified anomalies appears reasonable for maintaining the integrity of the pipeline indefinitely.

Future ILI can be expected to reduce the number of excavations otherwise required. This reduction comes from:

- An additional dataset improving the ability to estimate historic growth rates accurately (which are used to predict future growth rates); and
- "Resetting" the starting point for growth calculations with a (new, future) set of observed anomaly measurements – on a statistical basis, this new set of data as a group is likely to

[3] For the DN400 line, a relatively small number of anomalies were identified by ILI. APTPPL used the P100 growth rate from that data set (ie fastest observed growth rate) for estimating timing of required repairs. This greater conservatism is appropriate given the lower statistical reliability of a small dataset and the resultant small number of repairs forecast by the modelling.

[4] Source: "APTPPL Response to AER Information Request" dated 14 October 2016

indicate growth (as a group, not for each individual anomaly) around the (current) P50 growth rates.

In providing for a reduction in required repairs following ILI during the AA period, APTPPL may have used, for example, a mechanistic approach to this (for example, by changing assumptions in its modelling to provide a "best guess" of the outcome of a future ILI run) or relied on a high-level observation of excavation reductions made from history on the RBP and other pipelines.

In the absence of APTPPL's rationale for the quantum used for this reduction, an assessment of whether the number of excavations forecast post a future ILI run is efficient could be made by:

1. For each section of the pipeline, using the relevant P95/P100 growth rates as the basis for excavations up until the time of the next ILI run (ie as per APTPPL's current approach);
2. Estimate the data set of the next ILI run by projecting the P50 growth rate from the current data set; then
3. Using this estimated data set as a starting point (nett of any repairs that are anticipated to occur in the meantime), forecast the growth of these anomalies for the remainder of the period using the P95/P100 growth rate.

This revised projection of anomaly growth would then determine the number of repairs and excavations. Naturally, the actual program implemented by APTPPL will be refined over time and therefore may involve a higher or lower number of excavations and repairs. However, subject to specific knowledge of any bias in the current data set, the above approach should be a reasonable basis for preparing an efficient forecast of activity.

The number of repairs required is sensitive to the assumed growth rate. Consequently, the improvement in data interpretation and growth estimation from a future ILI run has the potential to substantially change the required number of repairs subsequent to that ILI run. How APTPPL has taken this into account is not clear and, therefore, it is difficult to assess the conservatism (or otherwise) in the predicted number of excavations for the later years of the AA period.

In relation to the unit cost, given the size of the program and the number of recent excavations undertaken on the pipeline (approximately 35 in FY15 and 75 in FY16) we would anticipate that these would be based on actual historic costs, with adjustment for factors such as differences in scope, differing land access and labour rate changes. Whilst these would be undertaken at a high level given the nature of unit costing, demonstration of the steps made in this estimation could provide confidence as to the rates' reasonableness.

Finally, in terms of presentation of the details of APTPPL's proposal, mention is made of the combining of anomalies requiring repair if they are in close proximity, thereby reducing the number of excavations required. Coupled with the presentation of information in a mixture of calendar year and financial years, and the consequent overlap between AA periods, this inhibits the ability to assess the forecast's reasonableness. For example, attempts to reconcile data[5] provided in APTPPL'S supporting business case indicate a lower number of excavations if the relevant calendar year (CY17 and CY22) periods are simply halved to reflect that only six months of these years fall within the 2017-22 AA period. This reconciliation approach, although highly simplified, produces a discrepancy of around 80 excavations. This is material when compared against the total AA program of 521.

In summary, there are a series of factors that have a material influence on the extent and cost of the excavation and repair program that are not clear in the submission and supporting documentation reviewed by 4ei:

[5] "Attachment 5-2 – Forecast Capital Expenditure Project Documents (Confidential)", page 6, graph and table

- the assumed impact (ie reduction) on number of repairs required, subsequent to future ILI runs;
- how the predicted unit rates for excavations and repairs have been determined; and
- reconciliation of calendar year excavation numbers to financial years, including the effect of any "carryover" of notionally current AA activity in to the 2017-22 AA period.

