RESPONSE BY AGILITY ON BEHALF OF EAPL TO NERA REPORT ENTITLED "DEPRECIATION WITHIN ODRC VALUATIONS"[1]

NERA has examined the concept of DORC in the context of the meaning and interpretation of DORC established by the Commission, as encapsulated in the following passage:

- *"One interpretation of DORC is that it is the valuation methodology that would be consistent with the price charged by an efficient new entrant into an industry, and so it is consistent with the price that would prevail in the industry in the long run equilibrium; and*
- *The second interpretation is that it is the price that a firm with a certain service requirement would pay for existing assets in preference to replicating the assets."*

There are a number of points, particularly of principle, on which we agree with NERA. At the same time, there are some aspects of the approach proposed by Agility which NERA appears to have misunderstood or misinterpreted, and we seek to clarify these. Finally, we address three key points on which we disagree with NERA. In our view:
- The Agility approach, based as it is on assumptions as to the revenue path of a hypothetical new entrant, does not involve circularity as asserted by NERA;
- Costs, including capital costs, are inseparable from revenues in a NPV evaluation. As a consequence of its exclusive focus on costs, NERA's formulation in effect assumes that uneconomic investments will be made resulting in a DORC value which is below the maximum that a new entrant would be prepared to pay for the existing asset, and is therefore inconsistent with the new entrant hypothesis; and
- NERA's preliminary conclusion that "the Commission's straight-line depreciation framework may be more consistent with the economic characteristics of the gas pipeline industry than Agility/Professor King's proposed approach" appears not to be supported by NERA's analysis, and is inconsistent with the economic underpinnings of the definition of DORC which require that DORC be expressed in terms of NPVs.

A Points of agreement:

We concur with NERA that:

- "[by adopting the Commission's expression of DORC] … the DORC remains consistent with the assertion that under most circumstances it should represent the maximum value of the ICB, as any valuations in excess of this will leave the asset vulnerable to by-pass.";

- that the economic principles underlying the Commission's expression of DORC require that it be evaluated by reference to net present values;

- that "[in the context of section 8.10 of the Gas Code], (or any other) context, DORC should be established exclusively on the basis of the economic principles underlying the concept and not by reference to factors that are addressed separately and specifically elsewhere in section 8.10 of the Gas Code.";

[1] NERA (2002), *Depreciation within ODRC valuations, a report for the ACCC*, September 2002.

–   that "[the calculation of DORC on the basis of the economic principles underlying the concept] is consistent with the wording of section 8.10, which states the regulator should consider DORC *and* a range of other issues when setting the ICB. There does not appear to be any implication within section 8.10 that the DORC under the gas code should differ from DORC as it is generally understood, and we can see no reason DORC should be estimated on the basis of anything other than the economic principles underpinning this valuation concept." [2] and, by extension;

–   that the proper calculation of DORC is independent of past depreciation and tariff setting frameworks.

B   Correction of NERA's understanding of the Agility approach:

NERA suggests that the Agility approach is founded on an assumption of constant prices and there is no allowance for technological progress that would change the value of ORC over time. On the contrary, both Agility and Professor King recognise that the new entrant's revenue profile can take any form.   Agility has accepted that the ACCC's competition depreciation model (which allows for the effects of technological progress on competitive market prices) has merit as a basis for defining the new entrant's revenue path, and has generally based its submissions and evaluations on that model. At the same time, Agility and Professor King have noted that the NPV approach can accommodate other profiles, including straight line depreciation, if thought appropriate.

NERA observes that Professor King assumes the costs of operating and maintaining the two assets (new and old) to be identical. Agility, in its original (August 2000) submission noted that "in practical applications the higher cost of maintaining existing (DORC) assets vis a vis new (ORC) assets should be taken into account. Because maintenance is asset specific, this factor is not included in the analysis that follows. The effect on DORC for capital intensive infrastructure assets will be small."

Professor King addressed only the question of principle i.e. what is the correct approach for determining DORC; NPV or straight-line? He was not asked to consider the issue of maintenance cost differences which is of second order significance. Agility has assessed the effect of maintenance cost differences in subsequent submissions relating to the MSP and the ABDP.

C   Points of disagreement:

NERA suggests that the Agility approach involves circularity. Circularity may arise in the context of setting the initial capital base (ICB) for an existing asset under the Gas Code because the value of the asset may be determined by reference to the NPV of the income stream it is expected to generate, and at the same time an underlying principle of the Code is that the income stream established through the regulatory process should be sufficient to yield a NPV equal to the ICB i.e. the income stream is set by reference to the ICB and the value of the ICB may be set by reference to the NPV of the income stream.

