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Response to ERA Discussion Paper - Measuring the Debt Risk premium: A Bond-Yield Approach

PUBLIC VERSION

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1. INTRODUCTION

1.1.   On 1 December 2010, the Economic Regulation Authority (**ERA**) issued a discussion paper, *Measuring the Debt Risk Premium: A Bond-Yield Approach* (**Discussion Paper**), which described a procedure for determining the debt risk premium. The ERA advised that it intended to apply this procedure in the setting of rates of return for regulated rail, electricity and gas pipeline businesses in Western Australia (including for DBP and WA Gas Networks), subject to feedback it received on the Discussion Paper.

1.2.   The ERA argued that the procedure for estimation of the debt risk premium described in the Discussion Paper was unbiased, stable, practical, replicable and transparent.

1.3.   DBP neither concurs with the ERA's procedure for determining the debt risk premium, nor accepts the unquestioned method of estimation of the cost of debt of which the debt risk premium is a part, in so far as they are to be used by the ERA in performing its statutory function of assessing access arrangement proposals under the *National Gas Law* (**NGL**).

1.4.   Such procedure and method are inconsistent with a proper application of the relevant provisions of the *National Gas (WA) Act 2009*, which implements the NGL and the *National Gas Rules* (**NGR**)

1.5.   DBP acknowledges that the method of estimation of the cost of debt used by the ERA is generally accepted by other Australian regulators. DBP also acknowledges that that method is mandated in the *National Electricity Rules*. However, DBP's concern is not with:

(a)   the decisions of those other Australian regulators;

(b)   the national regulatory regime applying in the electricity sector outside Western Australia; and

(c)   the way in which the cost of debt is determined in regimes applying in Western Australia to other regulated industries.

1.6.   The methods used by other Australian regulators, and the methods mandated under the National Electricity Rules, are not relevant to the Access Arrangement for the Dampier to Bunbury Natural Gas Pipeline (**DBNGP Access Arrangement**).

1.7.   In Western Australia, access to the services of electricity transmission and distribution networks is governed by the *Electricity Networks Access Code 2004*. The *Electricity Networks Access Code* requires that a rate of return be established as a weighted average cost of capital (**WACC**) in accordance with any determination of a methodology for calculation of that WACC which may have been made by the ERA (sections 6.43, 6.64 and 6.65). If no determination is in effect, the service provider must, in accordance with sections 6.65 and 6.66, use a WACC which:

(a)   represents an effective means of achieving the Code objective and the objectives in section 6.4; and

(b)   is based on an accepted financial model such as the Capital Asset Pricing Model.

1.8.   The pricing principles of the Western Australian *Railways (Access) Code 2000* require use of a capital cost of railway infrastructure calculated, as an equivalent annual cost or annuity, from the gross replacement value of the infrastructure and a WACC (Schedule 4, clause 2). The WACC is to be determined, in accordance with Schedule 4, clause 3, by the ERA, but the *Railways (Access) Code* provides no guidance on the methods to be used.

1.9.   In respect of the rate of return to be used in the setting of regulated access prices, the requirements of the *Electricity Networks Access Code* and the *Railways (Access) Code* are not the same as those of the NGR. The ERA's assertion, in paragraph 5 of the Discussion Paper, that rules and processes similar to those in Rule 87 of the NGR apply in the electricity and rail industries is not correct. In the schemes of price determination under the Western Australian access regimes for electricity networks, railway infrastructure and gas pipeline systems there are important differences in the law pertaining to the way in which a return is to be provided on investment made by a service provider. DBP is concerned that the Discussion Paper fails to recognise these differences.

1.10.   Proposed revisions to the DBNGP Access Arrangement must be prepared, and approved, in accordance with the requirements of the *National Gas (WA) Act 2009, the NGL and the NGR.*

1.11.   In its Submission 8 (*Rate of Return*), which accompanied the proposed revisions to the DBNGP Access Arrangement which were submitted to the ERA in April 2010, DBP set out the correct approach to determining a rate of return which addressed the criteria in Rule 87 of the NGR and the NGL in general. That approach did not require an estimate of the debt risk premium.

1.13.   The focus in the Discussion Paper is clearly on estimation of the debt risk premium in the context of setting the rate of return required by the NGL and the NGR. Beyond its introductory comments, the Discussion Paper does not address the calculation of the WACC required by the *Electricity Networks Access Code*, or the calculation of the WACC required by the *Railways (Access) Code*. DBP's concern in this submission is, then, with the procedure set out in the Discussion Paper for calculation of the debt risk premium, and with the method of estimation of the cost of debt of which that procedure is a part, only in the context of the regulatory regime of the NGL and the NGR.

[REDACTED]

1.15. In this submission, DBP sets out:

[REDACTED]

(b)   in section 3, the requirements of Rule 87 of the NGR;

(c)   in section 4, the correct approach to addressing the criteria in Rule 87, an approach which does not require estimation of a debt risk premium; and

(d)   in section 5, DBP's understanding of the ERA's proposed procedure for estimating the debt risk premium, and the reasons why a cost of debt estimated using this procedure does not meet the requirements of Rule 87 of the NGR.

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3.   RULE 87 OF THE NATIONAL GAS RULES

3.1.   In the scheme of the NGL and the NGR, the overriding objective of a regulatory rate of return for an access arrangement proposal is prescribed by section 24(5) of the NGL: a reference tariff is to allow for a return commensurate with the regulatory and commercial risks involved in providing the reference service to which that tariff relates.

3.2.   Section 24(5) does not require that a reference tariff allow for a return based upon a specific approach to the setting of a rate of return. Such an interpretation would be contrary to section 7 of schedule 2 of the NGL, which requires a provision of the NGL to be interpreted so as to best achieve the purpose or object of the NGL in preference to any other interpretation.

