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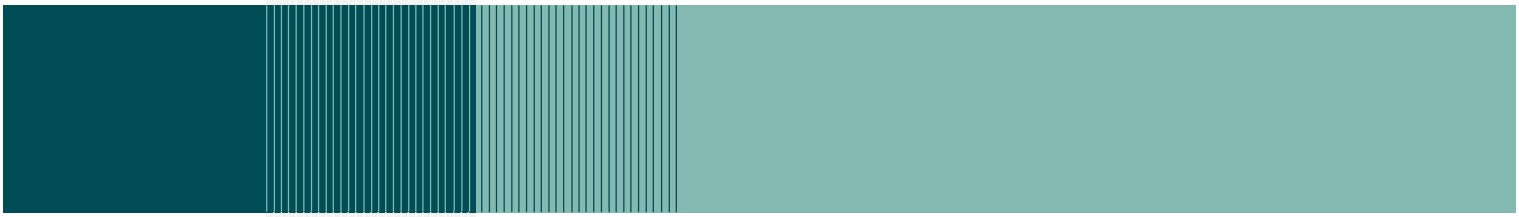
Critique of Responses to RBP ICB Draft Decision

ACCC



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Executive Summary

This report attempts to address all issues of substance raised by APT and CRA in their submissions on the ACCC's approach to determining DORC in its draft decision on the RBP. However, for the purpose of this executive summary those issues have been distilled into three major issues, namely:

1. What discount rate should be applied to future costs;

2. Whether the 'Incumbent' or 'New Entrant' version of DORC is more relevant to the determination of the ICB; and

3. Whether straight line DORC or NPV cost based DORC is a superior proxy for economic DORC in the current context.

What Discount Rate Should be Applied to Costs

The NPV cost based DORC is the difference between the present value of future costs on a new pipeline and the present value of future costs on the existing pipeline. We have previously explained why the present value of future costs must be discounted using a discount rate that reflects the risks associated with costs. This is consistent with the advice of Professor Grundy who has explained why core principles of finance theory require that the present value of costs can only be calculated by discounting future costs by the discount rate that reflects the (systemic) risks associated with those costs. Moreover, we have explained why, and Professor Grundy has affirmed, that this discount rate can not be presumed to be the discount rate associated with profits (the WACC).[1]

In this round of submission's CRA purports to provide a mathematical proof that this is not the case. CRA purports to show that, on the basis of three reasonable assumptions, it can be shown that the discount rate applied to costs must be the discount rate on profits. Were it true, this would turn finance theory on its head. In reality, CRA has not proven this because the mathematical manipulation in it 'proof' employs an implicit fourth critical assumption. In effect, the discount rate on profits is *assumed* to be equal to the discount rate on costs. That is, CRA implicitly assumes what it sets out to prove. As such, CRA's 'proof', and APT's reliance on it in its submission, provides no insight into the question of which discount rate is correct.

This issue is addressed in section 1.1 of our report. In section 2.2.4 we address other errors in APT's discussion of the issue.

Incumbent versus New Entrant DORC

Two different definitions of NPV cost based DORC have been established during regulatory proceedings in relation to the MSP and RBP. These definitions have been (somewhat unhelpfully) termed 'New Entrant DORC' and 'Incumbent DORC'. The difference between

[1] We have also pointed out that precisely this issue has been dealt with in establishing accounting standards for the valuation of future liabilities (costs) for insurance companies. International accounting standards explicitly reject discounting future costs by the discount rate on profits and instead recommend the use of the risk free rate.

these two definitions is quite simple. The first is based on the tax costs of a new entrant buying the existing pipeline and the second is based on the tax costs of the incumbent continuing to own the existing pipeline.

Both CRA and APT claim that DORC must be considered in the context of a hypothetically competitive market for pipeline services. APT argues that this is consistent with accepting a 'nexus' between DORC and the 'hypothetical new entrant test' (HNET). CRA and APT argue that a competitive market benchmark implies that a new entrant perspective must be the relevant perspective for estimating DORC.

We show that quite the reverse is true and that adherence to a competitive market benchmark requires the adoption of Incumbent DORC if future regulated revenues are to be set on the basis of the incumbent's tax costs (as is the ACCC's approach). In section 1.2 we show that setting the ICB equal to Incumbent DORC will result in regulated revenues equalling the costs of a new entrant - provided that future regulated revenues are (consistently) based on the incumbent's actual tax position (as is the standard practice of the ACCC). By contrast, if the ICB were set equal to New Entrant DORC regulated revenues would be higher than a new entrant's costs.

This gives rise to the somewhat anomalous situation where adopting Incumbent DORC gives rise to regulated revenues that equal to those demanded by a new entrant while adopting New Entrant DORC gives rise to regulated revenues that are *higher than* those demanded by a new entrant.[2] This anomaly exists due to an internal inconsistency in setting the ICB based on the tax position of a hypothetical new owner of the pipeline but setting future revenues based on the incumbent owner's tax position.

We show in section 1.2. that, provided internal consistency is adhered to, the a competitive market benchmark can be achieved with either Incumbent or New Entrant DORC. Specifically, the present value of regulated revenues will equal the present value of a new entrant's costs if either:

- the ICB is set equal to Incumbent DORC *and* future regulated revenues are modelled based on the incumbent's tax position; or
- the ICB is set equal to New Entrant DORC *and* future regulated revenues are modelled based on the new entrant's tax position.

Given these facts, we find that APT is in error when it states:

> "*Modelling of cash flows once the ICB has been set, whether or not with the PTRM, is a separate process in which the ICB is one input. Any perceived need for consistency with the current revenue modelling approach is not relevant*."[3]

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[2] It is due to this anomaly that we regard the terminology that has developed around these terms unhelpful and believe a superior nomenclature would involve the term 'New Owner DORC' replacing the term ' New Entrant DORC'.

[3] Page 9 of APT submission.

On the contrary, if replicating competitive market outcomes[4] is important (as CRA and APT profess to believe) then adopting a definition of DORC that is consistent with the approach to modelling regulated cash flows is paramount.

Straight Line DORC as a Proxy for Economic DORC

APT attempts to argue that the adoption of 'straight line DORC' is a less rigorous approach to calculating DORC than NPV cost based DORC. On the second page of Attachment 1, APT claims:

> "*In relation to the first principal point of difference NERA now argue that the rigorous NPV methodology used in the calculation of DORC for the Moomba Sydney Pipeline System (MSP) should be abandoned in favour of a proxy method (i.e. the straight line adjustment of ORC, which has been applied historically by regulators).*"[5]

We do not agree that a straight line DORC methodology is a less rigorous estimate of economic DORC than the NPV cost based DORC methodology proposed by APT. We do accept that it is simpler, better understood and less information intensive than NPV cost based DORC. However, as is explained below, we consider that these are advantages relative to an NPV cost based DORC methodology and that these advantages can not be presumed to come at cost in terms of either accuracy or rigour.

In a previous report[6] NERA was asked to advise on the relative advantages and disadvantages of estimating economic DORC using straight line depreciation of an ORC ('straight line DORC') versus an estimate based on the difference in the NPV of costs between the existing and an optimised pipeline ('NPV cost based DORC'). We were asked to advise on this issue in the context of regulatory proceedings to establish the ICB of a regulated pipeline.

In that report we explained that the 'NPV cost based DORC' calculated by APT and CRA is an upward biased estimator of economic DORC because it fails to take into account that an optimally designed new pipeline will have higher service potential than the existing pipeline. (This results in an upward biased estimate of the second hand value of a pipeline for the same reason as would estimating the value of a second hand TV while ignoring that it can only produce black and white vision.) We also noted the fact that, in designing a replacement asset for the RBP, Venton & Associates specifically explained why the new pipeline would deliver superior services compared to the existing pipeline.

In section 2.1.2 below we explain that, in its most recent submission APT does not address the specific issues raised by NERA including the issues we point to in the Venton & Associates report.

We previously concluded that the existence of this bias meant that one could not conclude that NPV cost based DORC was a more accurate theoretical measure of economic DORC

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[4] In the sense of ensuring that the present value of regulated revenues do not exceed the present value of costs of a new entrant.

[5] Page 51 of the submission.

[6] NERA, *2006Comparison of DORC Estimation Procedures,* 25 July 2006.

than straight line DORC (or *vice versa*). In this context, we argued, amongst other things, that the simplicity of straight line DORC was a desirable property. We argued that this was especially so given that the information required to estimate NPV cost based DORC (let alone economic DORC) is highly uncertain and asymmetrically held by the current pipeline owner. Put simply, in the presence of highly uncertain and asymmetrically held information and an adversarial process[7] one can not presume that devoting increased resources to estimating NPV cost based DORC will result in a more accurate estimate of DORC.

We advised that:

> *"Neither straight line DORC nor NPV cost based DORC can be presumed to provide a more accurate estimate of economic DORC. Similarly, neither can be presumed to better promote economically efficient outcomes in the gas pipeline industry or more generally.*
>
> *However, in the context of 8.10 (b) of the Code, grounds do exist for preferring the adoption of straight line DORC. Specifically:*
>
> *(a) Straight line DORC is simpler and can be estimated in a more transparent and predictable manner than NPV cost based DORC;*
>
> *(b) Straight line DORC relies less heavily on information that is asymmetrically held;*
>
> *(c) Partly of a consequence of (a) and (b), the resource costs associated with establishing a straight line DORC estimate will be lower than the resource costs associated with establishing an estimate of NPV cost based DORC (including the costs associated with rent seeking);*
>
> *(d) Straight line DORC can not be presumed to be a biased estimator of economic DORC.*
>
> *The above considerations suggest that, in a regulatory context, the ACCC could reasonably prefer straight line DORC to NPV cost based DORC as an estimate of economic DORC.*
>
> *Of course, an alternative to both approaches is to attempt to estimate economic DORC directly, ie, to estimate the NPV of differences in service levels. However, the practical difficulties associated with estimating NPV cost based DORC would be dramatically compounded if this were attempted."*

Section 2.1 below explains why we do not accept any of APT's criticisms of the above conclusion.

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[7] That is, a process where the current owner has a strong incentive to release or portray information in a manner that results in the highest possible estimate of DORC.

1. Critique of CRA's 'Key Inputs' Paper

CRA's paper is devoted to arguing two propositions:

1. That the access by a hypothetical new entrant to tax advantages associated with accelerated depreciation should be recognised in a higher 'correct' value of DORC; and

2. That a mathematical proof exists which shows, on the basis of three reasonable assumptions, that the correct discount rate to use to discount costs is not the discount rate associated with costs but rather the discount rate associated with profits.

The following two sections show why both of these propositions, and the arguments presented in their support, are false. We start with CRA's analysis of the appropriate discount rate.

1.1. CRA's Discount Rate Analysis

1.1.1. CRA assumes what it sets out to prove

In section 4 of its report CRA purports to mathematically prove that the WACC is the correct discount rate to use to discount costs in the calculation of NPV cost based DORC. Such a claim should immediately raise concerns as, by definition, the correct discount rate to discount costs is the discount rate associated with costs. Nonetheless, CRA claims to be able to make this proof based solely on three assumptions - assumptions that we agree are reasonable. The three assumptions (explicitly) listed by CRA are reproduced below:

> *"Three assumptions are employed in the discussion below:*
>
> *1. the NPV of economic profit to the existing pipeline must be zero;*
>
> *2. the NPV of economic profit to a new pipeline must also be zero;*
>
> *3. the revenue earned by the new pipeline is the same as that earned by the existing pipeline each year."*

However, CRA analysis actually relies on a critical fourth, un-stated, assumption in order to arrive at its mathematical proof. CRA's fourth implicit assumption should have been spelt out as:

> *4. All risk adjusted discount rates are identical. (Namely, profits have the same risk properties as revenues which have the same risk properties as expenditures and these are the same for the existing and new pipeline).*

However, this is precisely what CRA sets out to prove. In other words, CRA's 'proof' that the regulatory WACC can be used to discount costs is, in reality, nothing more than an assumption that the discount rate on costs is equal to the regulatory WACC. That is, CRA assumes rather than proves its conclusion.