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[2]   Note that, by virtue of the recent Epic decision in the Supreme Court of Western Australia, the setting of the ICB is now also subject to other sections of the Gas Code, most notably section 2.24.

Circularity does not arise in the Agility NPV approach to DORC because the hypothetical new entrant's "ICB" is established independently and objectively as ORC. A rational new entrant will not invest unless the NPV of the expected income stream is at least equal to ORC, and the principle of the Code just referred to provides an environment in which it should be possible for this to occur [3]. The only unknown is the profile of the new entrant's income stream. However, while there may be an infinite number of possible profiles, the range of profiles that could be regarded as economically sensible and meaningful is relatively narrow.

NERA argues that "it is inconsistent with the economic principles underlying DORC that it should be derived from an assumption about revenues [as opposed to costs]". In fact capital costs cannot be divorced from cash costs <u>and revenues</u> – they are simply different sides of the same coin i.e. stocks and flows. Moreover, NERA's cost based formulation can, in some circumstances, result in a DORC value which is below the maximum a new entrant would be prepared to pay for the existing assets. Such a result is inconsistent with the new entrant hypothetical.

A rational investor will invest only if there is an expectation that the NPV of cash flows to be generated by the investment over its life will at least equal the amount of the investment. The hurdle must be met for each of the two scenarios (new and old) over their respective lives. It must also be met by each of the investments (or re-investments) required as each scenario unfolds. To test these expectations the investor must make some assessment of revenue.

Following NERA's formulation, $NPV(Capex_{New}) + NPV(Non Capital Costs_{New})$ (and in fact each investment in the stream) will be evaluated against the revenue that the investment is expected to generate. In particular, given an assumed profile, the minimum revenue stream required to yield a NPV equal to zero can be determined. Likewise $DORC + NPV(Capex_{Old}) + NPV(Non Capital Costs_{Old})$ will be evaluated against the revenue stream expected to be generated by that investment schedule.

Given the competition hypothesis, and that both scenarios (new and old) are assumed to serve the same market, there is no basis for postulating that the two revenue streams will be different. In fact an alternative view of the new entrant hypothesis is that the investor is considering the choice between two investment/cost profiles that will yield the same revenue stream. DORC must be the NPV of the net cash flows that can be attributed to the DORC investment. It follows therefore that, as proposed by Agility and demonstrated by Professor King – and no matter how NERA choose to characterise it – DORC is the NPV of the first "n" years of the new entrant's revenue stream, less the NPV of the amount by which operating costs of old assets are higher than those for new assets over that period.

Finally, the NERA "cost-based" formulation is flawed in cases where the market being served is assumed to have a finite life. In these circumstances, and assuming that the last asset replacement in the analysis occurs in the "old" scenario, $Capex_{Old}$ can include uneconomic replacements which are significant in NPV terms and lead to DORC being understated in

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[3]   There is an ongoing debate involving the industry and Regulators as to whether in fact this outcome is achievable given the manner in which Regulators presently apply Code provisions to greenfield developments.

effect to subsidise those uneconomic investments [4]. This becomes most evident when the present value cost of the final asset replacement in the analysis is high. This would occur where the market life is short and/or where productivity is assumed to be large and negative (unlikely in practice). It is this effect that causes the flatter shape of and discontinuities in the short life curves in NERA's Figure 5.2. The flaw is illustrated most clearly by assuming that productivity is equal to the complement of real WACC, and operating cost differences are negligible i.e. the investor is indifferent in NPV terms as to when money is spent. In that case, the "cost based" formulation produces the nonsensical result that DORC is equal to ORC if the existing asset is brand new and zero for all other values of remaining life (see formulae in NERA Table B.1) i.e. except when it is brand new, the existing asset has no value despite the existence of a market. As will be seen below, under the same assumptions, the Agility revenue based approach results in a straight line relationship between DORC and ORC. The solution, once again, is to determine the NPV DORC by reference to the new entrant's revenue stream.

NERA reaches the preliminary conclusion that "the Commission's straight-line depreciation framework may be more consistent with the economic characteristics of the gas pipeline industry than Agility/Professor King's proposed approach." NERA does not state its reasoning for this, albeit qualified, conclusion.

This conclusion is inconsistent with the economic underpinnings of the definition of DORC which require that DORC be expressed in terms of NPVs. The straight-line depreciation framework adopted to date by the Commission does not involve consideration of NPVs. As Professor King states, the straight line adjustment to transform ORC to DORC in the Draft Decision "is arbitrary and appears to lack any economic justification" and is "clearly inconsistent with the Commission's stated economic underpinnings and justification of DORC".