3.3.   In conformity with section 24(5), Rule 87(1) of the NGR provides that the rate of return on capital is to be commensurate with prevailing conditions in the market for funds and the risks involved in providing reference services. Rule 87(1) does not state that a rate of return which complies with its requirements will be the result of a calculation made using a specific procedure, method or model.

3.4.   Rule 87(2) obviously sets out a scheme which guides the setting of a rate of return. It is significant that the rate of return is to be "determined", and not "calculated". This use of the word "determined" implies that judgments will be made in the process of setting the rate of return. Rule 87(2) is predicated upon a process of determination which requires the making of judgments to achieve a rate of return which complies with Rule 87(1).

3.5.   Rule 87(2)(b) indicates the approaches to be "used" in making a determination. It does not prescribe the result of a determination. The approaches indicated in Rule 87(2)(a) and Rule 87(2)(b) are not intended to produce an outcome independent of a determination which complies with Rule 87(1).

3.6.   Rule 87(2)(b) requires only:

(a)   use of a well accepted approach, which incorporates the costs of equity and debt;

(b)   use of a well accepted financial model; and

(c)   use of benchmark levels of efficiency, and use of benchmark standards as to gearing and other financial parameters for a going concern and as reflect in other respects best practice.

3.7.   In this context, there are a number of well accepted approaches which incorporate the cost of equity and the cost of debt. In making its decisions on proposed access arrangements, and proposed revisions to access arrangements, the ERA has, to date, used a weighted average of the cost of equity and the cost of debt. It could have used another approach, such as the nominal post-tax approach of the Australian Energy Regulator, which does not require the use of a WACC (although it incorporates the cost of equity and the cost of debt).

3.8.   There are also a number of well accepted financial models which might be used. The ERA has, to date, used the Capital Asset Pricing Model to determine the cost of equity. It could have used another financial model, such as the dividend growth model or the Fama-French three factor model, for the same purpose.

3.9.   Benchmarking cannot occur in the abstract, and requires consideration of many factors including the reliability of gas suppliers, the locations of pipeline assets, the ways in which those assets are operated and maintained, the state of capital markets, and the creditworthiness of counterparties. In respect of gearing and other financial parameters,

the use of benchmarks is further qualified by a requirement to take into account best practice. Practice is responsive to conditions and context: what is best practice in one context may not be best practice in another. In consequence, the requirements to use benchmark levels of efficiency, and to use benchmark standards as to gearing and other financial parameters, call for judgement and therefore admit a range of possible outcomes. The process of estimation and calculation applied by the ERA assumes a benchmark standard as to gearing of 60% debt, 40% equity when financial theory and a review of business practice both indicate that other values might reasonably be assumed.
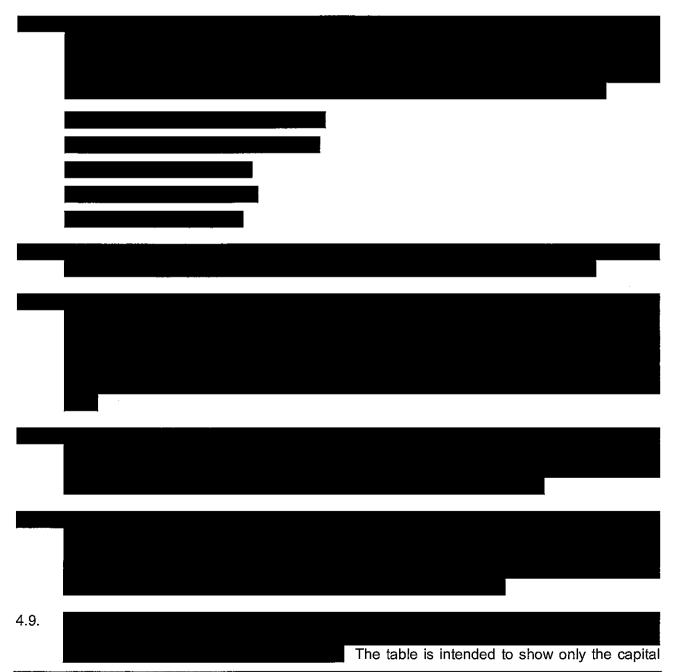
3.10. Rule 87(2) does not, therefore, prescribe the exclusive approach to be used in determining a rate of return. Rule 87(2) does not prescribe the form of well accepted financial model which is to be used (although it indicates that the Capital Asset Pricing Model is such a model), and it does not prescribe benchmarks for efficiency, and benchmark standards for gearing or other financial parameters.

3.11. Rule 87(2) indicates that in determining a rate of return, a well accepted approach which incorporates the cost of equity and the cost of debt, such as a WACC, is to be used. A WACC calculated in accordance with the requirements of Rule 87(2) is conceptually distinct from the rate of return which is required by Rule 87. This has been noted by the Australian Competition Tribunal:

> . . . the use of the WACC formula is only a means to an end, which is to estimate the
> required rate of return for an investment with certain characteristics of riskiness and debt.[1]

3.12. Hence, a WACC calculated in accordance with the requirements of Rule 87(2) cannot be assumed to be the rate of return commensurate with prevailing market conditions in the market for funds and the risks involved in providing reference services. The obvious and only purpose of Rule 87(1) is to overcome this difficulty. If a WACC is calculated in accordance with Rule 87(2), Rule 87(1) operates to ensure that that WACC is then adjusted to yield the required regulatory rate of return: a rate which is commensurate with prevailing conditions in the market for funds and the risks involved in providing reference services. This is the rate of return which allows the statutory objective of section 24(5) of the NGL to be achieved.