In order to understand why CRA's un-stated assumption is in general false (and to see where it enters into CRA's analysis) it is useful to illustrate why the discount rate on profits (the

WACC) will tend to be higher than the discount rate on revenue and higher still than the discount rate on costs. To do this, we adopt a simple example, where an investor has expected revenues of $R in one year's time and expected expenditure of $E in one year's time.

The present value of profits is correctly calculated as the difference between the present value of revenues (discounted using a rate reflecting the systemic risks of revenues ("W_R")) less the present value of expenditures (discounted using a rate reflecting the systemic risks of expenditures (W_E)):

$$\text{PV profits} = \frac{R}{1+W_R} - \frac{E}{1+W_E}; \qquad \textbf{(1)}$$

This is the correct definition of the present value of net cash flow ('profits'). As previously attested by ourselves and Professor Grundy, revenues and expenditures must be discounted by the risk adjusted discount rate associated specific to the risk profile of each.

The framework under which NPV cost based DORC is calculated assumes an **identical revenue** profile can be earned with **different expenditure** profiles. (This is explicitly agreed by all the parties.[8]) From equation (1) it is clear that the difference in present value of profits will be solely determined by the difference in present value of expenditures *discounted at the expenditure discount* rate (because identical revenues cancel out).

However, it is important to understand that if we assume identical revenues and different expenditure profiles (as we must under the NPV cost based DORC approach) then the discount rate on profits will *not* be the same under each scenario. To see why this is the case note that equation (1) can be expressed in terms of a single discount rate for profits (W_p) as per the following equation.

$$\text{PV profits} = \frac{R-E}{1+W_P}; \qquad \textbf{(2)}$$

Because equation 2 must give the same answer as equation 1, it follows that the correct discount rate on profits must be expressed as function of all four variables in equation 1. Setting equation 1 and 2 equal and rearranging terms to solve for the discount rate on profits gives:

$$W_P = \frac{R*(\frac{W_R}{1+W_R}) - E*(\frac{W_E}{1+W_E})}{\frac{R}{(1+W_R)} - \frac{E}{(1+W_E)}} \qquad \textbf{(3)}$$

[8] For example, see page 55 of the APT submission which states:

"*Once that revenue path is known then the assumption of identical revenues (which underpins the cost-based NPV approach)…*"

That is, the correct discount rate on profits is a function of discount rates on **both** revenues and expenditures **and** the relative levels of expected revenues and expenditures. Importantly, if the riskiness of revenues exceeds the riskiness of expenditures then increasing the level of future expenditures will increase the riskiness of profits (ie, increasing E will increase W_P).[9]

The intuitive reason for the above result in relatively simple. If expected revenues are $100 and there are no future expenditures, a 5% fluctuation in revenues is equal to a 5% fluctuation in profits. However, if future expenditures are $90 then future profits are only $10 (100-90) and a 5% fluctuation in revenues results in a 50% fluctuation in expected profits. It is therefore unsurprising that the discount rate applied to profits dramatically increases as higher future liabilities are added to net cash flows.

This is important in the current context because future expenditures on the incumbent pipeline (including replacing that pipeline in the future) are higher than expenditures on the hypothetical new pipeline.[10] This means that the riskiness of profits on the incumbent pipeline will be higher than the riskiness of profits on the hypothetical new pipeline - *assuming that revenues are identical in both scenarios (as all parties agree is required by the NPV cost based DORC framework)*.[11] .

However, CRA's purported mathematical 'proof' sets the same discount rate for profits on both pipelines. (See equations 1 and 2 on page 12 of the CRA report where the same 'W' is used in both equations.). By doing so, CRA is *assuming* that the WACC for both pipelines is the same. Given that the pipelines have the same revenue stream but different future expenditure profiles this is equivalent to *assuming* that the discount rate for revenues equals the discount rate for expenditures (and that both equal the discount rate for profits). That is, it is equivalent to assuming what CRA sets out to prove.

Conclusion 1.1

CRA's 'proof' is fundamentally flawed and implicitly assumes what it sets out to prove. It is of no value in understanding the appropriate discount rate for costs in the NPV cost based DORC calculation.

1.1.2. Implications for regulatory WACC estimation

A conceivable, but wrong, argument in support of CRA's implicit assumption (that the discount rate on net cash flows for the two pipelines are the same) is that regulators tend to set similar WACC's on different regulated assets. Thus, the argument may go, it is appropriate to assume the same profit discount rate in the two scenarios considered in the context of NPV cost based DORC.

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[9] For completeness we should also specify that this is true while the present value of profits is positive. As the present value of profits approaches zero due to increases in the level of costs the discount rate on profits approaches infinity. For higher levels of costs the discount rate on profits actually becomes negative.

[10] Noting that the cost of buying the existing pipeline (DORC) or building the new pipeline (ORC) is incurred up-front and does not need to be discounted.

[11] And also assuming our contention that expenditures have relatively lower risk.

Such an argument would be wrong. We have shown above that, *if we assume identical revenue streams* (as is required under the NPV cost based framework) then the discount rate on profits is different for pipelines with different expenditure profiles. This conclusion follows from the assumption that pipelines with different future expenditures have identical revenues. This is a necessary assumption in the context of NPV cost based DORC but it is a false assumption in the context of actual regulation of assets. For regulated pipelines, differences in future expenditures on regulated assets will tend to be reflected as differences in revenues for those regulated assets (both in terms of the time profile and the present value).[12]

It is worth noting that CRA assumes that the identical revenues available to either pipeline are equal to those determined in a hypothetical competitive market.

> *"The comparison is able to be made on the basis of expenditures alone by our assumptions that the pipeline tariff is independent of which pipeline transports the gas, and that the new pipeline has the same capacity as the existing one. These assumptions imply that in each year the revenue earned by the new pipeline is the same as the revenue earned by the existing pipeline."*[13]

However, what CRA fails to appreciate in their later analysis is that this assumption means that the profile of net cash flow is *different* on each pipeline and, therefore, has *different* risks (ie, they have identical revenues but different ratios of expenditures to revenues which must give rise to different net cash flow). Differences in the nature of net cash flow mean that CRA can not simply assume that the discount rate on cash flows is the same for each pipeline.

On this basis alone the argument that net cash flows on each pipeline have he same risk is invalid.

Moreover, it is unclear on what basis CRA believes that the regulatory WACC is relevant for either 'hypothetically competitive' pipeline. CRA, appears to argue that all consideration of NPV cost based DORC must take place in the context of a hypothetical competitive market for gas transport services. CRA's makes no argument as to why the discount rate on net cash flows in this context should be the same as the discount rate on net cash flows for regulated assets. In reality, there is no basis on which to make such an assumption precisely because, in reality, such a market does not exist (otherwise we would not be applying regulation). This serves to highlight the circularity problems associated with attempting to set DORC on the basis of an assumption regarding net cash flows (or the discount rate applied to them) rather than costs.

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[12] It is also true that the nature of regulation in general is that it tends, for reasons other than the matching of costs to revenues, to equalise risks across different regulated assets. For example, regulation, such as that under the Gas Code, tends to reduce or remove the risk of asset stranding compared to competitive markets. Similarly, the common application of five year cost based regulatory reviews and pass through provisions during regulatory periods (for events beyond the business's control) also tend to equalise risks across regulated assets.

[13] Page 7 of the CRA report.

1.1.3. 'Reconciliation' with Grundy/NERA analysis

Finally, it in section 4.3 CRA claims that it is able to reconcile the fact that we, and Professor Grundy, reach different conclusions to those 'proved' by CRA. It does so by arguing that:

> *"Neither Professor Grundy nor NERA qualify these statements with reference to the purpose of the present value calculation, nor the type of firm which is considered. However, these qualifications turn out to be crucial to the question of interest here. The empirical work cited by Professor Grundy and NERA was reported in Brealy, Cooper, and Habib. Unfortunately, that paper provided no detail concerning the sample of UK firms that formed part of that preliminary study. The study's context, being a contrast between behaviour of public sector organisations and private firms, does not suggest that the firms considered were subject to price regulation. Many of NERA's examples concern insurance companies, which are not constrained to earn zero economic profit.*
>
> *"As the foregoing algebraic analysis demonstrates, the fact of price regulation is fundamental to our conclusion, which depends on the three stated assumptions. If these assumptions are not met, as they appear not to be in the examples cited by Professor Grundy and NERA, then our conclusion does not follow.*
>
> *"Thus the positions of Professor Grundy and NERA can be reconciled with the conclusions reached here by observing that the ACCC experts were speaking about firms that are fundamentally different from a covered gas pipeline, which is constrained to earn zero economic profit."*[14]

This statement is wrong. As shown previously, CRA's 'algebraic analysis' does not prove what it claims to prove. Consequently, there is no reconciliation between CRA's analysis and ours/Professor Grundy - CRA's conclusions are simply wrong.

In any event, we find it highly peculiar that, at the end of section 4, CRA claims "*price regulation is fundamental to our conclusion*" when sections 2 and 3 were devoted to demonstrating why DORC must be interpreted in the context of a hypothetical competitive market. On the one had CRA appears to be arguing that DORC can only be understood in the context of a hypothetically competitive market while simultaneously arguing that regulation is central to its analysis. For example, CRA states (emphasis added):

> *"As the asset valuation is a key determinant of the regulated price, the natural question is 'what valuation would prevail in a workably* ***competitive market****?'"*[15]
>
> *"Given this characterisation of a* ***competitive market*** *for gas pipeline services, the question of interest is what valuation would be placed by various players on an existing pipeline?"*[16]

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[14] Page 14 of the CRA report.

[15] Page 2 of the CRA report.

[16] Page 4 of the CRA report.

> *"This section evaluates the Commission's Incumbent Perspective approach in the light of the conceptual framework for **pipeline competition** outlined above."*
>
> *"The ACCC's own NPV DORC calculation does not correspond to any conceivable decision that an incumbent might make in the **competitive pipeline market** being discussed here."*[17]
>
> *"In short, the ACCC's NPV DORC calculation has no bearing on any of the decisions that a new entrant or an incumbent could plausibly face, and therefore it has no relevance to the asset valuation that would arise in a **competitive pipeline market**."*[18]
>
> *"Once that characteristic of **competitive pipeline markets** is taken into account, the properly construed Incumbent DORC coincides with the HNE DORC as calculated by APTPPL and CRA."*[19]

Even more perplexing is why CRA states that:

> *"Thus the positions of Professor Grundy and NERA can be reconciled with the conclusions reached here by observing that the ACCC experts were speaking about firms that are fundamentally different from a covered gas pipeline, which is constrained to earn zero economic profit."*

When earlier in the report it states that:

> *"These competitive market assumptions lead to several important observations. First, competition between pipelines will ensure that, over any pipeline's life cycle, its owners will earn zero economic profit."*[20]

That is, earlier in the report CRA correctly argues that competitive markets constrain economic profits to be zero. However, later in the report CRA appears to be arguing that NERA/Grundy analysis relates to competitive firms and is therefore irrelevant because, unlike competitive firms, regulated firms are constrained to earn zero economic profits. These positions are mutually inconsistent.

