

DAMPIER TO BUNBURY NATURAL GAS PIPELINE

SUBMISSION#4 REFERENCE TARIFF POLICY AND REFERENCE TARIFF

PUBLIC VERSION

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1. Introduction

- 1.1 On 21 January 2005, DBNGP (WA) Transmission Pty Ltd ("Operator") filed public versions of the following documents with the Economic Regulation Authority ("Regulator"):
- (1) Proposed Revised Access Arrangement; and
 - (2) Proposed Revised Access Arrangement Information.
- 1.2 These documents contained the minimum information that the Code requires to be included for submission to the Regulator.
- 1.3 To assist the Regulator properly assess the Proposed Revised Access Arrangement, Operator indicated, in the accompanying Submission#1, Revised AA & AAI Explanation, its intention to provide further submissions to the Regulator as soon as possible on a number of key issues. One of these further submissions would provide information on the Reference Tariff Policy and determination of the proposed Reference Tariff.
- 1.4 This Submission#4 is the submission Operator previously indicated it would provide on the Reference Tariff Policy and determination of the proposed Reference Tariff. Subsequent sections of the submission cover the following topics:
- (1) Roll forward of the Capital Base;
 - (2) Rate of Return;
 - (3) Non Capital Costs;
 - (4) Capacity and throughput forecasts;
 - (5) Total Revenue and Reference Tariff;
 - (6) Tariff model;
 - (7) Fixed principles; and
 - (8) Efficiency carryover mechanism.

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2. Roll forward of the Capital Base

Code requirements

- 2.1 Section 8.9 of the National Third Party Access Code for Natural Gas Pipeline Systems ("Code") states that, under the Cost of Service methodology for establishing the Total Revenue, the Capital Base at the commencement of each Access Arrangement Period after the first is to be determined as:
- (1) the Capital Base at the start of the immediately preceding Access Arrangement Period; plus
 - (2) the New Facilities Investment (or the Recoverable Portion) in the immediately preceding Access Arrangement Period (adjusted as relevant, as a consequence of section 8.22, to allow for the differences between actual and forecast New Facilities Investment); less
 - (3) Depreciation for the preceding Access Arrangement Period; less
 - (4) Redundant Capital identified prior to the start of the new Access Arrangement Period; plus
 - (5) an adjustment for inflation (if any) as is appropriate given the approach to inflation adopted pursuant to section 8.5A of the Code.

Determination of the Capital Base a principle not subject to review

- 2.2 Section 7.16 of the Access Arrangement drafted and approved by the Regulator on 30 December 2003 ("Original Access Arrangement") made the methodology for determination of the Capital Base at the commencement of each year of the Access Arrangement Period, as set out in section 7.3, a Fixed Principle in accordance with section 8.47 of the Code.
- 2.3 The effect of section 7.3 of the Original Access Arrangement was the determination of the Capital Base at the commencement of each year of the Access Arrangement Period in real (December 1999) values. Section 7.3 did not provide for expression of the Capital Base and, in particular, the Capital Base at the end of the Access Arrangement Period of the Original Access Arrangement, in prices current at that time, and current for the purposes of the Proposed Revised Access Arrangement.
- 2.4 Operator has, therefore, proposed revisions to section 7.3, consistent with the requirement of section 8.47 of the Code that a Fixed Principle can not be changed without the agreement of the service provider.

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Revisions to section 7.3: calculation of the Capital Base