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[1] *Application by Telstra Corporation Limited ABN 33 051 775 556* [2010] ACompT 1, paragraph 422.

4. THE CORRECT APPROACH TO ADDRESSING THE REQUIREMENTS OF RULE 87 DOES NOT REQUIRE ESTIMATION OF THE DEBT RISK PREMIUM

4.1. For its proposed revisions to the DBNGP Access Arrangement, which were submitted to the ERA for approval in April 2010, DBP proposed the following approach to estimation of the cost of debt.

4.2. The cornerstone of DBP's approach was the engagement of an experienced capital markets advisor to advise on possible options for refinancing, and on the likely pricing of debt by lenders.

4.3. The advisor provided a view on options - on the availability of finance, on lenders, on terms to maturity and on costs - available in Australian capital markets, in particular, in the domestic bond market and in the Australian bank market.

4.9. The table is intended to show only the capital

markets from which debt finance could be sourced, and the components of the cost of that financing. The total cost, when added to the lender's base rate, gives the estimated cost of debt from each source.

Table 1

Estimates of cost of debt: Australian dollar equivalent pricing

Term		US public bond (144a) market 10 years	US private placement market 10 years	Australian domestic bond market 5 years	Australian domestic bond market 7 years	Australian domestic bond market 5 years	Australian domestic bank market 7 years
Margin	bp	1	1	1	1	1	1
Underwriter fees	bp	1	1	1	1	1	
Upfront fees	bp	1	1				1
Other transaction costs	bp	1	1	1	1	1	1
Currency swap costs	bp	1	1				
Floating rate hedge costs	bp	1	1	1	1	1	1
Debt advisor fees	bp	1	1	1	1	1	1
Total cost	**bp**	**7**	**7**	**5**	**5**	**5**	**5**
Lender's base rate (e.g. BBSW)		1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
Estimated cost of debt		**1.07%**	**1.07%**	**1.05%**	**1.05%**	**1.05%**	**1.05%**

4.10. DBP notes that the lender's base rate shown in Table 1 is not the nominal risk free rate of return of regulatory WACC calculations. The nominal risk free rate is a theoretical construct. It is not the basis on which lenders quote the cost of finance. Market practice is to quote the cost of finance as the sum of a well recognised and accepted market reference rate, such as the Bank Bill Swap Rate (BBSW), or the Bank Bill Swap Bid Rate (BBSY), and the margins and fees which are to be added to that rate.

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4.12. Table 2 summarises the outcome from this allocation process, and the resulting cost of debt. ██████████████████████ and the "data" shown in the table have no meaning beyond the totals being arithmetically correct.)

Table 2
Debt portfolio and cost of debt

	Allocation (%)	Cost of debt (%)
US public bond (144a) market (10 years)	20.0%	1.07%
US private placement market (10 years)	20.0%	1.07%
Australian domestic bond market (3 years)	20.0%	1.05%
Australian domestic bond market (5 years)	20.0%	1.05%
Australian bank market (7 years)	20.0%	1.05%
Total	**100.0%**	**1.06%**

4.13. The total cost of debt from Table 2 is the estimate of the cost of debt to be used in applying Rule 87(2).

4.14. The approach outlined above allows an estimate of the cost of debt to be made on a reasonable basis: as a build-up of the costs which are likely to be incurred by a service provider with benchmark gearing requiring debt finance for investment in a gas pipeline system. The approach recognises the fact that the service provider will source finance in a number of markets, and this may include the sourcing of finance in international capital markets. Furthermore, the approach recognises the real limitations in these markets. If lenders in a market will not provide finance to a particular entity because they are already exposed to the limit they consider acceptable to the group of companies of which the entity is member, that market will not be an option for finance. If debt with a term to maturity of, say, 10 years is not available in a market, it will not be considered as an option.

4.15. Although this approach to the estimation of the cost of debt is a pragmatic approach:

(a) it uses a model - "a simplified or idealized description or conception of a particular system, situation, or process, often in mathematical terms, that is put forward as a basis for theoretical or empirical understanding, or for calculations, predictions, etc";[2]

(b) unlike the Capital Asset Pricing Model, the model used to estimate the cost of debt is not in mathematical terms;

(c) the constructs of this model are clearly financial - the approach uses a financial model;

(d) the model uses a financing structure that meets benchmark standards as to gearing (60% debt, 40% equity);

(e) the model assumes a going concern and best practice in the way in which it takes into account the options for debt financing which are available in capital markets;

(f) the model assumes that the service provider's contracting practices reflect best practice; and

(g) the model is a well accepted financial model: it "models" the approach taken by lenders when pricing debt, and is well accepted by capital market participants.

4.16. The approach to estimation of the cost of debt described in this section 4 is a reasonable basis of estimation, and provides the best estimate possible in the circumstances.

4.17. The approach makes direct reference to financing options currently available in capital markets, and requires of the capital markets advisor that it make assumptions about default

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[2] Oxford English Dictionary.

risk and other risks which it considers appropriate to the service provider. The approach provides an estimate of the cost of debt which is commensurate with prevailing conditions in the market for funds and the risks involved in providing reference services. When implemented with an appropriate method for estimating of the cost of equity, this approach to estimating the cost of debt leads to the rate of return required by Rule 87.

4.18. DBP acknowledges that the approach set out above is not unbiased in the sense in which that term is used in the Discussion Paper. The approach does not lead to a cost of debt which has been obtained by reference to a large sample of entities. The business-specific nature of the debt risk premium (discussed in the latter part of section 5 of this submission) precludes an approach which has this property of unbiasedness. However, and importantly, the NGR do not require a cost of debt, or a rate of return, which is unbiased.