CRA also make the following statement in their report:

> *"If revenues are constrained by regulation to approximate costs, then it is difficult to see how revenues and expenditures could fail to exhibit very similar systematic risk profiles."*[21]

This sentence is no more compelling in its logic than the same sentence with the word 'competition' replacing the word 'regulation'. The empirical evidence, as per Brealy,

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17 Page 7 of the CRA report.

18 Page 7 of the CRA report.

19 Page 8 of the CRA report.

20 Page 3 of the CRA report.

21 Page 14 of the CRA report.

Cooper, and Habib, suggests that costs are less risky than revenues and profits. This is reflected in international accounting standards in insurance. Moreover, as described above and in previous reports, there are good a *priori* reasons to expect costs to be less volatile than profits. Given the evidence, a statement that CRA finds it 'difficult to see' why this is the case is insufficient grounds for adopting a contrary position.

1.2. 'Incumbent' vs 'New Entrant' DORC

Sections 2 to 4 of CRA's report are devoted to arguing that the 'correct' definition of NPV cost based DORC is the price a new entrant would be willing to pay for the existing pipeline (given the alternative of earning the same revenue stream with a new pipeline). This compares with the ACCC's view that the 'correct' definition of NPV cost based DORC is the value the incumbent places on the existing pipeline (given the alternative of earning the same revenue stream with a new pipeline). In the discussion to date, these values have been termed 'New Entrant DORC' and 'Incumbent DORC' respectively.

In order to properly explain the errors in CRA's analysis it is useful to first establish the differences between the two definitions and the implications for choosing one over the other in the context of setting an ICB.

1.2.1. Why 'Incumbent' and 'New Entrant' DORC differ

As calculated by the parties to the RBP access arrangement, the New Entrant DORC is greater than the Incumbent DORC. The fact that these values are different is, at first, counterintuitive. After all, why should a new entrant value the existing pipeline at more than the incumbent? If this was the case, surely the incumbent would simply sell to a new entrant?

The solution to this seeming conundrum is that the two valuations are not directly comparable (they involve a comparison of apples with oranges). The 'New Entrant DORC' is a pre-tax payment (ie, a payment on which tax will be payable) while the incumbent DORC is a post-tax valuation (ie, the value of the existing asset after taking into account all current and future tax payments). Once the New Entrant DORC is turned into a post tax valuation, by removing the tax payable on transfer of the asset, the above seeming conundrum disappears.

In fact, it can be shown that, if the incumbent must pay tax on the difference between the tax depreciated value of the existing pipeline and the consideration received for its sale, then the New Entrant DORC is less than the Incumbent DORC when compared on an 'apples for apples' basis. This means that the Incumbent would never accept such a purchase offer of New Entrant DORC because, in after tax terms, it would leave them worse off than if they continued to own the existing pipeline.

To see why, note that the difference between New Entrant and Incumbent DORC is simply the present value of the difference in claimable tax depreciation on the existing pipeline by the incumbent relative to a new owner. For example, assuming that the incumbent has already fully depreciated the existing pipeline for tax purposes and that a new purchaser can depreciate the purchase price in a straight line over its tax life of 'TL' years, then the relationship between New Entrant and Incumbent DORC can be expressed as follows:

$$New\ Entrant\ DORC = Incumbent\ DORC + \sum_{i}^{TL} \frac{New\ Entrant\ DORC * t}{TL * (1+r)^{i}} \quad \textbf{(4)}$$

The second term on the RHS of equation 4 is simply the present value of tax deductions of "New Entrant DORC / TL" for TL years (with "t" being the corporate tax rate and "r" being the relevant annual discount rate). Solving equation 4 for New Entrant DORC gives:

$$New\ Entrant\ DORC = \frac{Incumbent\ DORC}{1 - \frac{t}{TL} \cdot \sum_{i}^{TL} \frac{1}{(1+r)^{i}}} \quad \textbf{(5)}$$

However, if this amount was actually paid to the incumbent our understanding is that it would have to be included in the incumbent's assessable income.[22] That is, if the incumbent sold the existing pipeline for a value above its depreciated tax value it would have to include the difference in its taxable income. If the depreciated tax value of the asset is zero then our understanding is that the entire sale proceeds would be included in taxable income.

This means that the post tax value of the price a new entrant is willing to offer is:

$$Post\ Tax\ New\ Entrant\ DORC = \frac{Incumbent\ DORC}{1 - \frac{t}{TL} \sum_{i}^{TL} \frac{1}{(1+r)^{i}}} \cdot \frac{1-t}{1} \leq Incumbent\ DORC \quad \textbf{(6)}$$

The Post Tax New Entrant DORC is clearly less than Incumbent DORC as the "1-t" in the numerator must be less than the denominator for all values of TL equal to or greater than 1.[23] The reason that the Post Tax New Entrant DORC is less than the Incumbent DORC is straight forward. The amount that a new entrant is willing to pay above Incumbent DORC is equal to the tax advantage to it of depreciating the purchase price from assessable income *over the next TL years*. The tax cost to the incumbent from selling the pipeline is equal to the cost of including the sale price in assessable income *immediately*. If the time value of money is positive (r>0) then the tax cost to the incumbent from selling must exceed the tax advantage to the purchaser (as the full tax cost is incurred immediately while the tax advantage is spread over TL years). Only if the time value of money is zero (r = 0) do the two amounts exactly offset each other and the Post Tax New Entrant DORC = Incumbent DORC.

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[22] See http://www.ato.gov.au/businesses/content.asp?doc=/content/31615.htm&page=9#H50

[23] Note that equation 5 (and by implication equation 6) is not valid for values of TL less than 1 because it would imply that the new entrant can write off more than 100% of the purchase price of the asset for tax purposes.

Conclusion 1.2

If the incumbent is taxed on the difference between sale price and depreciated tax value, an Incumbent would reject a sale price of New Entrant DORC in favour of continuing to derive 'Incumbent DORC' in value from the existing pipeline.

1.2.2. What are the implications of using each definition

In the previous section we have explained why Incumbent and New Entrant DORC differ. We explained why Incumbent DORC offers a higher valuation of the existing pipeline than New Entrant DORC once they are both expressed in fully after tax terms.[24] The question still remains 'which is correct'?

This question can not be answered without reference to context. The current context is the establishment of an ICB for the purposes of determination of future regulated revenues.

1.2.2.1. Internal consistency of choice

Given the relevant context, internal consistency of regulatory decision making requires that the Incumbent DORC be preferred over the New Entrant DORC. To see why, note that regulated revenues are determined by reference to the business's ICB and their forward-looking costs (including tax costs). The New Entrant DORC is higher than the Incumbent DORC only because it is presumed that the New Entrant has lower forward-looking tax costs on the existing pipeline. To increase the ICB to reflect lower future tax costs *of the new entrant* but then to set revenues based on the (higher) tax costs *of the incumbent* is internally inconsistent.

Internal consistency requires that if it is the *incumbent's costs* of operating the existing pipeline that are being used to regulate future prices then it must be these costs that go into the NPV cost based DORC calculation. That is, it must be the *Incumbent DORC* that is used to determine the NPV cost based DORC.

1.2.2.2. Internal consistency required under competitive market paradigm

A negative consequence associated with (inconsistently) using New Entrant DORC to set the ICB would be that consumers would pay higher prices than if the hypothetical new pipeline was actually built. This is clearly inappropriate if the purpose of using a 'hypothetical new entrant benchmark' is to ensure that customers pay prices on the existing pipeline that are not higher than they would pay on a new pipeline.

A simple example can illustrate this problem. Imagine that both existing and new pipelines have an infinite life and zero operating costs. For simplicity of exposition assume that the tax value of the existing pipeline is zero (ie, it has been fully depreciated for tax purposes) but that the new pipeline can be fully and immediately depreciated for tax purposes. Now, let us examine how much revenue customers pay (investors receive) under four different scenarios:

[24] Based on our understanding of tax implications for the sale of a tax depreciable asset

1. An efficient new pipeline is constructed and regulated services are provided using that asset (with its ICB = ORC) and the new pipeline's tax costs are used to determine regulated revenues;

2. Services are provided with the existing asset and the ICB is set equal to Incumbent DORC and (consistently) the incumbent's tax costs are used to determine future revenues;

3. Services are provided with the existing asset and the ICB is set equal to New Entrant DORC and (consistently) the new entrant's tax costs are used to determine future revenues;

4. Services are provided with the existing asset and the ICB is set equal to New Entrant DORC but (inconsistently) the incumbent's tax costs are used to determine future revenues.

We show below that in the first three of the above scenarios revenues paid by customers (received by investors) are the same - ie, are equal to the costs of a new entrant. However, in the final (inconsistent) scenario revenues are higher than the costs of a new entrant.

In the first scenario, the builder of a new pipeline has a total pre tax cost of construction equal to ORC and, consequently, the ICB is set equal to ORC. However, regulation of future revenues takes into account the value of tax depreciation to the owner (worth ORC*t by assumption). Thus, regulation sets future after tax revenues to recover a present value of ORC*(1-t) - being the after tax costs incurred by the owners of the newly constructed pipeline.

In the second scenario, the ICB is set equal to Incumbent DORC - equal to ORC*(1-t).[25] Regulation then sets after tax revenues based on recovering the ICB plus the value of the incumbent's other costs net of remaining tax depreciation. The incumbent has no future costs and no remaining tax depreciation so the incumbent receives ORC*(1-t) in present value of future after tax revenues. This is the same value of revenue that the hypothetical constructor of the new pipeline would have received.

In the third scenario, the ICB is set equal to New Entrant DORC of ORC.[26] This price is higher than Incumbent DORC by the value of tax depreciation a new owner would enjoy (ORC*t). However, future regulation consistently takes into account the value of tax depreciation available to the new owner (worth ORC*t). Thus, once more, regulation sets future after tax revenues to recover a present value of ORC*(1-t) (being the ICB less the value of tax depreciation to the new owner).

In the fourth scenario, the ICB is set equal to New Entrant DORC again (ie, ORC). However, future regulated revenues are (inconsistent with the estimation of New Entrant DORC) based on tax costs of *the incumbent* who has no tax depreciation available on the existing pipeline.

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[25] Where ORC*(1-t) is equal to the after tax costs of the new pipeline (ORC*(1-t)) less the after tax costs of the existing pipeline *to the existing owner* (zero).

[26] The new entrant would be prepared to pay ORC for the existing pipeline because, by assumption of perpetual life and zero ongoing costs, the existing pipeline is just as good as a new one.

This means regulated after tax revenues recover ORC - which exceeds the after tax revenues received in the three other scenarios, ie, exceeds the after tax costs of a new entrant.

In a hypothetically competitive market, customers would not pay more than the costs of a new entrant. Clearly, if setting the ICB equal to DORC is intended to mimic the outcomes in a competitive market then it is imperative that there is consistency between:

- The tax costs that are included in the calculation of DORC; and
- The tax costs that are used to model regulated revenues.

Given these facts, we also find that APT is in error when it states:

> "*Modelling of cash flows once the ICB has been set, whether or not with the PTRM, is a separate process in which the ICB is one input. Any perceived need for consistency with the current revenue modelling approach is not relevant*."[27]

Conclusion 1.3

If the purpose of using a 'hypothetical new entrant benchmark' is to ensure that customers pay regulated prices on the existing pipeline that are not higher than they would pay on a new pipeline then internal consistency between the calculation of DORC and the calculation of future revenues is necessary. If the ACCC continues to set future revenues on the basis of the incumbent's tax cost then internal consistency requires the incumbent DORC be used in the context of setting the ICB.