*Most of the steps in APTPPL's approach to modelling the anticipated number of repairs and excavations seems reasonable and appropriate. However, there is insufficient detail regarding the assumed benefit of future ILI runs in reducing future excavations as well as the assumed extent of combining anomalies requiring repair to provide unqualified statement as to the proposal's efficiency. Similarly, insufficient background to assumed unit rates, including substantiation based on actual historic costs, plus a lack of clarity around the treatment of potential overlaps between AA periods, inhibits an unqualified statement regarding the prudency and efficiency of the cost of the program.*

# 5. PROPOSED STAY-IN-BUSINESS CAPITAL EXPENDITURE

| Stay In Business | 2017/18 | 2018/19 | 2019/20 | 2020/21 | 2021/2022 | Total |
|---|---|---|---|---|---|---|
| **Total** | **17.23** | **5.66** | **1.39** | **1.5** | **3.27** | **29.05** |

APTPPL has proposed several projects within the Stay-In-Business Capital Expenditure category. Three of these programs are considered in detail below.

## 5.1. URBAN RISK REDUCTION

### 5.1.1. What's proposed?

APTPPL has proposed an MOP reduction plus the installation of physical barriers (eg concrete slabs) in metropolitan sections of the RBP, at a total cost of $11.0 million (inclusive of expenditure during the current AA period).

| Year Ending June | 2017/18 | 2018/19 | 2019/20 | 2020/21 | 2021/2022 | Total |
|---|---|---|---|---|---|---|
| **Urban Risk Reduction**[6] | 1.69 | 0.31 | 0.31 | 0.31 | 0.31 | 2.92 |

### 5.1.2. Why is it proposed?

Urban encroachment on the pipeline has increased risk levels associated with the pipeline in relation to likelihood of occurrence (increased activity in proximity to the pipeline) and the severity of consequence of occurrence (essentially that more people live in close proximity to the pipeline).

In addition, changes to community/legislative requirements for risk minimisation have changed since construction of the pipeline. Whilst the requirements are open to interpretation (nb uncertainty in relation to assessment of what constitutes ALARP), APTPPL's approach appears consistent with gas transmission industry practice.

### 5.1.3. What are the alternatives?

Four main alternatives (plus combinations of these alternatives) were considered by APTPPL:

a) MOP reduction to a sufficient extent that rupture risk is diminished substantially;
b) Replacement or looping of existing pipeline with a new, standards-compliant pipeline;
c) Installation of physical barriers to reduce the likelihood of damage to the pipeline by third parties; and
d) Increased awareness of the pipeline with third parties, such as through increased liaison with landowners, additional signage and additional patrols.

[6] Source: 2017-2022 RBP Access Arrangement revision submission – updated version submitted 16.09.16, Table 5.15, page 113

| | Effect | APTPPL cost estimate | Comment | Further potential considerations |
|---|---|---|---|---|
| **MOP reduction** | Reduces likelihood and consequence | $31m | APTPPL analysis indicates that MOP reduction alone would render capacity below the market's requirement. A significant portion of the estimated capital cost for this alternative relates to the installation of compression ($25m) to compensate for this reduced capacity. | The market outlook for the metro area is relatively flat, with the potential for a substantial reduction in demand in the event that Incitec Pivot was to cease operations. In this event, the cost of this option may be substantially less (eg by potentially avoiding added compression). |
| **Replacement** | Reduces likelihood and consequence | $120m-$150m | This alternative is based on completion of the existing metro looping project and associated works to enable a reduction in MOP of the original pipeline. APTPPL posits its estimated capital cost based on costs to date for the metro looping project. Notably this alternative provides additional capacity in the metro area. | Market testing of this cost, especially if this option was reconfigured to provide only capacity required by the (potentially flat or reduced) market may result in a substantially lower cost. However, in any case, the result would not be low enough to be cost competitive with APTPPL's proposed program. |
| **Physical barriers** | Reduces likelihood | $32.9m | Note that this reduces the likelihood, but not the consequence, of rupture. | |
| **Raise awareness** | Reduces likelihood | $7m per 5 years | Some effect on likelihood but none on consequence. | |

Combinations of the above were then considered by APTPPL. APTPPL's analysis essentially uses the following logic:

- Pipeline replacement, whilst effective, is substantially higher than the installation of physical barriers;
- Physical barriers provide significant reduction in the likelihood of an event but not its effect;
- The MOP reduction alternative can be modified to remove the cost of the compressor and meet the required risk reduction for a large part of the metro loop, with the installation of physical barriers installed in some section where the MOP reduction is not sufficient in itself to meet targeted risk levels.