4.19. The approach is not stable in the sense in which that term is used in the Discussion Paper. Again, the business-specific nature of the debt risk premium would seem to preclude an approach which has this property of stability. In any event, the NGR do not require a cost of debt, or a rate of return, which is stable.

4.20. The approach does, however, provide a practicable and replicable estimate of the cost of debt. It is easily implemented with the assistance of an experienced capital markets advisor, and DBP would expect that, at any given time, different advisors would recommend similar options with similar total costs of debt. Those total costs would not be identical because the process is not "mechanical": expert judgement is required, and the opinions of experts, when considering the same set of circumstances, can vary. Although practicability and replicability are not requirements of the NGR, an approach which is practicable and replicable is likely to be an approach which is commensurate with prevailing conditions in the market for funds. An approach which uses, for example, a premium on bonds with a period to maturity of 10 years when those bonds are not traded in the market is not practicable, and may not be easily replicated. Since the bonds in question are not traded, the approach is not commensurate with prevailing conditions in capital markets.

4.21. DBP's approach, using the services of an experienced capital markets advisor, may not be as transparent as the ERA's earlier use of data from the Bloomberg and CBASpectrum financial data services, and may not be as transparent as the proposal of the Discussion Paper to use a sample of bonds from Bloomberg. However, the use of data from the Bloomberg service is not, itself, particularly transparent. Those data are available only to subscribers to that service. As with other matters to be considered by the regulator in the making of a decision on proposed revisions to an access arrangement, pipeline users and end-users will need to rely on the ERA properly carrying out its functions under the NGL and the NGR, rather than on full disclosure of the details of the regulatory decision making process. Transparency is not, in any case, a requirement of the NGR.

4.22. The NGR do not require a cost of debt and a rate of return which are unbiased, stable, practical, replicable and transparent. They require an estimate of the cost of debt which has been arrived at on a reasonable basis, and which represents the best estimate possible in the circumstances (Rule 74(2)). They also require a rate of return which is commensurate with prevailing conditions in the market for funds and the risks involved in providing reference services (Rule 87(1)). DBP's approach to the cost of debt meets the criteria of NGR 74(2). When that approach is implemented with an appropriate method for estimating the cost of equity, it leads to a rate of return commensurate with prevailing conditions in the market for funds and the risks involved in providing reference services. It leads to the rate of return required by Rule 87.

5. ERA'S PROCEDURE DOES NOT MEET THE REQUIREMENTS OF RULE 87

5.1. In the preceding section of this submission, DBP set out its view of the correct approach to estimation of the cost of debt on a proper application of the provisions of the NGL and NGR. That approach does not require use of a debt risk premium.

5.2. Were DBP's approach found not to be correct, and a debt risk premium was required to be determined on a proper application of the provisions of the NGL and the NGR, the procedure of the Discussion Paper to estimate a debt risk premium, the resulting estimate of the cost of debt, and the rate of return determined from it, would not meet the requirements of Rule 87. The reasons why this is the case is set out in this section of this submission.

5.3. This section comprises two parts. In the first, DBP sets out its understanding of the ERA's proposed procedure for estimating the debt risk premium. In the second part, DBP explains why estimation of the cost of debt using the procedure for estimating the debt risk premium proposed in the Discussion Paper will not satisfy the requirements of Rule 87, assuming that a debt risk premium is required to be estimated on a proper application of the provisions of the NGL and NGR.

The ERA's proposed procedure for estimating the debt risk premium

5.4. For its access pricing decisions to date, the ERA, like other Australian regulators, has estimated the cost of debt as the sum of three components:

(a)   the nominal risk free rate of return;

(b)   the debt risk premium; and

(c)   an allowance for debt raising costs.

5.5. DBP does not discuss the allowance for debt raising costs in this submission, and does not have much to say about the nominal risk free rate of return. DBP does not consider these to be unimportant, but they are not central to the issues raised in the Discussion Paper.

5.6. Paragraph 33 of the Discussion Paper advises that the ERA proposes to discontinue its previous practice of basing the debt risk premium on the premium in the yield on corporate bonds with 10 years to maturity. In paragraph 34, the ERA advises that it favours a method which relies on yields which are observed in financial markets (and not inferred from fair value curves).

5.7. DBP concurs with the view that the cost of debt should be estimated by reference to yields observed in capital markets.

5.8. Setting the cost of debt in this way is not, however, a matter of preference. The rate of return which results from the process of applying Rule 87 must be a rate which is commensurate with prevailing conditions in the market for funds and the risks involved in providing reference services. A rate of return determined through a process in which the cost of debt is established from inferences about yields on securities which are not currently traded in capital markets (for example, Australian corporate bonds with 10 years to maturity) does not satisfy the test of being commensurate with prevailing conditions in those markets.

5.9. DBP does not agree with the view that the rate of return which results from the process of applying Rule 87 must be a rate determined through a process which uses only

observations from Australian capital markets. Even before the Global Financial Crisis (which has now exacerbated the situation), some gas pipeline businesses were not able to raise all of the debt finance they required in Australian markets, and had to source at least a part of that finance in international capital markets. Conditions in the market for funds, and the risks involved in delivering reference services, have required, and continue to require, that for some service providers the process through which the rate of return is determined requires explicit consideration of observations from international markets. The arguments which the ERA advances in paragraph 34 of the Discussion Paper, and which have been put forward by other Australian regulators, for limiting the observations used in rate of return determination to observations from Australian capital markets are theoretical arguments. They have no basis in the regulatory regime of the NGL and the NGR.