By contrast, if the ICB is set equal to New Entrant DORC but future revenues are, inconsistently, set on the basis of the incumbent's tax position then this will result in revenues exceeding the costs of a hypothetical new entrant. Such as result would be inconsistent with the outcomes of a competitive market.

1.3. CRA Propositions

CRA makes a number of claims in its paper that are demonstrably wrong. The following sections deals with these.

1.3.1. CRA Misunderstands Tax Law

Section 3.4 of the CRA report details CRA's understanding of the tax implications of selling a depreciable asset for more than its depreciated tax value. In this section, which we repeat in full below, it is clear that CRA's analysis is based on the purchase price in excess of depreciated tax value not being assessable income to the seller. Our understanding is that this is wrong. Consequently, CRA's analysis and conclusions are also wrong.

[27] Page 9 of the APT submission.

"The claim might be put that basing NPV DORC on the HNE's perspective would attribute to the incumbent a tax benefit that it may not actually be able to obtain. This benefit arises from the fact that the HNE would be able to claim a tax deduction for the depreciation on its purchase price, DORC, over a period of 20 years. A pipeline that has been under the same ownership for more than 20 years would most likely not receive this tax deduction. Hence, the argument goes, an incumbent would not have access to tax deductions to minimise its costs of owning the existing pipeline, so the "Incumbent DORC" would be lower than the "HNE DORC".

"This argument essentially invokes an ad-hoc adjustment to the NPV DORC valuation in order to prevent the incumbent obtaining a revenue benefit by virtue of its ability to sell the pipeline to a party that could obtain tax deductions for depreciation on the secondhand purchase price.

"This ad-hoc adjustment is inconsistent with the behaviour that would be expected in a competitive pipeline market. Such a market, in equilibrium, would have a single gas transportation price, meaning that for two pipelines with identical capacity the ***pre-tax*** *revenues would be equal. In such a market, if equal pre-tax revenues led to unequal post-tax revenues, then the firm with the disadvantageous tax position would modify its behaviour. In the particular case in point, the behaviour modification is that incumbent pipeline owners would sell their pipelines once the tax deductions for depreciation had been used up. In equilibrium in a competitive pipeline market, incumbents would never be in the disadvantageous tax position that the ACCC has assumed for its Incumbent DORC calculation.*

"Once that characteristic of competitive pipeline markets is taken into account, the properly construed Incumbent DORC coincides with the HNE DORC as calculated by APTPPL and CRA."[28]

CRA clearly shows a misunderstanding of the tax law when it states "*In the particular case in point, the behaviour modification is that incumbent pipeline owners would sell their pipelines once the tax deductions for depreciation had been used up."* This would be true if the incumbent owner could sell the asset to a new entrant without having to pay tax on the purchase price in excess of the written down tax value of the asset. However, as a matter of fact under Australian tax law, we understand that this is not the case. As described in the previous section, properly analysed, the incumbent would refuse to sell to a new entrant.

Far from being 'tax disadvantaged', the Incumbent has actually received substantial past tax advantages by depreciating the existing asset faster than its economic value falls. The 'behaviour modification' suggested by CRA would actually undo precisely this tax advantage and would be irrational.

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[28] Page 8 of the CRA report.

Conclusion 1.4

CRA understanding of the tax law is flawed as are its conclusions that are based on this understanding.

In any event, it is surprising that CRA makes the argument that:

"…incumbent pipeline owners would sell their pipelines once the tax deductions for depreciation had been used up"

but its own modeling assumes no such thing.[29] That is, CRA's own modeling assumes that all assets are held by a single owner over the remainder of their economic life - even when this exceeds its life for tax purposes.

It is worth noting that CRA makes the same errors in their description of the tax value of depreciation in section 2.2.[30]

1.3.2. DORC's Role in Hypothetical Decision Making

Sections 2 and 3 of the CRA report assert that New Entrant DORC must be the 'correct' DORC as it is the only valuation that would be used to determine decisions in a workably competitive market. On page 2 of the report CRA states:

> *"As the asset valuation is a key determinant of the regulated price, the natural question is "what valuation would prevail in a workably competitive market?""*

CRA's premise for rejecting Incumbent DORC is summarised by the first paragraph of section 3.1.

> "*Any incumbent calculation must be made in the context of a specific decision that the incumbent might face. There are really only two decisions the incumbent could realistically take that would involve a valuation of the existing pipeline: first, what reservation price to apply in evaluating an offer to buy from a new entrant and second,*

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[29] We have not cited the most recent model submitted by APT. However we are advised by the ACCC that, consistent with CRA's initial model submitted prior to the Draft Decision, all assets are assumed to be held by their original owners until the end of their economic life.

[30] In that Section CRA states:

> *"At the outset the first owner, in purchasing the pipeline, obtains two sets of tax entitlements: one for years 1 … N, and one for years N+1 … 2N. The second set of entitlements can be realised by the first owner through a forward contract for sale of the pipeline at the end of year N. As the field of bidders for the initial pipeline franchise is assumed to be competitive, any successful bidder can be expected to propose initial ownership by itself (purchaser A) for the first N years, then ownership by a "stapled" purchaser B for the second N years. A successful bid would therefore reflect the expected cost profile and the present value of the stream of tax benefits over 2N years. If a bidder only took account of the first N years' tax benefit, it would be underbid by another offer that took account of the second N years' benefit."*
>
> …
>
> *"The upshot of these considerations is that it is incorrect to assume in the NPV DORC calculation that an incumbent owner does not obtain any tax depreciation benefits from the existing pipeline."*

Once more, this analysis fails to recognise that at the time when ownership transfers from "purchaser A" to "purchaser B' the value of consideration will be taxable to purchaser A. When this is recognised CRA's conclusion is clearly wrong.

assuming no change in ownership, when to replace the existing pipeline with a new one. The first question is considered here, and the second in the following subsection."[31]

The first sentence of this quotation is unsupported by any further analysis. In our view, Incumbent DORC is a well defined and meaningful concept. A perfectly reasonable and accurate description of Incumbent DORC is 'the value of the existing pipeline to the incumbent if they have the option of earning an identical revenue stream with a new pipeline". This is a perfectly meaningful and sound definition of DORC irrespective of whether it would inform a specific decision that an incumbent might face. In any event, in the above hypothetical scenario, it clearly would inform the incumbent's reservation price, ie, the price they would be willing to sell the pipeline to another party.

In support of the above conclusions, CRA makes a number of errors. These errors can be understood by examining the four key arguments in each of sections 3.1 to 3.4 of the CRA report.

1. In section 3.1 CRA argues that Incumbent DORC is not relevant because an incumbent would value the pipeline based on revenues not costs.

   "The incumbent's reservation price cannot be evaluated without knowing the future haulage tariffs. This fact makes it unsuitable as a reference point for a regulatory asset valuation. Using the minimum price the incumbent would accept to sell the existing pipeline as the regulatory valuation would create an irresolvable circularity: the regulated tariff depends on the regulatory valuation, which would depend on the incumbent reservation price, which depends on the regulated tariff. Therefore, the incumbent's reservation price, whatever it might be, sheds no useful light on the question of NPV DORC." [32]

2. In section 3.2 CRA argues that the incumbent DORC is not relevant to the incumbent's timing of the replacement of the existing pipeline.

   "The incumbent would replace the existing pipeline when the net present value of future expenditures on the existing pipeline equals or exceeds the net present value of future expenditures on the new pipeline, including the capital cost of acquiring it. The comparison is able to be made on the basis of expenditures alone by our assumptions that the pipeline tariff is independent of which pipeline transports the gas, and that the new pipeline has the same capacity as the existing one. These assumptions imply that in each year the revenue earned by the new pipeline is the same as the revenue earned by the existing pipeline.

   "This comparison of net present values of expenditures is similar to the one that is performed in the NPV DORC calculation, but the decision context implies that replacement of the existing pipeline will only occur when NPV DORC is zero or negative. Recall that NPV DORC represents the capitalised savings a new entrant would achieve by using the existing pipeline instead of building a new one. When it is time to replace the existing pipeline, there are no savings.

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[31] Page 6 of CRA report.

[32] Page 6 of the CRA report.

"Once again, the incumbent's decision to replace the existing pipeline sheds no useful light on the question of NPV DORC."[33]

3. In section 3.3 CRA argues that the incumbent would have no interest in the costs of a new pipeline because it would never build a new pipeline.

   "This defect could possibly be overcome if the new pipeline part of the calculation was interpreted as the NPV of costs that the incumbent would face if it constructed a new pipeline, but this interpretation makes no sense. The incumbent would only construct a new pipeline and abandon its existing pipeline if continuing to operate it was uneconomic, in which case NPV DORC would be zero or negative.

   "In short, the ACCC's NPV DORC calculation has no bearing on any of the decisions that a new entrant or an incumbent could plausibly face, and therefore it has no relevance to the asset valuation that would arise in a competitive pipeline market."[34]

4. In section 3.4 CRA argues that Incumbent DORC is really the same as New Entrant DORC because an incumbent would rationally sell the asset as soon as it was depreciated for tax purposes.

   "This ad-hoc adjustment is inconsistent with the behaviour that would be expected in a competitive pipeline market. ... incumbent pipeline owners would sell their pipelines once the tax deductions for depreciation had been used up. In equilibrium in a competitive pipeline market, incumbents would never be in the disadvantageous tax position that the ACCC has assumed for its Incumbent DORC calculation.

   "Once that characteristic of competitive pipeline markets is taken into account, the properly construed Incumbent DORC coincides with the HNE DORC as calculated by APTPPL and CRA."[35]

CRA is wrong in each of these assertions.

CRA's first assertion is inconsistent and therefore wrong. It is inconsistent because the logic CRA uses to declare the Incumbent DORC irrelevant applies equally to New Entrant DORC. CRA states that Incumbent DORC can not be used to determine a reservation price for the incumbent because that reservation price would, in reality, have regard to revenues foregone less costs foregone. If this is true, precisely the same logic should be applied to a New Entrant, ie, a New Entrant would value the existing asset on the basis of revenues earned less costs incurred. This means that new Entrant DORC would be equally as irrelevant as Incumbent DORC.

Of course, the whole point of focussing on cost differences is to derive a value for the existing asset *assuming* that identical revenues can be earned with a new asset. This thought experiment can be applied equally to both Incumbent and New Entrant. Incumbent DORC is the maximum amount the incumbent would have to be offered (after tax) to give up its

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[33] Page 7 of the CRA report.

[34] Page 7 of the CRA report.

[35] Page 8 of the CRA report.

existing asset *given that it could earn identical revenues from a new asset*. New Entrant DORC (as calculated by CRA) is the maximum amount the New Entrant would offer the incumbent (before tax paid by the incumbent) *given that it could earn identical revenues from a new asset*.

CRA's second assertion is wrong. The incumbent will decide to replace the existing pipeline when NPV cost based DORC is zero. Clearly, NPV cost based DORC is a meaningful value to the incumbent in this context.

CRA's third assertion suffers from the same logical flaw as its first. CRA is simply wrong to claim *"... the ACCC's NPV DORC calculation has no bearing on any of the decisions that a new entrant or an incumbent could plausibly face."* Incumbent DORC describes the after tax value that an incumbent will accept for sale of the existing pipeline, New Entrant DORC is the before tax amount that a new entrant would be prepared to pay. Each of these values have an equally real and valid meaning to each of the potential parties to the transaction (buyer and seller).

CRA's fourth assertion is wrong because it relies on a flawed understanding of the tax law as was explained in the previous section (ie, CRA incorrectly assume that a single depreciable asset can, through multiple sales, be depreciated for several multiples of its initial tax value without any tax consequences for the selling party).