The conclusion is also inconsistent with NERA's lack of support for SKM's recommendation favouring the continued use of straight line depreciation.

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[4] Where the market has a finite life shorter than that of the ORC asset, the rational new entrant will seek to recover his investment (ORC) over that period. The shorter the life of the market compared to the technical life of the ORC asset then the higher will be the price that the new entrant requires to recover the investment over the life of the market. If the market life is also shorter than (or equal to) the technical life of the existing asset, DORC will equal ORC (subject to adjustment for non-capital costs). This result would be produced by both NERA and Agility.

However, when the remaining technical life of the existing asset is shorter than the life of the market, the technical life of the replacement asset will extend beyond the life of the market. In order to avoid inter-generational subsidies, the NPV of the investment in the replacement asset must equal the NPV of the income that can be generated by that investment over the period beyond the life of the old asset. That income is in turn capped by the new entrant's revenue path. The corollary to this is that DORC is the NPV of the income that can be generated over the life of the existing asset. Simply to apply the NERA "cost" formulation can result in clearly irrational outcomes. For example if the existing asset's life were just one year less than the life of the market, the cost based formulation still assumes that the asset will be replaced in that last year when, on any assessment, made either now or at the time the money is spent, the investment must be uneconomic. The cost based formulation, in effect assumes automatically that such uneconomic investments will made and will be subsidised through a reduced DORC whereas in reality, the investment would not be made and the market would be left unserved. The alternative to reducing the DORC would be for the market to pay more in the period beyond the life of the existing asset than it would have done had the new entrant served the market from the outset. In either case, the outcome is clearly inconsistent with the new entrant justification for DORC.
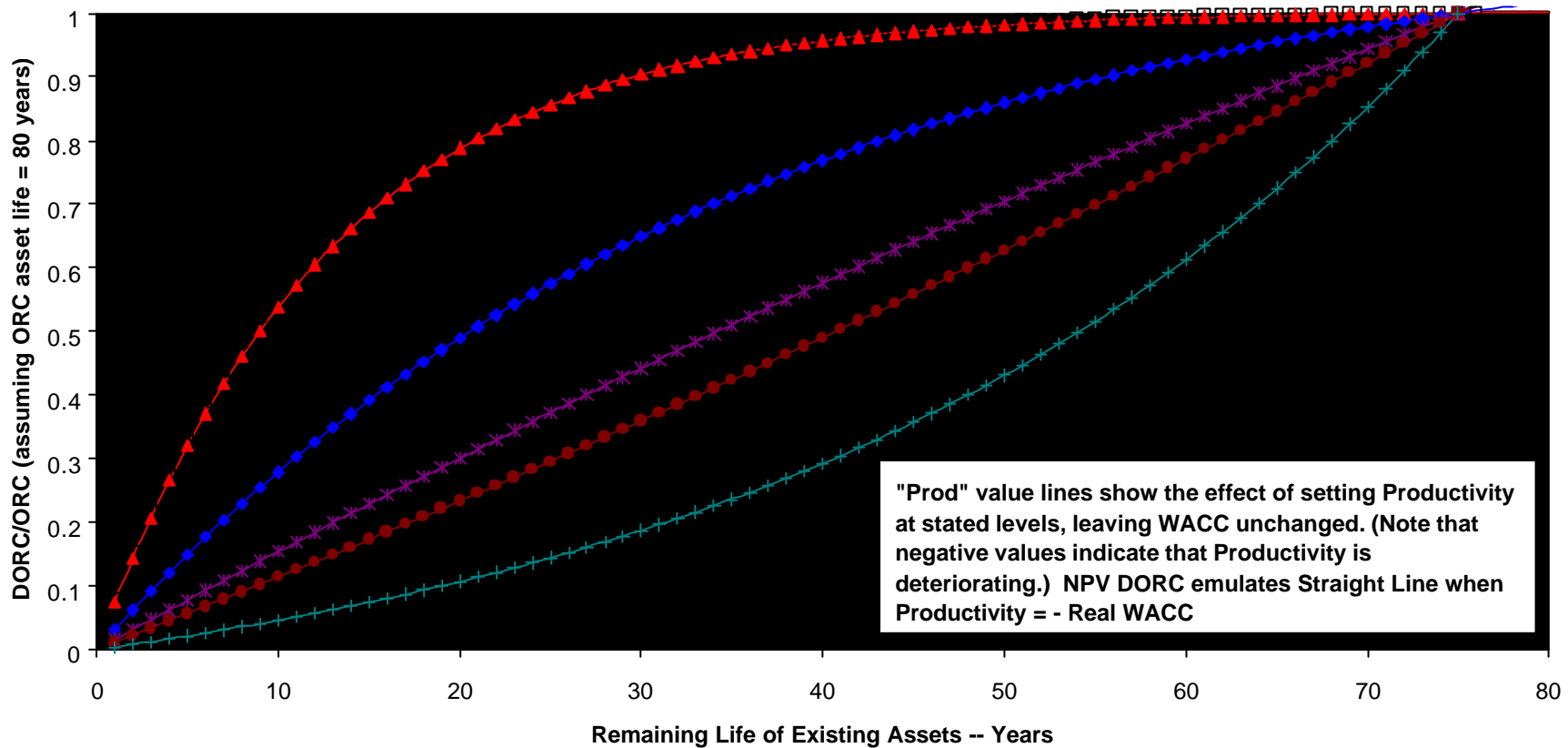
"NERA has been asked to consider the economic underpinnings of the DORC analysis and we have therefore based our interpretation of the depreciation element on the premise that the purpose of DORC is to measure the maximum amount a new entrant would be willing to pay for existing assets in preference to procuring new assets with an equivalent service potential. It is by taking this approach that the DORC remains consistent with the assertion that under most circumstances it should represent the maximum value of the ICB, as any valuations in excess of this will leave the asset vulnerable to by-pass."