### 5.1.4. Commentary and conclusions

The physical barrier (only) alternative estimated cost of $32.9m was based on "…a unit rate of slabbing costs per km across all HCA along all diameters of the RBP downstream of Brightview…" (page 8). This total project distance of 65km (page 12) suggests a unit rate of $500k/km. In subsequent correspondence with the AER[7], APTPPL noted that this was a high level assessment of a unit rate, which 4ei concurs is a typical approach at a screening level. Notably, if a refinement of this figure to be of the order of $250,000/km was achieved by applying a greater level of detail to the cost

[7] Source: "APTPPL Response to AER Information Request" dated 14 October 2016

estimation (as occurred through the refinement of the proposed solution), the physical barrier (only) alternative would remain higher than the proposed solution ($16.5m vs $11.0m), and would not provide the same level of risk reduction.

Given the current level of demand on the pipeline, the analysis undertaken by APTPPL in identifying its proposed solution appears sound. A key set of assumptions for the modelling APTPPL would have undertaken to formulate its solution would have revolved around the market's capacity requirements in this section of the pipeline.

An alternative assumption in relation to these market requirements may result in a different optimal outcome. For example, in the event that the Incitec Pivot load did not remain on the pipeline then an alternative workable solution may be:

1. MOP reduction (only) adopted, but without the installation of additional compression; and
2. To address the delivery pressure requirements of the Networks Ellengrove to Gold Coast delivery point, and potentially Networks Willawong, reconfiguration of APTPPL's proposed program by supplying these loads through a connection to the DN400 line[8], enabling an MOP reduction in the Ellengrove to Eight Miles Plain section of the DN300 pipeline to 3,000kPa.

In a scenario such as this there appears scope for the cost to be lower than the solution proposed by APTPPL. However, the costing for this option has not determined.

*Commentary as to the appropriate market demand basis for design of the Urban Risk Reduction program is outside the scope of this report. Subject to the assumption that Incitec Pivot continues to be supplied by the RBP, then the solution proposed by APTPPL appears to be an effective and efficient program and would satisfy Rule 79 of the NGR.*

## 5.2. DALBY TURBINE OVERHAUL

### 5.2.1. What's proposed?

The overhaul of the single Solar Centaur 50 gas turbine compressor set located at Dalby.

| Year Ending June | 2017/18 | 2018/19 | 2019/20 | 2020/21 | 2021/2022 | Total |
|---|---|---|---|---|---|---|
| **Dalby Turbine Overhaul[9]** | - | - | - | - | 1.33 | 1.33 |

### 5.2.2. Why is it proposed?

The Dalby compressor set was installed in 2012 and, during 2016, has operated 20,000 hours since installation. Good industry practice indicates overhaul between 32,000 (OEM recommendation) and 50,000 operated hours. Regular maintenance of compression sets is required to maintain performance and reliability.

[8] Source: "Roma to Brisbane Pipeline Access Arrangement Submission Attachment 5-2, Urban Risk Reduction Business Case", page 10 ALARP proposal diagram

[9] Source: 2017-2022 RBP Access Arrangement revision submission – updated version submitted 16.09.16, Table 5.16, page 115

### 5.2.3. What are the alternatives?

APTPPL considered two alternatives. Firstly, a "do nothing" option, allowing the equipment to operate until failure. This is not consistent with industry practice and will almost certainly result in higher whole-of-life costs.

Secondly, APTPPL considered in-house overhaul. However, APTPPL does not have the requisite skills so, although unquantified, this option would likely be more expensive than provision by the OEM.

### 5.2.4. Commentary and conclusions

APTPPL has proposed that the overhaul occur in 2022. This calculation has been prepared on the basis an assumed average 5000 hours of operation per annum and that the aggregate hours at time of the overhaul is at or near the maximum of the range. APTPPL indicated that this estimation of future hours was an approximation of the actual operating hours between July 2012 and December 2015:

| Period | Jul-Dec 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|
| Hours operated | 3385 | 7249 | 7595 | 1646 |

In further correspondence between the AER and APTPPL[10], APTPPL noted that inclusion of operating hours for 2016 (January – August) of 135 would reduce the simple average of these historic numbers to 4016 hours per annum.