Conclusion 1.5

The logic in sections 3.1 to 3.4 of CRA's report is deeply flawed. The conclusions of those sections are unreliable.

1.3.3. Value to Other Parties

In our prior report we argued that the question of DORC value could not be properly answered without first answering value to who. In that report we argued that, from the perspective of society, tax is not a real 'cost' as it is simply a transfer from one member of society to another. Thus, if DORC was intended to capture the value to society of the exiting pipeline then NPV cost based DORC would not include taxes as a 'cost'. Given that society is the ultimate user of the asset, this definition of NPV cost based DORC can be interpreted as 'Consumer DORC'. On page 13 of our earlier report we state:

> *"A further unresolved conceptual issue in defining economic DORC is value to whom? Consider the valuation of 'tax costs' on a new pipeline from the perspective of three different market participants:*
>
> - *pipeline users / society at large;*
> - *the incumbent owner's shareholders; or*
> - *a potential new owner's shareholders.*
>
> *From society's perspective, tax payments are a transfer not an economic/resource cost. A tax payment goes to provide government services which provide offsetting benefits to society (including taxpayers). That is, tax provides value above and beyond that provided by the pipeline (unlike the cost of steel in the pipeline which has value only in so far as it*

contributes directly to pipeline services). The DORC valuation of the existing pipeline to society will not include tax payments as a pure cost."

In this regard, CRA, in section 3.5, has responded that this conception of DORC is irrelevant because:

"NERA's paper considers the NPV DORC calculation from three perspectives: the HNE and Incumbent perspectives already mentioned, and also the perspective of gas consumers. Unlike the HNE and Incumbent, consumers do not have an explicit reason for valuing a gas pipeline, as they do not build, buy or sell pipelines. Further, it is not clear what influence, if any, consumers have over the ownership and construction decisions taken by others."

We simply do not understand CRA's argument and how it has any bearing whatever on the analysis we previously presented. Our analysis, as evidenced in the previous quote from our report, was clearly focussed on the value to society of the existing pipeline. CRA's response simply fails to address our contention.

Our contention remains valid, namely, if DORC is interpreted as the value that society places on the existing pipeline given that society has the option of replacing it with a new pipeline then the 'correct' definition of NPV cost based DORC does not include taxes as a 'cost'.

Conclusion 1.6

The analysis in section 3.5 of CRA's report misrepresents, and therefore fails to address, NERA's previous analysis.

2. Critique of APT Submission

2.1. APT's Response to NERA

APT explicitly addresses NERA's earlier reports in Attachment 1 to its submission (from the bottom of page 58 onwards). APT organises its response under seven headings:

> *"The principal issues raised by NERA are:*
>
> 1. *The straight line adjustment of ORC as a proxy for "Economic DORC"*
> 2. *Differences in service potential*
> 3. *Complexity, cost and transparency*
> 4. *Commercial practice*
> 5. *Information asymmetry*
> 6. *Pre tax and post tax discounting*
> 7. *Weighted average life vs separate treatment of assets."*
>
> *Taking them in order:"*

We adopt the same headings as used by APT when responding to claims made from page 58 onwards of Attachment 1 to APT's submission on the draft decision.

2.1.1. The straight line adjustment of ORC as a proxy for "Economic DORC"

APT claims, on the bottom of page 58 to attachment 1, that they will address each of the '*principal issues raised by NERA'* as listed above. However, in its following section entitled '*the straight line adjustment of ORC as a proxy for "Economic DORC"*', APT does not address any NERA analysis. Rather, it restricts itself to arguing:

i. Straight line DORC is not forward-looking and therefore inconsistent with the generally understood view that DORC is forward looking;[36]

ii. Straight line DORC implicitly assumes that past revenues would have been sufficient for straight line depreciation to have been recovered; [37]

iii. Straight line DORC involves price shocks when asset replacement occurs; [38] and

iv. The ACCC implemented the 'wrong' straight line DORC methodology. [39]

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[36] See the second paragraph in section 1 on page 59 of Attachment 1 to the APT submission.

[37] See the third paragraph in section 1 on page 59 of Attachment 1 to the APT submission.

[38] See the fourth paragraph in section 1 on page 59 of Attachment 1 to the APT submission.

[39] See the fifth paragraph in section 1 on page 59 of Attachment 1 to the APT submission.

We consider, for reasons explained below, that APT is wrong in attempting to make each of these four arguments. However, the more important flaw in APT's analysis is the failure to address any of NERA's analysis of whether it is possible to conclude that straight line DORC or NPV cost based DORC are better proxies for economic DORC.[40] Our conclusion was that it was not possible to say one way or the other:

> *"On the basis of the above conceptual analysis it is not possible to conclude which of the above estimation procedures is likely to provide a better proxy for economic DORC."*[41]

With reference to the four arguments actually made by APT in this section we believe that all of these are flawed for the following reasons.

First, straight line DORC is forward-looking in so far as it is calculated using an ORC that reflects currently available information (eg, on current construction costs). The fact that this forward-looking ORC is depreciated based on the remaining life of the existing pipeline does not make it a backward-looking valuation.

Second, APT is wrong to claim that

> *"…as formulated by the Commission, there is an implicit assumption that the hypothetical ORC pipeline is constructed instead of the existing pipeline, and that this pipeline would have recovered its capital cost on a real straight line basis up to the date of the DORC calculation."*[42]

Both straight line accounting DORC and NPV cost based DORC start from a forward-looking ORC and then depreciate this based on the remaining life of the existing asset. Neither approach employs any assumption (implicit or otherwise) about past cost recovery. One could argue that a regulatory valuation methodology should, on equity grounds, take account of past cost recovery. However, we are unaware of any arguments that suggest that this is relevant to the calculation of 'DORC'. Moreover, any such equity argument would apply equally to straight line accounting DORC and NPV cost based DORC.

Third, APT is incorrect when it claims that setting an ICB with reference to straight line accounting DORC promotes price shocks "*…when an asset replacement occurs*".[43] APT appears to be confusing the setting of an ICB when regulation is first applied with depreciation of the regulatory asset base (RAB) thereafter

Although it is not necessarily so, in some circumstances application of straight line depreciation of the RAB *during future regulatory periods* can lead to price shocks if there is a major asset replacement at a particular time that dramatically increases the RAB and, consequently, dramatically increases both depreciation and return on capital (and these are not offset by higher volumes and/or lower operating costs). In this scenario smoothing of

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40 See section 5.1 of NERA, "*Comparison of DORC Estimation Procedures: A Report for the ACCC*", 25 July 2006.

41 Page 19 of NERA, "*Comparison of DORC Estimation Procedures: A Report for the ACCC*", 25 July 2006.

42 See the third paragraph in section 1 on page 59 of Attachment 1 to the APT submission.

43 See the fourth paragraph in section 1 on page 59 of Attachment 1 to the APT submission.

prices can be achieved by applying lower rates of depreciation immediately following a major asset replacement than immediately before a major asset replacement.

However, this is not a relevant consideration to the setting of the ICB. Using straight line depreciation of the ORC to determine the ICB creates no restrictions on future depreciation profiles that can be applied to the RAB - just as setting the ICB based on NPV cost based DORC creates no restriction on how future depreciation must be set. Specifically, any depreciation profile aimed at smoothing future prices is equally available no matter how the ICB has been set.

Fourth, APT claims that:

> *"Finally, the Draft Decision's application of the straight line proxy DORC to the RBP highlights a practical flaw, where the lives of the ORC asset and existing asset are different. The result of the Commission's approach is that the straight line proxy DORC for the RBP is understated."*[44]

APT implicitly argue that the correct way to apply straight line depreciation is as per the following formula:

$$\text{APT straight line DORC} = ORC * \frac{\text{remaining life of existing pipeline}}{\text{economic life of exsitng pipeline}}$$ [45]

By contrast, the approach taken by the ACCC, consistent with NERA's own advice, is to adopt the following definition:

$$\text{ACCC straight line DORC} = ORC * \frac{\text{remaining life of existing pipeline}}{\text{economic life of new pipeline}}$$

The only difference between these two definitions is the nature of the denominator. Where the economic life of the existing and new pipelines are the same then these two definitions are also the same. Where technological advancement means that the economic life of a new pipeline is longer than the economic life of the existing pipeline, as is the case for the RBP, the ACCC value will be reduced whereas the APT value will not.

The relevant question becomes 'is it appropriate for the DORC value of existing pipelines to fall to reflect higher service potential, in the form of longer lives, of new pipelines'? The answer to this question is clearly 'yes' if straight line DORC is a proxy for economic DORC. As discussed in our previous reports, economic DORC will fall the higher is the service potential of the new pipeline relative to the existing pipeline.

2.1.2. Differences in service potential

In its first sentence in this section APT states:

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[44] See the fifth paragraph in section 1 on page 59 of Attachment 1 to the APT submission.

[45] See page 71 (Attachment 2 to APT's submission).

> *"The DORC hypothetical involves the choice between buying the existing pipeline and building an optimally designed new pipeline to replace the service potential of the existing pipeline i.e. a like-for-like replacement."*[46]

This statement is wrong. Assuming the two pipelines would have the same service potential is inappropriate unless, by pure good fortune, the existing pipeline is providing the same level of service potential as would an optimally designed new pipeline. In the case of the RBP, this means assuming that a pipeline initially constructed and designed around 40 years ago is currently providing the level of service potential that an optimal new pipeline, designed and constructed today, would provide.

This error is repeated elsewhere in APT's submission. For example, page 53[47] of the APT submission states that "it is accepted that the DORC calculation involves three steps" which APT then go on to describe. However, these three steps do not include an adjustment for differences in service potential that both NERA and Allen Consulting Group[48] have previously described as necessary. Given that APT quote from both NERA and Allen Consulting Group reports in the same submission we regard the statement that 'it is accepted' that DORC does not involve such a step as misleading.

In our view, differences in service potential between the Venton designed pipeline (on which ORC was based) and the existing pipeline are likely to be highly material. This is based on Venton's own description of differences in service potential between the two pipelines and on our own analysis of the economic advantages that a new pipeline with lower marginal costs will have.

In our previous report, we provided clear examples of where a new pipeline would have higher service potential than the existing pipeline (some of which are based on Venton's analysis).[49] APT has not responded specifically to any of these. However, APT has asserted that there will be no material difference in service potential:

> *"Venton (Venton 2006b) also determined an ORC for a pipeline with effectively identical service capability to the current RBP. This pipeline followed the optimal route identified in the initial Venton report. Venton stated (Venton 2006b p1):*
>
> > *The pipeline is assumed to be constructed along the route proposed for the optimised design in Venton & Associates report 167-R-01 [ie Venton 2006a], for the reason identified in that report that the existing route through metropolitan Brisbane is so congested that the alternative route that uses existing road and power easements will be lower cost, and will provide increased safety through the residential area.* [50]

Note that in the above quote APT asserts that Venton determined an ORC for a pipeline with '*effectively identical service capability to the current RBP'*. However, APT provides no

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46 Page 61 (Attachment 1 to the APT submission).

47 Page 53 (Attachment 1 to the APT submission).

48 ACG, *Methodology for Updating the Regulatory Value of Electricity Transmission Assets*, August 2003.

49 Pages 10 to 14 of NERA, *Assessment of Elements of APT's DORC Calculations for RBP*, 25 July 2005.

50 Page 61 (Attachment 1 to the APT submission).

evidence that this is the case and the quote from the Venton report does not support the APT assertion in any way. By contrast, NERA identified several quotes from the previous Venton report that suggest the opposite view but APT has chosen not to specifically address these.