In stating that straight-line depreciation is "more consistent with the general characteristics of gas pipelines", NERA may be referring to the investor's desire, where possible, to recover capital early through front-ended depreciation schedules. Setting aside whether such schedules can be sustained, particularly for greenfield projects, given market expectations and the history of Regulatory decisions which have tended to adopt constant real depreciation, a front ended depreciation schedule would be reflected in a requirement for higher initial revenues and tariffs. To be consistent with the economic underpinnings of DORC, the new entrant would reflect these higher initial revenues in his assessment of DORC not by straight line depreciation of the ORC, but in the NPV calculation (as observed by Agility and Professor King). It is inconsistent with the economic underpinnings of DORC, and therefore wrong, simply to apply straight line depreciation to ORC.

The reasonableness of NERA's conclusion can be tested in another way by determining the circumstances under which the NPV formulation of DORC would produce a relationship between DORC and ORC that coincides with the Straight Line Depreciation (ACCC) line in NERA's Figure 5.1. If it is assumed that the new entrant adopts the ACCC's competition price path, and disregarding the effect of any difference in O&M costs between new and old assets, the NPV DORC and straight line depreciation will coincide only if productivity is negative (i.e. deteriorating) and equal in magnitude to the real WACC. Furthermore, the magnitudes of the negative productivity and real WACC must be very close before the NPV DORC/ORC relationship approaches the straight line. This is illustrated in Graph 1 attached. Note also, as observed previously, that NERA's "cost based" approach would result in a DORC of zero if the "old" asset was anything other than brand new under these assumptions. Of course, such a relationship between productivity and WACC is most unlikely in practice. If allowance is made for the operating cost differential between old and new assets, the