APTPPL also notes that using aggregate operating hours is not a definitive measure of assessing the timing of when an overhaul is needed.

Running the compressors harder, for instance, is likely to reduce the intervals between overhauls. Using the range of aggregate operating hours (32,000 to 50,000) rather than the upper end as initially assumed by APTPPL, for example, produces a range of outcomes for the timing of the next overhaul as 2019 (as per 32,000 aggregate hours) and 2024 (as per 50,000 aggregate hours).

The question arises as to whether the averaging undertaken by APTPPL of historic annual operating hours is a reasonable basis for predicting future operating hours. Normalising the 2012 figure for a full year (approx. 6770 hours) highlights that the period to end-2014 had annualised figures in the range of 6700-7600 hours. In comparison, 2015's 1646 and 2016's 203 (after normalising) are far lower, presumably reflecting reductions in demand and/or changes elsewhere in the pipeline's operation that have reduced the need for operation of the Dalby compressor.

In the absence of evidence to suggest earlier operating periods are a better approximation for likely future operation of the compressor, a greater weighting should be placed on recent performance. This view is supported by the relatively flat outlook for demand on the pipeline.

Based on the aggregate operating hours of approximately 20,000 to date, future annual operating hours consistent with 2015 or 2016 would suggest an overhaul timing after 2022, even given the lower end of the 32,000-50,000 hour range.

*Therefore, the actual required timing of the overhaul of the Dalby Turbine is likely to be later than 2022. On this basis, APTPPL's proposal is not efficient or prudent and therefore does not satisfy Rule 79 of the NGR.*

[10] Source: "APTPPL Response to AER Information Request" dated 21 October 2016

# 6. HISTORIC CAPITAL EXPENDITURE

| Year Ending June | Cost | Comment |
|---|---|---|
| **Emergency Works** | $16.6m | These were a range of activities to address issues at Marburg Range, the crossing of Sandy Creek and the crossing in the vicinity of the Great Dividing Range escarpment near Toowoomba.<br><br>The approaches taken in each case appear consistent with good industry practice, especially given the nature of the situations. In a non-urgent situation, alternatives (primarily full replacement and relocation or increased depth-of-burial) are able to be fully investigated and costed.<br><br>For example, in relation to Marburg Range, the ability to use a temporary bypass enabled the implementation of a long-term solution to occur relatively quickly. The location of this incident relative to other land uses in the area may have been a contributor to allowing the long term solution being implemented quickly.<br><br>As a second example, in relation to the two washouts at Sandy Creek, APTPPL notes that "...studies confirmed that the natural creek banks had been lowered by the floodwater action[11]". Whether these studies identified whether it was the first or second flood that caused the lowering, and whether such a study could have been done after the first flood, is not detailed. To the extent that the lowering may have been able to be identified following the first flood, then the lowering of the pipeline may have been implemented earlier, potentially avoiding the second washout.<br><br>*Subject to the comments above, APTPPL's approach to the Emergency Works appears prudent. On that basis, this expenditure appears to satisfy Rule 79 of the NGR.*<br><br>In its submission for the RBP 2012-17 AA, APTPPL categorised proposed flood emergency works as operating expenditure. In contrast, APTPPL's categorisation of work undertaken during the 2012-17 period was categorised as capital in nature. The rationale for this change was not provided. AER has requested 4ei to consider whether a justification may exist for this re-categorisation. In summary, whilst whether these costs are best considered as capital or operating is open to interpretation, there is no apparent justification for a change in classification from one category to the other, as the nature of the activities has not changed sufficiently.<br><br>Clear categorisation requires a clear definition of what constitutes capital expenditure (as opposed to operating expenditure). The most |