For example, we previously noted that on page 17 of the Venton report it is stated:

> *'A new pipeline constructed along the existing route will:*
>
> *(e) Introduce increased public safety issues by construction of a high pressure pipeline through existing and future residential areas.*
>
> *(f) Not provide for an existing and expected future significant gas loads in the Swanbank area.*
>
> *It will also limit a potential opportunity to deliver gas to the Amberley region'*

In other words, relative to the existing pipeline the new pipeline offers better public safety and the ability to meet demand that the existing pipeline does not have. The fact that the existing pipeline route will "*not provide for an existing and expected future significant gas loads in the Swanbank area"* strongly suggests a material difference in service levels between the two assets.

Similarly, on page 38 the Venton report states:

> *"The metropolitan section of the pipeline has an additional constraint which is evident from the existing pipeline – future modification to expand the pipeline capacity will be very costly, because of land use change through the life of the pipeline. Consequently it is essential that the metropolitan pipeline is designed with the capacity required to deliver the maximum forecast load in its forecast design life. Capacity expansion by looping is unlikely to be capable of justification on the basis of incremental growth."*

This suggests that serving increased demand on the existing pipeline is likely to be uneconomic but increased demand on the new pipeline will not be. If serving incremental growth is prohibitively costly then the service levels on the two pipelines are automatically different - voiding a pure NPV cost based DORC valuation.

The above are just two of the four quotes we presented in our previous report. APT has not specifically addressed any of these quotes from the Venton report. The only reference APT makes to these quotes are as follows:

> *"Referring to the Venton report, NERA (NERA 2006b, p11) discuss the higher costs of maintaining the existing pipeline and the relative risk characteristics of the existing and replacement pipelines in the context of a discussion of service potential. As formulated by The Allen Consulting Group (ACG 2003, p22) and understood by APTPPL, differences in service potential will generally be reflected in differences in revenues. Differences in maintenance costs and risk profiles (to the extent they are reflected in different insurance*

> *costs) are provided for in the NPV DORC calculation through the assumption that the existing pipeline has higher O&M costs than the replacement pipeline."*[51]

It is unclear what APT mean by the statement "*As formulated by The Allen Consulting Group (ACG 2003, p22) and understood by APTPPL, differences in service potential will generally be reflected in differences in revenues."* First, APT do not specify the quote from the ACG report they are referring to but simply provide a reference to 'page 22'. Second, page 22 provides no mention of the word 'revenue' or anything that could be construed as being consistent with APT's statement. Third, reading page 22 of the ACG report provides a clear and compelling case for the need for DORC to reflect differences in service potential. In fact, on this page ACG describes the 'second step' of estimating economic DORC as:

> *"Secondly, to identify the differences in the forward-looking service potential and costs associated with the existing asset compared to the new (optimal) asset."*[52]

Finally, it is unclear what point that APT intends to make with its statement that '*differences in service potential will generally be reflected in differences in revenues'*. If this was the case it would simply be another way of saying that NERA (and ACG) are correct. If the optimal pipeline would have higher revenues than the existing pipeline (to reflect higher service potential) then the existing pipeline would have a commensurately lower value to investors. That is, investors who have the option of earning higher revenues with the new optimal pipeline will need to be offered a further discount to buy the existing asset with a lower revenue.

APT also make the claim that:

> *"In any event, the NPV DORC calculation presented by APTPPL in its Access Arrangement Information (AAI) includes provision for costs, including capital expenditure of $115m ($2005/06 real) on the existing pipeline in the years up to 2011 (CRA 2006, Table 3), to expand its capacity to that of the "optimal" (ie higher capacity) ($462m) ORC design so that the APTPPL DORC calculation is based on a like-for-like comparison. That being the case, and given that the principal service will always be receipt of gas at one point and delivery at another, and end-use markets are identical, any remaining differences in the service potentials of the two pipelines compared in the APTPPL DORC calculation are unlikely to be great."*[53]

The first sentence of this quote states that APT's allowance for capital expenditure on the existing pipeline ensures that it has the same service potential as a new pipeline. However, it does nothing more than state this. It certainly does not address any of the reasons provided in section 3 of our earlier report as to why this was not the case.[54] The second sentence is another unsupported statement that two pipelines would provide identical service potential which, once more, fails to address the reasons why we do not believe this to be the case.

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[51] Page 61 (Attachment 1 to the APT submission).

[52] Page 22, ACG, *Methodology for Updating the Regulatory Value of Electricity Transmission Assets*, August 2003.

[53] Page 62 (Attachment 1 to the APT submission).

[54] See pages 9 to 14 of NERA, *Assessment of Elements of APT's DORC Calculations for RBP*, 25 July 2005.

In this regard, it is worth noting that APT makes no mention of the analysis we presented in section 3.2 of our earlier report[55] which showed why we expect that optimal volumes on the existing pipeline with higher marginal cost of capacity expansion will be lower than optimal volumes on the Venton pipeline (which has lower marginal cost of capacity expansion).

2.1.3. Complexity, cost and transparency

In this section APT argue that even if the estimation of NPV cost based DORC is complex and uses up a great deal of resources this is justified given the importance of the ICB for future revenues.

> *"As the Commission acknowledges, "the ICB is the most crucial input parameter in determining the level of reference tariff" (Draft Decision, p11). Once determined, it is not re-evaluated. There is no question of re-setting the DORC at future reviews, and so the situation is not comparable to that considered by The Allen Consulting Group and referred to by NERA (see NERA 2006a, p7). A quest for the "correct" DORC value involving commensurate levels of effort and complexity is justified. As the Tribunal (ACT 2004, paragraph 38) said:*
>
> > *'Where the value attributed to the ICB will have a continuing effect for the balance of the life of the pipeline, it is appropriate that there be a serious effort made to arrive at the correct result'"*[56]

Our previous reports have analysed a number of issues that are relevant to an appraisal of the above quote. In order to avoid repeating large slabs of text, we summarise these as five (5) discrete points and provide section references to earlier reports where the issue is discussed in more detail.

i. The NPV cost based DORC concept proposed by APT is not conceptually the same as economic DORC. Consequently, increased effort put into estimating NPV cost based DORC can not be presumed to improve its 'accuracy' - assuming this is measured against economic DORC. (See section 3 of our earlier report).[57]

ii. Economic DORC (and NPV cost based DORC) relies so heavily on conjecture about unknown and unknowable future events (future costs and future demand for gas) that it is misleading to talk about estimating a single 'correct' value. (See section 4 of our earlier report).[58]

iii. The fact that what information is available is held asymmetrically by parties with vested interests means that increased 'effort' can not be assumed to result in more accurate assumptions about future events. Put simply, increased effort by parties with vested

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55 NERA, *Assessment of Elements of APT's DORC Calculations for RBP*, 25 July 2005.

56 Page 63 (Attachment 1 to the APT submission).

57 NERA, *Assessment of Elements of APT's DORC Calculations for RBP*, 25 July 2005.

58 NERA, "*Comparison of DORC Estimation Procedures: A Report for the ACCC*", 25 July 2006.

interests and asymmetric access to information is more likely to result in less accurate estimates than more accurate estimates. (See section 5.1.2 of our earlier report).[59]

iv. There is uncertainty as to what DORC referred to in the Code means and whether there is a single correct meaning (eg, straight line accounting DORC vs incumbent economic DORC vs new entrant economic DORC vs users' economic DORC). (See section 3 of our earlier report[60]).

v. There is no economic benefit, in terms of more efficient operation of the pipeline, from setting the ICB equal to the 'correct' DORC value (assuming conceptual agreement could be attained on what that value constituted). (See section 5.2 of our earlier report.)[61] Hence, the importance APT appears to attach to accurately estimating DORC must be associated with some other, non-economic, criteria.

On the basis of the above, we remain unconvinced by arguments that it is appropriate to sacrifice a great deal of effort and resources in estimating 'DORC'. We do not believe that such effort will necessarily improve accuracy of estimation (defined against any of the possible conceptual benchmarks) and that, even if it did, it would not provide any benefits in terms of promoting the efficient operation of a gas pipeline.

We note APT has, in its submission on the draft decision, sacrificed accuracy for expediency in its own estimate of NPV cost based DORC.

> *"Given the difficulties apparently faced in reaching a common position on future capital costs when the forecast capacity ORC is adopted, APTPPL will accept the use of the existing capacity ORC as the basis of the calculation of NPV DORC. This also has the benefit of alignment with the approach adopted in the Draft Decision to the calculation of straight line DORC."*[62]

This approach is unambiguously wrong if one is intending to estimate the differences in costs between the current and an *optimally designed* new pipeline. It effectively forces the new pipeline to have a sub-optimal design such that it faces the same (higher) expansion costs as the existing pipeline. APT then appears to believe that this allows them to ignore expansion costs - presumably because they are assumed to be the same on both pipelines. This assumption introduces a significant error into the calculation of NPV cost based DORC (resulting in an upward biased estimate of the value of the existing pipeline). APT's adoption of this approach is inconsistent with a view that 'accuracy' in estimation of DORC is more important than simplicity.

2.1.4. Commercial practice

We have previously argued that it would be desirable if the valuation methodology used to estimate DORC was consistent with general commercial valuation practices. This is based on

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[59] NERA, "*Comparison of DORC Estimation Procedures: A Report for the ACCC*", 25 July 2006.

[60] NERA, "*Comparison of DORC Estimation Procedures: A Report for the ACCC*", 25 July 2006.

[61] NERA, "*Comparison of DORC Estimation Procedures: A Report for the ACCC*", 25 July 2006.

[62] Page 12 of APT submission

the view that transparency and predictability of the regulatory process will be aided if a well understood, and widely used, valuation methodology is used. We argued that straight line accounting DORC is a widely used *accounting* valuation methodology. By contrast, NPV cost based DORC is not a widely used commercial valuation methodology (accounting or economic). In our view, these facts are not determinative but do lend some weight to the adoption of straight line accounting DORC as a regulatory valuation methodology.

APT's response[63] does not appear to reject our interpretation of commercial practice but rather argues that no weight should be given to it in the current context.

> *"Regardless of whether DORC is a common valuation method in commercial practice, the Code, as clarified by the Tribunal, requires that the regulator have regard to the DORC value in establishing the ICB of a pipeline."*

By contrast, we continue to believe that some weight should be given to commercial valuation practice.

Despite a seeming lack of relevance to the issue of 'commercial practice', APT go on to state:

> *"NERA cite the fact that the cost-based NPV DORC calculation is based on costs alone as a point of difference between that calculation and commercial practice where valuations involve consideration of revenues (NERA 2006a, p21). As NERA suggest, they may well have been the first to introduce the cost-based NPV approach (NERA 2006a, p20) but NERA's rejection of the revenue-based approach in favour of the cost-based approach is, at the very least, questionable given their contemporaneous application of the HNET to the MSP, which in turn relied on assumptions as to the revenue path the HNE will adopt (NERA 2002a). Moreover, the cost-based NPV DORC calculation avoids reference to revenues only because of the assumption of identical service potentials – an assumption which NERA now question.*
>
> *"DORC is necessarily a hypothetical concept. Its value can be calculated by reference to costs alone or by reference to the revenue path that the HNE would require to recover the costs of a new pipeline costing ORC – the two approaches are equivalent by virtue of the matching of revenues and costs. While the concept may be hypothetical, DORC becomes a real value, for regulatory purposes at least, when it is adopted as the ICB."*

It would appear from this quote that APT is:

i. criticising NERA's introduction of NPV cost based DORC on the basis that an alternative revenue based DORC was available that would be "equivalent by virtue of the matching of revenues and costs";

ii. criticising the NPV cost based approach for 'assuming away' differences in service potential;

None of the above points would appear to have any relevance to the question of whether NPV cost based DORC represents a commonly used valuation methodology. Consequently, we do

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[63] Page 63 of Attachment 1 to APT's submission.

not understand why APT chose to include this discussion under that heading of its report. Nonetheless, we address each of them in turn below.