5.10. In paragraph 35 of the Discussion Paper, the ERA notes that other Australian regulators have consistently used Australian financial data to estimate the debt risk premium. This has certainly been the case. However, it is an observation which should be examined carefully. Australian financial data have been used consistently by other regulators - and, in particular, by the Australian Energy Regulator - in setting rates of return for regulated electricity network service providers. The use of Australian data, at least for estimating the debt risk premium, is, in these circumstances, mandated by the *National Electricity Rules* (Rule 6.5.2(e) for distribution networks, and Rule 6A.6.2(e) for transmission networks). Use of those data is not mandated by the NGR. Were they to apply the principles of the *National Electricity Rules* beyond the regulated electricity networks sector, these other Australian regulators would risk being in error.

5.11. In paragraph 36 of the Discussion Paper, the ERA observes that most Australian corporate bonds currently traded in the market have periods to maturity which are significantly shorter than 10 years.

5.12. This is consistent with DBP's experience, and is consistent with DBP's view that gas pipeline businesses prefer portfolios of debt with varying terms to maturity because this allows smoothing of the maturity profile, which reduces refinancing risk.

5.13. Results obtained from estimating the debt risk premium and the cost of debt by reference to a hypothetical 10 year bond issue, when bonds with a period to maturity of 10 years are unavailable in capital markets, will not lead to determination of a rate of return which is commensurate with prevailing conditions in those markets. Market realities, and the requirements of the NGR, dictate a move away from the "10 years to maturity" assumption.

5.14. The ERA therefore proposes, in paragraph 48 of the Discussion Paper, to determine the debt risk premium from a sample of Australian corporate bonds with period to maturity of two years or longer and credit rating of BBB-/BBB/BBB+ by Standard & Poor's. Furthermore, that sample is to be drawn from data available from the Bloomberg service for bonds issued in Australia, denominated in Australian dollars, by Australian entities, and is to include both fixed bonds and floating bonds, and bonds with bullet and callable/putable redemptions.

5.15. For a sampling period during October 2010, 15 bond issues by Australian corporations met the criteria of a period to maturity of two years or longer and credit rating in the range BBB-/BBB/BBB+. However, not all of these issues were by businesses in the same industry. When a criterion of "in the same industry" was adopted, only a few issues were found. The ERA therefore proposes that the sample of bonds to be used in estimating the debt risk premium be the broad sample of Australian corporate bonds with a period to maturity of two years or longer, and with a credit rating in the range BBB-/BBB/BBB+.

5.16.   In paragraph 50 of the Discussion Paper, the ERA notes that the bonds in the broad sample exhibited different characteristics (the issuers were in different industries, and the terms to maturity were different) and that consideration needed to be given to whether weights should be applied to each bond to reflect its relative importance in the sample. Four methods of weighting were identified:

(a)   equal weights (that is, use of a simple average);

(b)   weighting by number of years until maturity;

(c)   weighting by amount issued;

(d)   middle ranked observation in the sample (that is, use of the sample median).

5.17.   Although the Discussion Paper (in paragraphs 57 and 58) is not explicit on the matter, the ERA's proposed approach to estimation of the debt risk premium appears to be via a years-to-maturity weighted average of the yields to maturity on a sample of Australian corporate bonds with periods to maturity of two years or longer and credit ratings in the range BBB-/BBB/BBB+.

5.18.   DBP presumes that the debt risk premium is then obtained as the difference between the weighted average yield, and an average of the nominal risk free rate of return over the same sampling period. However, this is not made clear in the Discussion Paper. Nor does the Discussion Paper address the way in which the nominal risk free rate is to be determined.

5.19.   Taking a maturity weighted average of yields is a way of ensuring the resulting debt risk premium is not biased by differences in terms to maturity. However, it does not address other differences between issuers and bond issues in the ERA's broad sample of Australian corporate bonds. This failure to address these other differences ultimately leads to an estimate of the cost of debt which does not satisfy the requirements of Rule 87 of the NGR.

Estimation of the cost of debt using the procedure for estimating the debt risk premium proposed in the Discussion Paper will not satisfy the requirements of Rule 87 of the NGR

5.20.   The debt risk premium, estimated in the way proposed in the Discussion Paper is, DBP assumes, to be used in the method of estimating the cost of debt which the ERA has previously used in its access pricing decisions. As noted in paragraph 5.4 above, the ERA has previously estimated the cost of debt as the sum of:

(a)   the nominal risk free rate of return;

(b)   the debt risk premium; and

(c)   an allowance for debt raising costs.

5.21.   The rationale for this method of estimation has not been made clear by the ERA in its previous access pricing decisions. Nevertheless, it has a basis in financial economics. The ERA's method is consistent with the pricing of risky debt as a call option.[3]

Pricing of risky debt as a call option

5.22.   Consider a company which has issued a zero coupon bond promising to pay B dollars at time T (the date on which the bond matures). If the company fails to keep this promise, it is declared bankrupt and the bondholder receives the value of the company's assets at the

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[3]   DBP does not consider, in this submission, the alternative approach to the pricing of risky debt using reduced form models of the type developed by Duffie and Singleton. (See Darrell Duffie and Kenneth J. Singleton (1999), "Modelling Term Structures of Defaultable Bonds", Review of Financial Studies, 12(4): 687-720.)

time of bankruptcy. (In this submission, DBP is concerned only with the principles of this method of bond pricing and, for simplicity, bankruptcy costs and a number of other complicating factors are ignored.)

5.23. Were operations to cease just before time T, and the physical assets sold, the company would have a single financial asset, an amount of cash V_T, at time T. V_T is the liquidated value of the physical assets.

5.24. If $V_T \geq B$, the bondholder could be paid out at time T, and an amount $V_T - B \geq 0$ would available to shareholders. The value of the bond at maturity is, then, the minimum of V_T and B. The value of the equity in the company is V_T less the value of the bond at maturity, which is the maximum of $V_T - B$ and 0. That is, the shareholders have a claim on the assets of the company which has the characteristics of a call option: they have the right to acquire full control of the physical assets, and to receive all future payments from them, by paying an exercise price of B.