[11] RBP Access Arrangement submission, section 5.9.3.2, page 87

| | | |
|---|---|---|
| | | appropriate definition is open to interpretation. For example, two (of possibly several) alternate definitions could be:<br><br>• Costs that change the nature of the asset (ie create a new or enhanced asset); and<br>• Costs that occur on an irregular basis, for example, typically occurring less often than annually.<br><br>Based on the latter definition, it would appear that these costs should have always been categorised as capital expenditure.<br><br>Based on the former definition, there is potential for a justifiable change *subject to* the scope of the works being sufficiently different.<br><br>Review of Section 3 of APTPPL's Business Case for Emergency Works[12] highlights that the projects included in the 2012 submission primarily revolved around replacement/repair work and, in some cases, lowering of the pipeline by deepening the trench. This description would describe most of the work in the Emergency Works projects, with the notable exception of Marburg Range, where the extent of HDD undertaken is arguably a basis for distinguishing the new section of pipeline as a new asset – it is effectively re-located rather than lowered.<br><br>However, if this basis for categorisation is adopted, it would be inconsistent to treat the Sandy Creek activity to date, for example, as capital.<br><br>It is also unclear, as to why for example the lowering of a pipeline to accommodate changed subsurface conditions should be considered an operating cost whilst the proposed Urban Encroachment activities, designed to accommodate changes in the competing surface land use, should be treated as capital.<br><br>In conclusion, it is not evident that there has been a clear change in the type of activities or their outcome to justify a *change* in categorisation from operating cost to capital cost (or vice versa). Which category is the most appropriate remains open to interpretation. |
| **Aquarium Passage** | $1.9m | This was a regulatory-driven activity (ILI not able to be run given initial small pipe diameter across bridge). The design life of the temporary crossing required the early addressing of this issue, although an ILI is not required until 2017. Considered stand-alone, this activity appears necessary given the temporary design of the initial crossing and future requirements for ILI of the Lytton lateral and, therefore, it would satisfy Rule 79 of the NGR.<br><br>4ei notes correspondence between AER and APTPPL that the initial |

[12] Roma to Brisbane Pipeline Access Arrangement Submission, Attachment 6-1, Historic Capital Expenditure Project Documents, Business Case Number AA-01 – Revision 1

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| | | approval of the Lytton project's cost was on the basis of installation of DN200 for the entire length at the time of initial construction of the pipeline (ie the further work required for replacement and relocation of the Aquarium Passage section was not noted at the time). APTPPL states that the temporary solution was required "due to issues encountered during the project" and "[was necessary] in order to meet customer schedule requirements"[13].<br><br>APTPPL notes that considering the entire project (initial construction cost plus Aquarium Passage project cost) is NPV positive. APTPPL's view is that Rule 79 of the NGR is satisfied.<br><br>Whilst a delay to the pipeline's initial construction is likely to have reduced the overall cost, it appears likely that the outcome would not have been materially different in terms of overall efficiency considering that some or all of the revenue earnt in the initial period would have been foregone. The amount of foregone revenue depends on how long the construction of the Lytton Lateral would have been delayed. This is potentially as high as $3.4m as per APTPPL's forecast revenue.<br><br>Furthermore, dependent upon the specifics of the contract arrangements with the customer, delayed construction may have brought conditionality into the project. If this is the case, removal of the conditionality (by early construction of the lateral achieved via implementing the temporary solution) provided certainty that the new load was secured.<br><br>*Consideration of the Aquarium Passage as a stand-alone expenditure appears to satisfy Rule 79 of the NGR given the requirement to conduct ILI of the entire Lytton Lateral.*<br><br>*Considering the entire Lytton Lateral project inclusive of the Aquarium Passage Project, the nett incremental effect of the approach taken (as opposed to a delayed construction of the pipeline with a permanent Aquarium Passage crossing installed at the same time as the rest of the Lateral) is unlikely to have a material impact on the NPV and may have contributed to the certainty of securing the load. Whilst not solely a technical matter, it is our view that this is consistent with industry practice in similar situations.* |
| **Bi-Directional Flow** | $8.2m | This activity entailed reconfiguration of compressor pipework and the use of existing compression facilities (on an as-available basis) to enable bi-directional flow in the RBP. Capacity provided is 120 TJ/day. The market requirement for this service is unclear, although figures provided by APTPPL for the period October 2015 to June 2016 indicate a maximum of around 61 TJ/day[14]. Alternatively, email correspondence from AER to APTPPL cites an ACIL Allen statement that average flows of |