The first point is raised elsewhere in APT's report and is dealt with by us in section 2.2.2 below. In summary, if APT's conception of revenue based DORC is equivalent to NPV cost based DORC 'by virtue of the matching of revenues and costs' then the proposed revenue approach is simply a restatement of, not an alternative to, the cost based approach. (We do not dispute, and never have disputed, the mathematical fact that *if* the present value of future revenues is equal to the present value of future costs then you can use either number interchangeably because, by assumption, both numbers are the same). However, NERA can hardly be criticised for introducing NPV cost based DORC on the grounds that the same approach could be called something different.

In relation to the second dot point, we agree that a DORC defined purely on the basis of cost differences fails to adequately account for differences in service potential. A reasonable way to deal with differences in service potential is to estimate their value to customers. That is, the value of the existing pipeline would be reduced relative to a new pipeline to reflect the lower value of services on the existing pipeline provided *to customers*. It is not obvious to us that this need involve any assumption about revenues on either pipeline. Of course, if one *assumed* that revenues differed by the same amount then an equivalent result would be achieved (for the same reasons as described above).

2.1.5. Information asymmetry

APT has downplayed the importance of asymmetric information in the estimation of NPV cost based DORC.

> *"NERA makes much of information asymmetry as a justification for adopting the straight line proxy (NERA 2006a, pp6, 21, 22). In APTPPL's view, NERA's concern is misplaced. ORC is the source of most uncertainty in the DORC calculation and ORC is common to all DORC methodologies. Most of the other material data requirements are also common to both the NPV and straight line methods including the remaining lives of the existing assets and the economic life of the ORC asset."*[64]

We do not believe that it is accurate to state that "*ORC is the source of most uncertainty in the DORC calculation*". In fact, we believe that the opposite is true, namely, that the "D" (depreciation) is the source of most uncertainty in DORC. In order to calculate ORC it is necessary to determine the design and cost of constructing the optimal pipeline *now*. In order to calculate the depreciation of this value it is necessary to determine*, in every future year*:

(g) the difference in service potential between the new and existing pipeline; and

(h) the difference in expenditures on the new and existing pipeline.

This requires the regulator to know the medium to long term planning strategy of the business and the associated expenditures and service levels that would be provided. This information is critical to defining the "D" in DORC and is clearly held asymmetrically with the regulated

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[64] Page 64 of Attachment 1 to APT's submission.

business. As we pointed out in our previous submission,[65] the asymmetry of information faced by regulators when estimating expenditures and service levels over much shorter periods has had a pervasive impact on the structure of regulation in Australia. The adoption of what is known as 'incentive regulation' (with prices/revenues reset every 5 years based on updated estimates of past and future expenditures) represents a response to asymmetric information.

In the case of NPV cost based DORC the regulator must not only estimate the next five years expenditure on the current pipeline but must also estimate expenditure for every year beyond that date. Moreover, unlike with incentive regulation applied to ongoing revenues, there is no prospect of reappraising the ICB if actual expenditures are different from forecast. This dramatically increases the difficulty of the task facing the regulator and dramatically increases the pay-off for the business from strategically under-reporting expected future expenditures.

If a regulator really could accurately estimate future expenditure on the existing pipeline (as required to directly estimate NPV cost based DORC) then it should, consistently, use these estimates to set long term price paths for the regulated business. For example, if a regulator has enough confidence of future expenditure on the existing pipeline to 'lock in' a particular ICB based on NPV cost based DORC then consistency would suggest that it 'lock in' a long term price path based on the same assumptions about future expenditure. If there is insufficient confidence to do the latter, then it is not obvious why their should be confidence to do the former.

By way of relevance, we note that an important issue of contention between the ACCC and APT in the calculation of NPV cost based DORC is the likely nature of future expenditures on the exiting pipeline. APT states:

> *"As to the criticism in the Draft Decision that APTPPL's proposed expansions costs understated the costs of expansion and thus overstated the NPV DORC value, APTPPL considers that the assumptions made in its NPV DORC modelling to reflect future capital costs for asset replacement and expansion were reasonable. The fact that the Commission's consultant identified a number of other, more expensive, alternatives does not mean that APTPPL's assumptions were incorrect or unreasonable."*[66]

Presumably APT knows its future expansion plans better than the ACCC. However, it has a clear incentive in the current proceedings to be 'optimistic' about what will need to be spent and when. It strikes us that this is indeed an issue where asymmetric information exists and is important in determining the value of NPV cost based DORC.

It is also true that, in order to estimate economic DORC the regulator must also be in a position to assess the value of services provided by the existing pipeline into the future and how this compares with the optimal value of services that would be provided by an (optimally designed) new pipeline. This requires a great deal of conjecture about future demand for gas transport services and the costs of meeting those demands on different

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[65] Section 5.1 of NERA, "*Comparison of DORC Estimation Procedures: A Report for the ACCC*", 25 July 2006.

[66] Page 11 of APT's submission.

pipelines. This is information that the existing pipeline owners will also have asymmetric access to.

To give an illustration of the importance of the last issue note that APT's modelling of gas volumes assumes zero demand growth post 2025 - despite assuming that demand grows by 70% over the next 20 years. We can see no reason for such an abrupt 'end' to growth in demand for gas after such a sustained period of assumed growth. We also note that if, instead, demand for gas transport kept growing at the same average rate then it is likely that the existing pipeline would have a much higher cost of meeting that demand than the new pipeline. (Based on pre 2025 figures it would be 3 times higher.)[67] This would have two implications for economic DORC:

(i) it would reduce economic DORC because costs on the existing pipeline would be higher than costs on the new pipeline;

(j) it would reduce economic DORC because those higher costs would likely lead to less of the increase in demand being met by the RBP than by the new pipeline (which could accommodate incremental growth at lower incremental cost).

Finally, it is worth noting that, contrary to APT's suggestion above, information asymmetry is an issue in determining the value of ORC for NPV cost based DORC but is less of an issue in determining the value for straight line accounting DORC. This is because NPV cost based DORC requires the regulator to determine ORC based on the optimal design of the new pipeline *to meet current and future demand* (information that the pipeline owner will have best access to). Straight line accounting DORC requires the regulator to determine ORC based on the optimal design of the *pipeline to meet current service potential*.

2.1.6. Pre tax and post tax discounting

We understand that APT has changed its modeling in accordance with our recommendation.

2.1.7. Weighted average life vs separate treatment of assets

Prior to the draft decision APT estimated the present value of the cost of replacing the existing pipeline at the end of its life by:

(k) estimating the 'average' remaining life of all pipeline segments (using pipeline segment volume as a weight). Call this estimate of average remaining life "Z years"; and

(l) estimating the cost of constructing a new pipeline in its entirety in Z years. Given that pipeline costs are assumed to be falling at "tech" % per annum this is replacement cost is given by $ORC*(1\text{-}tech)^{Z}$;

(m) discounting that cost as if it was incurred in exactly Z years.

This gives the following formula:

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[67] See page 14 of NERA, "*Comparison of DORC Estimation Procedures: A Report for the ACCC*", 25 July 2006.

$$\text{CRA's estimate of the NPV cost of replacing the existing pipelines} = \frac{ORC * (1 - tech)^z}{(1 + r)^z}.$$

We argued that there were two reasons why this would underestimate the true present value of replacing the pipeline, namely:

1. It under-estimates the present value of total replacement costs because it ignores the higher cost of piecewise pipeline replacement compared to construction of an entirely new pipeline in a single construction project;

2. Using a single average asset life to discount multiple replacement costs will under-estimate the true present value of replacement costs.

CRA has addressed the second concern but not the first concern in their response to the draft decision. For the reasons explained in our earlier report,[68] we believe that this will lead to a material overestimate of the true NPV cost based DORC.

2.2. Other Statements by APT

APT's submission on the draft decision also makes a number of other statements that are relevant to work performed by NERA for the ACCC. Some of these involve restating the findings of CRA dealt and have been addressed earlier in this report. The remainder we address below.

2.2.1. Claimed abandonment of 'rigour'

In a number of places APT claims that NERA has recommended a move away from rigorous approach to the estimation of DORC. For example:

> *"In relation to the first principal point of difference NERA now argue that the rigorous NPV methodology used in the calculation of DORC for the Moomba Sydney Pipeline System (MSP) should be abandoned in favour of a proxy method (i.e. the straight line adjustment of ORC, which has been applied historically by regulators). APTPPL does not accept this position."*[69]

We do not accept this characterisation of our analysis and advice. A key element of our advice is that the '*NPV methodology used in the calculation of DORC for the Moomba Sydney Pipeline System (MSP)'* **is not** a rigorous methodology for estimating economic DORC. Consequently, it is unreasonable to characterise us as moving 'away from rigour' without at least noting that what APT regards as rigorous we do not. In fact, our prior reports show that, for a large number of reasons, the methodology used by APT in the RBP proceedings is not rigorous.

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[68] See section 4.1 of NERA, *Assessment of Elements of APT's DORC Calculations for RBP*, 25 July 2005.

[69] Page 51 of attachment 1 to APT submission on the draft decision.

2.2.2. Relevance of HNET to Incumbent vs New Entrant DORC

APT attempts to argue that New Entrant DORC must be the appropriate measure of DORC on the basis that only it is consistent with the application of the hypothetical new entrant test (HNET) (as carried out by NERA previously in the context of the MSP).

> *"As outlined in more detail in Attachment 1, NERA and the Tribunal accept there is a nexus between the HNET and DORC as a valuation methodology.The HNET involves an assessment of the revenue that the HNE would require to support an investment in the hypothetical new pipeline costing ORC. The corollary to this is that it must be the HNE who has the alternative of purchasing the existing pipeline in the HNE construct of DORC. That is, if DORC is to be consistent with the HNET, then DORC must be determined from the HNE's perspective. The HNE's perspective is also the only perspective that is supportable given the competitive market underpinnings of DORC."* [70]

In the section of its submission entitled "The nexus between HNET and DORC" APT claim:

> *"Under the HNET, the hypothetical new pipeline is being built by the HNE. Given the accepted nexus between the HNET and DORC, it follows that it must be the HNE that has the alternative of purchasing the existing pipeline and that DORC must be evaluated from the HNE's perspective."*[71]

This is wrong. In fact, the opposite is correct. To the extent that 'replicating the outcomes of a competitive market' is relevant it is important that any tax advantages a business enjoys are passed onto consumers - as this is what would happen in a competitive market. Incumbent DORC does precisely this because Incumbent DORC is less than New Entrant DORC by the present value of tax advantages enjoyed by a hypothetical new entrant but not enjoyed by the incumbent. This was explained in greater detail in section 1.2.2 above.

APT's mistake appears to flow from APT having simply presumed that because the nomenclature 'New Entrant DORC' uses the term 'new entrant' it must be the value of the ICB that results in revenues that a new entrant would require. As was shown in section 1.2 above, this presumption is invalid unless future regulated revenues are based on the tax costs of a new entrant. If, as is the case, future regulated revenues are based on the tax costs of the incumbent then Incumbent DORC must be adopted if internal consistency (and consistency with competitive market outcomes) is to be achieved. When this is understood, the quotes APT uses in this section from the NCC and NERA support the use of Incumbent DORC.