5.25. Applying the options pricing theory of Black and Scholes, Merton has shown that the yield on the bond can be explained in terms of a risk free rate of return and a premium for risk.[4] When there are T periods to maturity, the price of the bond is:

$$D_T = Be^{-rT}[N(h_2) + N(h_1)/d],$$

where:

(a)   r is the nominal risk free rate of return;

(b) $d = Be^{-rT}/V$, with V the value of the company;

(c)   N( ) is the standard normal distribution function;

(d) $h_1 = -[\sigma^2 T/2 - \ln d]/\sigma\sqrt{T}$, with σ^2 the variance (or volatility) of the company's returns; and

(e) $h_2 = -[\sigma^2 T/2 + \ln d]/\sigma\sqrt{T}$.

5.26. The first term of the pricing equation, $Be^{-rT}N(h_2)$, is the expected present value of receiving B at maturity, $N(h_2)$ being a measure of the probability that the company is solvent at time T. The second term, $VN(h_1)$, is the expected present value of receiving all of the assets of the firm conditional on their being worth less than V, $N(h_1)$ being a measure of the probability of default.

5.27. Since $D_T = Be^{-R(T)T}$, where R(T) is the yield to maturity on the bond when the company does not default, the pricing equation in paragraph 5.25 can be rewritten, in terms of returns, as:

$$R(T) = r - \ln[N(h_2) + N(h_1)/d]/T.$$

5.28. The yield on the bond is, then, determined as the sum of the risk free rate of return, r, and a premium for risk ($- [\ln[N(h_2) + N(h_1)/d]/T$). The risk premium, which is a function of the probability of default through $N(h_1)$ and $N(h_2)$ is, in turn, determined by:

(a)   the date on which the bond matures, T;

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[4]   See Fischer Black and Myron Scholes (1973), "The Pricing of Options and Corporate Liabilities", Journal of Political Economy, 81(3): 637-654; and Robert C. Merton (1974), "On the Pricing of Corporate Debt: The Risk Structure of Interest Rates", Journal of Finance, 29(2): 229-240. Merton's explanation of the pricing of corporate debt using options pricing theory was pioneering, but is not now the only approach to the debt pricing in the theory of financial economics. Moreover, Merton's results were obtained by making a number of important simplifying assumptions. Some of these assumptions can be removed, but at the cost of adding complexity.

(b)   the variance or volatility of company returns, σ^2; and

(c)   the quasi debt to total value ratio, $d = Be^{-rT}/V$.

5.29.   Setting aside the question of how the risk free rate of return is to be determined, three factors are "in play", allowing a wide range of possible values for the yield, or cost of debt, through their effects on the debt risk premium via the probabilities $N(h_1)$ and $N(h_2)$.

The cost of debt in the context of Rule 87 of the NGR

5.30.   In the context of determining a rate of return to be used in the setting of gas pipeline access prices, Rule 87(2) requires use of a financing structure which meets benchmark standards as to gearing and other financial parameters for a going concern and reflects in other respects best practice.

5.31.   Although DBP doubts that there is a "benchmark standard as to gearing", we accept that there are patterns in capital structures across industries and, for the purpose of this submission, do not question the assumption usually made for gas pipeline service providers that the benchmark standard for gearing is 60% debt (and 40% equity).

5.32.   By fixing the gearing at 60% debt, the quasi debt to total value ratio is effectively fixed, leaving only the period to maturity and the variance or volatility of company returns as factors determining the cost of debt. As has been noted above, the Discussion Paper deals with the period to maturity: it proposes estimation of the debt risk premium from a sample of bond with periods to maturity of 2 years or longer, implicitly recognizing the market reality that bonds with terms to maturity longer than about seven years are not currently traded.

5.33.   This leaves the matter of the variance or volatility of company returns. The ERA, like other Australian regulators, seeks to capture this aspect of debt pricing by assuming a benchmark standard credit rating.

Credit rating and default risk

5.34.   Krahnen and Weber offer a reasonably concise definition of a credit rating: a credit rating is a mapping from - a relationship between - the attributes of a company and its default risk.[5] In practice, company attributes are mapped to a discrete number of rating classes, and the rating classes are, in turn, mapped to probabilities of default on the basis of historical data. The relationship between rating classes and probabilities of default is essentially a statistical relationship. The relationship is not a causal relationship; it does not have clear conceptual foundations.

5.35.   In consequence, and as Elton, Gruber, Agrawal and Mann have demonstrated empirically, the bonds within a given (Standard & Poor's, or Moody's) rating class cannot be assumed to be of the same default risk.[6]

5.36.   Some financial economists, although acknowledging the undoubted importance of credit ratings to financial market participants, have questioned the economic role of those ratings. In their well known textbook, Richard Brealey and Stewart Myers argue that market participants "almost certainly exaggerate the influence of rating agencies, which are as

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[5]   Jan Pieter Krahnen and Martin Weber (2001), "Generally accepted rating principles: A primer", Journal of Banking &Finance, 25: 3-23.

[6]   Edwin J. Elton, Martin J. Gruber, Deepak Agrawal and Christopher Mann (2004), "Factors affecting the valuation of corporate bonds", Journal of Banking & Finance, 28: 2747-2767.

much following investor opinion as leading it".[7] A recent paper in which Boot, Milbourn and Schmeits seek to understand the economic role of ratings concludes:

Credit ratings are one of the most puzzling features of today's financial markets. Their importance is evident from the behavior of market participants; however, academic researchers have generally been sceptical about their incremental value.[8]

5.37. Boot, Milbourn and Schmeits use a theoretical argument to show that credit ratings can play a role coordinating investor expectations within the complex institutional framework of modern capital markets. This does not mean that the ratings convey no information about default risk. Rather, like the work of Elton, Gruber, Agrawal and Mann, it is a basis for viewing credit ratings as providing an incomplete and imprecise measure of default risk.