result will also be a reduction in the value of the NPV DORC and there may be combinations of non-zero operating cost differentials and productivity that coincidentally result in a DORC/ORC relationship that approaches a straight line. However, if OPEX assumptions are reasonable, productivity would still have to be negative to achieve that result (see Graph 2 attached). Once again, such combinations are unlikely to occur in reality.
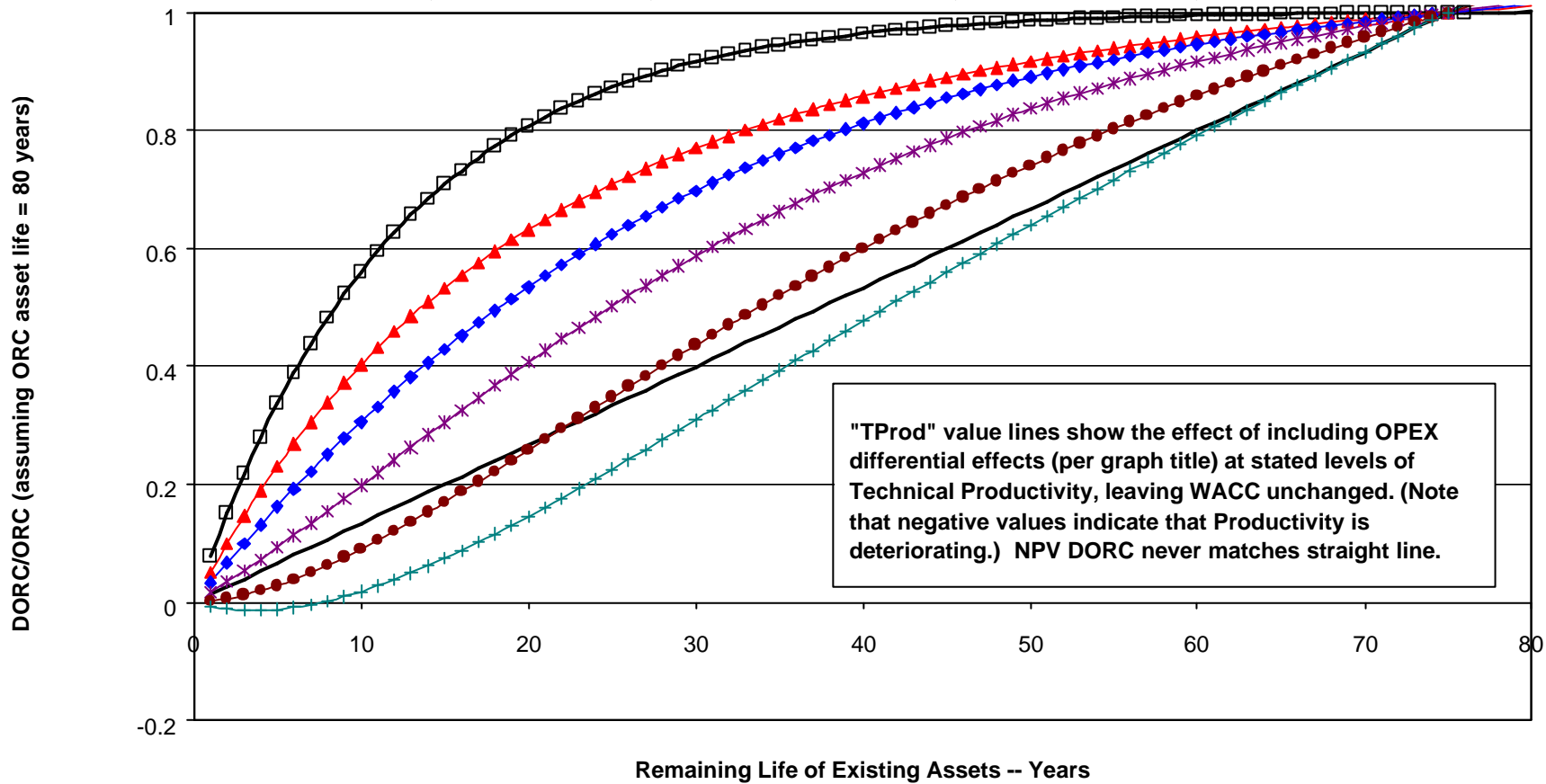
It is clear that, if DORC is to be justified and defined in terms of the ACCC's efficient new entrant model, then straight line depreciation of the ORC cannot be accepted even as a proxy for the DORC calculated properly by reference to NPVs, as required by that model.

Graph 1 – Relationship between the Ratio of DORC to ORC and Remaining Life of Assets assuming no operating cost differential between new and old assets
Productivity = 0.5%; WACC = 8.0% real

DORC/ORC (assuming ORC asset life = 80 years)

Remaining Life of Existing Assets -- Years

"Prod" value lines show the effect of setting Productivity at stated levels, leaving WACC unchanged. (Note that negative values indicate that Productivity is deteriorating.) NPV DORC emulates Straight Line when Productivity = - Real WACC

NPV DORC/ORC   Straight Line   Prod = 0.0%   Prod = -5.0%   Prod = -7.5%   Prod = -8.5%   Prod = -11.0%

Graph 2 – Relationship between the Ratio of DORC to ORC and Remaining Life of Assets
taking account of operating cost differential between new and old assets
Tech Prod = 0.5%; OPEX Prod = 0.5%; Start OPEX = 0.5% of ORC ; OPEX Growth = 2.0%; WACC = 8.0%

DORC/ORC (assuming ORC asset life = 80 years)

"TProd" value lines show the effect of including OPEX differential effects (per graph title) at stated levels of Technical Productivity, leaving WACC unchanged. (Note that negative values indicate that Productivity is deteriorating.) NPV DORC never matches straight line.

Remaining Life of Existing Assets -- Years

NPV DORC/ORC (No OPEX Diff)   Straight Line   TProd = 0.0%   TProd = -2.0%   TProd = -4.0%   TProd = -6.0%   TProd = -7.5%