In the next section of APT's submission entitled "*HNET as a Basis for the DORC Calculation and the Equivalence of the Revenue-Based and Cost-based Approaches to the NPV DORC Calculation*" APT state:

> *"Revenue-based DORC is consistent with HNET and both NERA and the Commission have accepted that the HNET is a feasible calculation. The revenue- and cost-based*

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[70] Page 9 of APT submission on the draft decision.

[71] Page 54 of attachment 1 to APT submission on the draft decision.

approaches are conceptually the same and will produce very similar results. NERA apparently accept this view (NERA 2002b, p14):

> 'It will always be possible to make assumptions about revenues that are founded in the costs the company faces and which will therefore result in the mathematical representation of the two models coinciding. In other words, if the revenues are assumed to reflect cost differences, then, yes, the two models will provide the same answer.'
>
> [In a footnote to this NERA quote, APT states: *"Note that EAPL accepted the cost-based approach to DORC in the MSP case principally because of this essential equivalence.*]*"*

"Under both the HNET and the Code, revenues do reflect costs. The Commission (Draft Decision, p21) seeks to particularise the cost-based approach and distinguish it from the revenue-based approach to support the suggestion that application of the cost-based approach to the MSP was in some way novel and had not been considered prior the MSP appeal. The fact is that the revenue- and cost-based approaches (and the HNET) are conceptually equivalent and, while the details of the MSP calculation were refined during the course of the appeal, the general form of the calculation follows directly from the HNE definition of DORC adopted by the Commission in 1998 (see King 2001). The Commission itself first described the DORC calculation by reference to the general formulae for summation of geometric series in the DRP (ACCC 1999, Box A5.1). Although the calculation of NPV DORC for the MSP involved considerable detail, the principles of the calculation are the same as those set out in the DRP.

"A DORC calculation based directly on the HNET revenue path is a practicable alternative to the cost-based DORC calculation and avoids a number of the concerns raised by NERA with the cost-based approach. In particular it does not require the consideration of major asset replacements in either scenario.

APTPPL does not propose that a revenue-based approach be adopted for the RBP, although that does remain an option. The purpose of the foregoing discussion is to reinforce the connection between the HNET (which considers the HNE's revenue in one year as a benchmark for the existing pipeline in that year) and DORC."

In the above quote APT appears to be arguing that because "the revenue- and cost-based approaches are conceptually the same" and have an "essential equivalence" it follows that:

- "the connection between the HNET (which considers the HNE's revenue in one year as a benchmark for the existing pipeline in that year) and DORC" implies that New Entrant DORC is the correct definition of DORC; and
- NPV cost based DORC is not a new or 'novel' concept because the same answer could be arrived at using a revenue based approach.

As already explained, the first of these suggestions is wrong.

The second of these suggestions is also problematic. The fact that there exists a hypothetical net revenue stream that gives the same valuation as NPV cost based DORC in no way

suggests that all discussion of valuations based on revenue streams are, in some manner, the same as valuations based on cost streams. As per the NERA quote that APT provides, if the PV of future revenues on the existing pipeline follows a path such that it is always equal to the PV of future capital and operating costs on a new pipeline then the two approaches are identical. However, this is nothing more than a mathematical truism[72] and amounts to a 'revenue based calculation' simply collapsing to a 'cost based calculation'. We are unaware of any analysis of a 'revenue based DORC' that imposed this condition on revenues prior to the MSP decision. We therefore regard it as a reasonable proposition that a cost based approach to valuation of DORC was new to the MSP decision.

As a matter of public record it is also useful to correct any misunderstanding APT has regarding previous NERA advice. On the top of page 56 of the APT submission it appears to be implied that NERA has provided inconsistent advice, namely, that:

- basing DORC on revenues is infeasible due to circularity (ie, you can't determine revenues without first determining DORC); and
- a hypothetical new entrant will demand revenues that recover its costs.

APT seem to argue that the second dot point implies that (hypothetical competitive) revenues can be derived independently of DORC and that, therefore, the first dot point is not correct. This is wrong. As we have seen above, assuming that revenues are based on a new entrant's costs is just another way of implementing NPV cost based DORC. Assuming revenues are equal to costs avoids circularity only because revenues are based on costs. This was precisely the point we made in the quote from our 2002 paper that APT have reproduced in the above quote.

2.2.3. Regulatory consistency

APT has argued that there need not be consistency between the choice of the DORC methodology and the use to which the ICB will be used to set future revenues (via the ACCC's PTRM model).

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[72] If we assume that the present value of revenues on the existing pipeline are equal to the present value of costs on a new pipeline (and subsequent replacements of that new pipeline) then the value of the existing pipeline can be written as:

Value of existing pipeline	=	Present value of revenues	-	Present value of costs on existing pipeline

However, if the present value of revenues is assumed to be equal to the present value of costs associated with supplying services with a new pipeline then this becomes:

Value of existing pipeline	=	Present value of costs associated with a new pipeline	-	Present value of costs on existing pipeline

Which is identical to the definition of NPV cost based DORC. Because it is identical it requires all the same information and, consequently, resolves none of the concerns we have raised about NPV cost based DORC.

"The NPV DORC should be based on the HNE approach rather than the incumbent approach. The choice of approach (new entrant or incumbent) affects tax treatment and it seems that a contributing factor to the Draft Decision's choice of the incumbent approach is that to do otherwise may compromise the "Post Tax Revenue Model". APTPPL believes that the calculation of DORC and setting of the ICB (whether or not equal to DORC) are distinct steps required by the Code. Modelling of cash flows once the ICB has been set, whether or not with the PTRM, is a separate process in which the ICB is one input. Any perceived need for consistency with the current revenue modelling approach is not relevant."

We do not agree with this view. Moreover, neither does APT's own consultants. CRA posits that the correct level of regulated revenues is the level of revenues that would exist in a hypothetical competitive market.

"The aim of price regulation is to establish prices for natural monopoly services that are comparable to those that would have prevailed had the services been provided in workably competitive markets." [73]

"It is well accepted that regulation attempts to replicate outcomes that would have prevailed in a workably competitive market."[74]

If the aim of regulation is to mimic prices in a competitive market then it is important that the calculation of the ICB be informed by how that ICB will be used to set future prices. As explained above and in section 1.2.2, if consistency with a competitive market is required then, given the nature of the PTRM, Incumbent DORC is the appropriate perspective on economic DORC.

2.2.4. Discount rate

APT makes a number of statements concerning the appropriate discount rate (above and beyond repeating CRA's findings[75]). For example, CRA states:

"The use of the risk free rate assumes that, over the life of the existing and new pipelines, all costs are certain*. It is self-evident that this assumption is incorrect in the context of an assessment of costs for the economic life of the pipeline – for example, the Draft Decision itself recognises uncertainty as to the timing (and therefore the cost) of capital expansions, and of non-capital costs, such as increased security costs. Additionally, a service provider is not able to obtain a fixed price contract for the management, operation and maintenance of the pipeline for its economic life, which would be required before the Commission could begin to be confident that the costs of the alternatives are without risk."*[76] [Emphasis added.]

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[73] Page 2 of the CRA report.

[74] Page 2 of the CRA report.

[75] The first dot point on page 10 of APT's submission is simply a restatement of CRA's submission which has been dealt with above.

[76] Page 10 of APT submission on the draft decision.

The first sentence of this statement is wrong. The use of the risk free rate does not assume all costs are certain. It assumes that unexpected variations from forecast costs are not systematically correlated with the returns on the stock market in that year. In academic finance nomenclature this means that the costs are free of 'systemic risk' and should be discounted by the (systemic) risk free rate. It does not mean that the costs are certain.

It is surprising that APT makes this error now given the number of times this has been argued in the past. In fact, CRA's report accompanying APT's submission makes clear that they at least understand the difference between lack of systemic risk and certainty.

> *"The ACCC, supported by experts including Professor Bruce Grundy, has instead adopted the risk-free rate as the discount rate in its NPV DORC calculation on the grounds that the discount rate should reflect the systematic risk inherent in the cash flows being discounted and that future pipeline expenditures exhibit no systematic risk, according to the Commission."*[77]

The second part of the APT quote is also instructive. In it APT argues that:

> "*Additionally, a service provider is not able to obtain a fixed price contract for the management, operation and maintenance of the pipeline for its economic life, which would be required before the Commission could begin to be confident that the costs of the alternatives are without risk."*

However, the facts referred to actually provide an intuitive illustration of why our approach is correct. It is correct to argue that the risk free rate should be applied to future costs when they are certain. APT correctly points out that future costs are not certain (ie, they maybe more or less than the level that has been forecast). The question then becomes does this uncertainty:

1. Reduce the attractiveness of liability for those costs (in which case a discount rate below the risk free rate should be applied as this makes the present value of costs more negative);
2. Leave the attractiveness of liability for those costs unchanged (in which case a discount rate equal to the risk free rate should continue to be applied as this leaves the present value unchanged); or
3. Increase the attractiveness of liability for those costs (in which case a discount rate above the risk free rate should be applied as this reduces the present value of costs).

To see why the above is true consider the scenario where you are liable for a certain $110 cost in one year's time and the risk free rate is 10%. The present value of this liability is $100 (=110/1.1). Now, imagine that instead of the liability being certain it might be $0 or it might be $220 - with both having a 50% probability of occurring. The expected cost of the liability is still $110 in one year's time but how does this uncertainty change the present value of the cost?

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[77] Page 11 of the CRA report.

If you prefer uncertainty to certainty then the present value of the liability will be lower with uncertainty. (That is, introducing uncertainty will make the perceived cost to you today of the expected future liability fall.) In order to achieve this you must discount the expected cost of $110 using a discount rate *higher than* the 10% risk free rate. On the other hand, if you dislike uncertainty then you must use a discount rate that is *lower than* the risk free rate. If you are neutral with respect to uncertainty then you must continue to use the risk free rate. For reasons discussed in previous reports, we believe that investors will be neutral with respect to the value placed on uncertainty in future costs - justifying the use of the risk free rate to discount those future costs.[78]

In the above quote APT is clearly claiming that uncertainty about future costs is a 'bad thing' from the perspective of those who are liable for those costs (ie, that investors would prefer that costs were certain). **However, if this is true then the correct discount rate to use is lower than the risk free rate**. This is because using a discount rate higher than the risk free rate has the opposite effect, namely, it reduces the present value of future costs - implying that investors prefer uncertain to certain costs.

2.2.5. Bias in DORC measures

APT claims that straight line DORC is a biased estimate of 'NPV DORC'.

> *"Straight line adjustment of ORC is an invalid proxy for NPV DORC on a number of grounds, including the likelihood that it is a biased estimate when NPV DORC is calculated correctly in accordance with the HNE construct and with discounting at WACC."*[79]

It appears that APT is arguing that, because straight line DORC will tend to provide a lower estimate than APT derives using its own assumptions, straight line DORC is a (downward) biased estimator of economic DORC. Of course, this relies on acceptance of APT's assumptions. We do not accept those assumptions and, hence, reject the assertion of downward bias.

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[78] In reality, exposure to the uncertainty in future costs is neither attractive nor unattractive to an investor with a diversified portfolio. Such investors simply require is that the probability of winning (weighted by the magnitude of the gain) from uncertainty equals the weighted probability of losing. If this is the case then investors with a diversified portfolio will be indifferent between certain and uncertain costs - provided that the expected value is the same. The only reason this would not be the case would be if future gains/loses from uncertain costs were systematically correlated with the return on the diversified portfolio (such as the ASX All Ordinaries. However, as discussed in previous NERA reports the available empirical evidence and *a priori* reasoning suggests that this is not the case and APT provides no evidence to the contrary.)

[79] Page 51 (attachment 1 to APT submission).

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