5.38. The ERA, and other Australian regulators, use a benchmark credit rating as an indicator of default risk and, implicitly, use the indicated default risk to ascertain the debt risk premium (having standardised for gearing and term to maturity). They use the benchmark credit rating to ascertain the premium - $\ln[N(h_2) + N(h_1)/d]/T$ directly, rather than seeking to ascertain variance or volatility of return (σ^2), and to infer the premium from that (again, given standard gearing and term to maturity). The resulting debt risk premium is therefore, at best, a rough approximation because:

(a) the premium is not simply the probability of default; and

(b) credit ratings are, themselves, incomplete and imprecise measures of default risk.

Benchmarking the credit rating

5.39. If the ERA's sample were restricted to bonds issued by energy sector businesses with credit ratings in the range BBB-/BBB/BBB+, the proposed sampling method of would have yielded the sample shown in Table 2 of the Discussion Paper:

(a) APA (BBB);

(b) Santos (BBB+);

(c) Snowy Hydro (BBB+);

(d) Envestra Victoria (BBB-); and

(e) DBP (BBB-).

5.40. This is an interesting list: two transmission pipeline businesses (APT and DBP), one gas distributor (Envestra), a gas producer (Santos), and an unusual - for Australia - electricity generator (Snowy Hydro). It is a far from complete list of Australian energy businesses, which indicates either:

(a) those businesses do not source the debt they require in Australian capital markets (DBP is not aware of any energy business which is 100% equity financed, and which does not have a requirement for debt finance); or

(b) the bonds issued by those businesses do not have credit ratings in the range BBB-/BBB/BBB+.

5.41. The Discussion Paper's broader sample (listed in Table 3) is even more interesting:

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[7]   Richard A. Brealey and Stewart C. Myers (2007), *Principles of Corporate Finance*, 7th ed., McGraw Hill, New York, page 685.

[8]   Arnoud W.A. Boot, Todd T. Milbourn and Anjolein Schmeidts (2006), "Credit Ratings as Coordination Mechanisms", Review of Financial Studies, 19(1): 81-118.

(a)   APA;

(b)   BBI DBCT Finance Pty;

(c)   Bank of Queensland Ltd;

(d)   CLP Australia;

(e)   DBP;

(f)   Dexus;

(g)   Envestra;

(h)   Leighton;

(i)   Sydney Airport;

(j)   Mirvac Group Funding;

(k)   Mirvac Group Finance;

(l)   New Terminal;

(m)   Snowy Hydro;

(n)   Santos; and

(o)   Wesfarmers.

5.42.   Added to the five energy businesses are: a coal port (DBCT), a bank (Bank of Queensland), an electricity generator and retailer (CLP Australia), two property groups (Dexus, and Mirvac with issues by two entities), a construction services business (Leighton), two airport operators (Sydney Airport and New Terminal Finance), and a retailer (Wesfarmers).

5.43.   Setting aside for the present the issue that a benchmark credit rating leads, at best, to a rough approximation for the debt risk premium, the larger sample proposed by the ERA - all Australian bond issues with periods to maturity longer than two years, and credit ratings in the range BBB-/BBB/BBB+ - might seem to be more reasonable. But how such a sample provides a benchmark standard for the purpose of Rule 87(2) of the NGR is not at all clear to DBP. This issue is not addressed in the Discussion Paper.

5.44.   A benchmark standard credit rating for energy businesses has greater intuitive appeal. However, as the sample of the Discussion Paper's Table 2 shows, even a broad range of BBB-/BBB/BBB+ leads to only a small, and rather idiosyncratic, sample of Australian energy businesses. The small sample is not necessarily a problem, but the result raises a question about whether the range BBB-/BBB/BBB+ is in any sense a benchmark standard. Without examining the issue in any detail, the Discussion Paper indicates that the range BBB-/BBB/BBB+ is a benchmark for businesses in the energy sector. There is no consideration in the Discussion Paper of whether that range is the benchmark standard required by Rule 87(2).

5.45.   In applying the scheme of the NGL and the NGR, effect must be given to the statutory objective of section 24(5) of the NGL: the reference tariff is to allow for a return commensurate with the regulatory and commercial risks involved in providing the reference service to which that tariff relates. In these circumstances, the relevant sample cannot be the ERA's broad sample. Nor can it be the smaller sample for the energy sector. If a sample of corporate bonds is to be taken for the purpose of applying Rule 87, that sample must - at least - be restricted to bonds issued by businesses in the gas pipeline industry. Only those businesses provide the reference services in question. We are left, then, with a benchmark standard represented by just three businesses: APA, Envestra and DBP. And,

again, the question remains: is the range BBB-/BBB/BBB+ in any sense a benchmark standard for gas pipeline service providers?

5.46. These issues of establishing a benchmark standard credit rating are indicative of a more fundamental problem.

5.47. DBP accepts the view that industry standards or benchmarks are important in schemes of incentive regulation. By allowing a regulated business to recover only costs of service provision which are benchmarked to standards of industry performance, and by rewarding superior performance through mechanisms like price caps, regulation can provide incentives for low cost service delivery in circumstances where those incentives are not provided by competition.

5.48. However, for incentive regulation to be effective, the benchmarks which it uses must be achievable by a regulated business. If they are obviously not achievable, the business will not be motivated to pursue them.