[13] RBP Aquarium Passage Crossing, Business Case AA-04 – Revision 1, page 1

[14] Graph on page 4, RBP Bi-Directional Flow Business Case

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| | | 75 TJ/day occurred in June 2016.<br><br>It is not stated by APTPPL whether the capacity of 120 TJ/day was designed to cater for the (approximate) view of the potential market or whether it was determined a logical quantum of capacity that could be developed for an expenditure that APTPPL considered reasonable. Typically, it would be combination of these two factors. Whilst it may be possible that less expenditure may have provided a capacity closer to the actual market supplied, it may not have been at much lower cost (ie the capacity developed vs cost is not typically linear).<br><br>Based on the spreadsheets setting out the NPV calculation for bi-directional flow[15], we note that the analysis includes no provision for future incremental costs (such as increased compressor fuel or accelerated maintenance) if any, albeit this is difficult to estimate reliably even if detailed pipeline hydraulic modelling was undertaken.<br><br>In any case, on balance neither a smaller capacity increase nor consideration of incremental operating costs (if any) is likely to be sufficient to materially affect the economic case presented by APTPPL for this expenditure.<br><br>*Whilst the breakeven point for demand may be higher than the levels of 2.4 TJ/day to 2.9 TJ/day estimated by APTPPL, the volumes experienced to date suggest that Rule 79 of the NGR is satisfied for this expenditure.* |
| **SCADA upgrade** | $1.0m | This activity involved upgrading the RBP SCADA system in conjunction with an upgrade on other APA Group pipelines. This option was preferred by APTPPL over a standalone system. A standalone system would likely be more expensive (APTPPL indicates a cost of $1.5m) and would add to operational complexity and risk given its inconsistency with other pipelines owned by APA Group. Replacement of the existing system was consistent with industry practice, given the system's age. The driver for timing of this replacement is less clear, albeit the implementation of it should be reflected in some reduction in complexity, and therefore cost, of operations.<br><br>Explanation of the method of cost allocation between RBP, BWP and CGP has not been provided.<br><br>*In any case, given this is a lower cost solution than a stand-alone solution, this expenditure appears to satisfy Rule 79 of the NGR.* |
| **RTU and Flow Computer Upgrade** | $1.1m | APTPPL assessed that the existing hardware presented a risk, especially in relation to potential interruptions to supply. Given the age of the hardware (in excess of 20 years old), replacement is consistent with good industry practice. |

[15] "IR #006 Q1 Bi direction NPV.xls" and "IR #006 Q2 Bi direction NPV zero 2015-17 revenue.xls"

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| **Toowoomba Station Upgrade** | $1.3m | The work undertaken by APTPPL at the Toowoomba offtake was to upgrade the station to be code compliant. Expenditure on this station had been approved as part of the 2012-2017 AA, where APTPPL had sought (and received) approval to replace "...the entire station with new code-compliant equipment..."[16] at a cost of $450,000. Further, it outlines that "...Depending upon workloads and timing the site equipment might be skid built at the APA facilities in Adelaide and shipped as a unit, or built and installed locally. The cheapest and most satisfactory option would be utilised with the APA facility tendering for the work". Limited detail is provided as to what specifically had been built into the cost estimate, however, the description of the potential to construct the new station on a skid away from site implies that the impact of unforeseen site-specific issues should be relatively minor.<br><br>In its business case supporting the actual expenditure, APA indicates that "...The selected option was a higher cost than initially envisaged when the project was first proposed which was a result of the risk assessment and identification of additional issues when compared with previous similar projects. The additional scope items were the replacement pressure vessel, and regulator skid (not just individual valves), and the civil works and pipe supports".<br><br>Some of the items identified as additional appear that they should have been included in the initial estimate, given its scope was for the entire station and potentially was to be constructed as a skid-mount off-site.<br><br>However, we also note that the expenditure was initially timed for 2016/17. Given the timing of APTPPL's submission, the leadtime implies that limited engineering and cost-estimation work would have been undertaken at that time. In the absence of a detailed scope and cost breakdown of the initial estimate and greater detail of the actual costs incurred, it is not possible to resolve the sources of difference.<br><br>*Subject to the comments above, APTPPL's design of the Toowoomba Offtake Station appears efficient and prudent and consistent with industry practice. On that basis, this expenditure appears to satisfy Rule 79 of the NGR.* |

[16] APA Group – APT Petroleum Pipelines (Limited), Conforming Capex justification (Toowoomba Station Upgrade), Ref APPL12-AA-06-F. Included in "APT Petroleum Pipelines Limited SIB Business Cases Covering the period 12 April 2012 – 30 June 2017"