5.49. In the estimation of the debt risk premium, there may be, as DBP has noted above, some basis for adopting a benchmark standard for gearing. Furthermore, although capital markets are dictating a shift away from a benchmark standard of 10 years to maturity for bond issues, some shorter term - three to five years - might be indicative of the current "industry standard". (However, the better view is that there is no standard: rather, a service provider will maintain a portfolio of debt with varying terms to maturity allowing smoothing of the maturity profile and reducing refinancing risk.)

5.50. Default risk, in the case of gas pipeline service providers, is clearly different. It cannot be reasonably benchmarked or standardised.

5.51. A gas pipeline service provider uses assets which are business-specific (they have few alternative uses, and much lower values in those alternative uses), and these assets are location-specific (they cannot easily be removed and redeployed in other locations).

5.52. Most of the services supplied using a gas pipeline are sold under long term contracts (to protect business- and location-specific pipeline assets, and to protect the business-specific assets of end-users using large volumes of gas). If a pipeline service provider is regulated, the prices it can charge for service are fixed for extended periods, and subject to change only in accordance with the rules of the regulatory regime which applies. Revenues from a given user base are, then, to a large extent fixed, depending on whether the long term contracts for services are long term contracts for capacity or for volume transported. Costs, being mainly capital costs, are also largely fixed. In these circumstances, net cash flows are relatively stable and certain.

5.53. With assets which are business- and location-specific, the relatively stable and certain net cash flow of a gas pipeline service provider is the principal security available to providers of debt finance. (The physical pipeline assets provide little recompense to providers of debt in the event of business failure.) The default risk to which providers of debt are exposed is, then, primarily the counterparty risk in the long term sales contracts of the pipeline service provider. That counterparty risk may also transmit general macroeconomic risks, of the type which are captured by equity pricing models such as the Capital Asset Pricing Model, but there is evidence that this transmission is not complete.[9]

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[9]   See, for example, Edwin J. Elton, Martin J. Gruber, Deepak Agrawal and Christopher Mann (2001), "Explaining the rate Spread on Corporate Bonds", Journal of Finance, 54(1): 247-277, and Francis A. Longstaff, Sanjay Mithal and Eric Neis (2005), "Corporate Yield Spreads: Default Risk or

5.54. When the default risk to which providers of debt are exposed is, primarily, the counterparty risk in long term sales contracts, that risk will vary systematically across gas pipeline service providers with differences in the users served. A pipeline service provider providing transportation of gas to mining and mineral processing operations will be exposed to counterparty risk which is different from the counterparty risk arising from the long term contracts of a pipeline service provider providing transportation services to large industrial users of gas, or to electricity generators. The counterparty risks of these service providers will, in turn, be different from the counterparty risk of a pipeline service provider which transports gas mainly for retailers supplying smaller commercial and residential end-users.

5.55. Differences in default risk are driven by differences in pipeline user bases. A pipeline service provider does not choose the industries in which its users operate and, beyond ensuring that its contracting practices reflect best practice, cannot control the counterparty risks in its long term sales contracts. These risks are specific to the user base of a particular pipeline, and cannot reasonably be benchmarked. To benchmark them, albeit imperfectly, as the ERA and other Australian regulators have attempted to do through "benchmarking" the credit rating used for the purpose of estimating the debt risk premium allows some service providers to earn higher returns than those which result from applying the "benchmark" for no other reason than they serve particular types of users. Moreover, it expropriates return from those service providers which cannot, through any action which might be taken by management, achieve the "benchmark" because this is precluded by the composition of their user bases. The pipeline businesses in this latter class are deprived of the opportunity to recover their efficiently incurred financing costs.

5.56. Rule 87(1) requires a rate of return which is not only commensurate with prevailing capital market conditions, but which is also commensurate with the risks involved in providing reference services. Through the application of the criteria of Rule 87(1), the statutory objective of section 24(5) of the NGL is to be achieved. Section 24(5) refers to specific reference services: those for which a reference tariff is being determined. In consequence, the reference services to which Rule 87(1) refers are those of the pipeline for which reference tariffs are being determined. Rule 87(1) does not use the term reference service in some non-specific or generic sense. In these circumstances, any measure of the debt risk premium (which cannot be benchmarked) must be business-specific. If the debt risk premium were, in some way, benchmarked across a range of businesses (by, for example, benchmarking the credit rating used in determining the premium), any rate of return which resulted from the process of applying Rule 87 would not be a rate which was commensurate the risks involved in providing reference services.

5.57. DBP notes that, although the requirement of Rule 87 of the NGR for a benchmark standard for gearing is explicit, the Rule does not require a benchmark standard for credit rating. Although Rule 87(2)(b) anticipates benchmark standards for financial parameters (and specifically for gearing) for a going concern, and which reflect in other respects best practice, it makes no specific reference to credit rating. DBP sees this as being entirely consistent with its view that, in the case of gas pipeline service providers, credit rating cannot be benchmarked.

5.58. In these circumstances, the estimation of the cost of debt to be used in applying Rule 87 cannot be the mechanical processing of market and other data which has previously been undertaken by the ERA and by other Australian regulators. Estimation of the cost of debt must recognise the specific circumstances of the pipeline business issuing the debt.

Liquidity? New Evidence from the Credit Default Swap Market", Journal of Finance, 55(5): 2213-2253.

5.59.   If the cost of debt is estimated using an estimate of the debt risk premium obtained by applying the procedure of the ERA's Discussion Paper, no account is taken of the specific circumstances of the pipeline business issuing the debt. The estimate of the cost of debt would not be an estimate which has been arrived at on a reasonable basis. It would not meet the criteria of Rule 74(2). Were this cost of debt to be used with an appropriate method for estimating the cost of equity, it would not lead to a rate of return which was commensurate with the risks involved in providing reference services. It would not lead to the rate of return required by Rule 87.