- 2.5 Section 8.5A of the Code permits the Cost of Service methodology adopted by Operator to be applied on a nominal basis, or on a real basis, or on any other basis for dealing with the effects of inflation, provided that the basis used is specified in the Access Arrangement, is approved by the Relevant Regulator, and is applied consistently in determining the Total Revenue and Reference Tariffs.
- 2.6 In accordance with section 8.5, Operator has revised section 7.3 of the Access Arrangement as follows:
- (1) The Initial Capital Base at 1 January 2000 was \$1,550.00 million.
 - (2) For each year after 2000, the Capital Base for the DBNGP at the beginning of the year is:
 - (i) the Capital Base at the beginning of the immediately preceding year; plus
 - (ii) an adjustment to the Capital Base at the beginning of that immediately preceding year for the effect of inflation; plus
 - (iii) New Facilities Investment during the preceding year; less
 - (iv) depreciation for the preceding year.
 - (3) New Facilities Investment after 1 January 2005 is New Facilities Investment that is forecast to occur during the Access Arrangement Period.
- 2.7 Revised section 7.3(a) recognises the determination of the initial Capital Base for the purpose of the Original Access Arrangement.
- 2.8 Revised section 7.3(b) has similar effect to section 7.3(b) of the Original Access Arrangement, but provides for adjustment of the Capital Base in nominal and not real terms.
- 2.9 Operator has sought to apply revised section 7.3 consistently in rolling forward the Capital Base to 1 January 2005 for the purpose of determining the Reference Tariff of the Proposed Revised Access Arrangement, and has sought to consistently apply revised section 7.3 in determining the Total Revenue (from which the Reference Tariff has been determined) for the Access Arrangement Period of the Proposed Revised Access Arrangement.
- 2.10 Consistent with revised section 7.3(a), Operator has determined the Capital Base at 1 January 2005 by starting with the Initial Capital Base, \$1,550.00 million, at 1 January 2000.

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Adjustment for the effect of inflation

2.11 To express the Capital Base at 1 January 2005 in current prices, Operator has adjusted the Capital Base in each year of from 1 January 2000, by the general movement in prices during the year. As a measure of the general movement in prices, Operator has used the December quarter Consumer Price Index (All Groups, Eight Capital Cities) ("CPI") published by the Australian Bureau of Statistics.

2.12 Operator has not adjusted the CPI for the effect of the introduction of a goods and services tax in 2000. Furthermore, Operator has estimated the CPI for the December quarter of 2004. Operator proposes replacing this estimate with the actual December quarter 2004 CPI once the index is published by the Australian Bureau of Statistics.

2.13 Operator maintains that there is no reason for adjusting the CPI for the effect of the introduction of a goods and services tax in 2000 in the context of rolling forward the Capital Base. To do so would result in a reduction in asset value contrary to the legitimate business interests of the DBNGP owner.

2.14 Moreover, regulators applying the Code in other jurisdictions have not required such an adjustment. In its Final Decision on GasNet's proposed revisions to the access arrangement for its Victorian transmission pipeline system, the Australian Competition and Consumer Commission ("ACCC") concluded (in section 6.5.7, at page 193):

"To remove the impact of the GST from the adjustment to the capital base, as recommended by some interested parties, would result in an erosion of the real (inflation adjusted) value of GasNet's assets. This would be inconsistent with its legitimate business interests (pursuant to section 2.24(a) of the Code)."

2.15 The need to avoid erosion of asset value was also given by the Victorian Essential Services Commission as the reason for its not requiring removal of the effect of the goods and services tax from the inflation index in its 2003 Gas Access Arrangements Review (section 3.5.3, at page 134):

"... on balance, the Commission proposed not to adjust measured inflation over the previous regulatory period to attempt to remove the impact of the GST-related spike in prices. In reaching this conclusion, the Commission noted that it placed significant weight on the implications of the financial capital maintenance concept, as well as the desirability of adopting a simple approach wherever possible. In addition, the Commission noted the complexity associated with the matter and accordingly proposed that a more a conservative approach was warranted."

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- 2.16 Similarly, in its July 2000 Final Decision on proposed revisions to AGL Gas Networks' Access Arrangement for its New South Wales distribution system, the Independent Pricing and Regulatory Tribunal noted (in section 8.4.3, at page 119):

"AGLGN is allowed to index the capital base over the period 2000-2004 by the CPI, inclusive of the Goods and Services Tax (GST). This is consistent with the concept of financial capital maintenance ..."

- 2.17 A proper application of the Code and regulatory precedent clearly support Operator's position that the CPI should not be adjusted for the effect of the introduction of a goods and services tax in the context of rolling forward the Capital Base of the DBNGP.

New Facilities Investment

- 2.18 Section 7.8(b) of the Original Access Arrangement (retained as section 7.4 of the Proposed Revised Access Arrangement) requires that, for the purpose of calculating the Capital Base at the commencement of the next Access Arrangement Period, New Facilities Investment will consist only of actual New Facilities Investment that has occurred during the Access Arrangement Period.
- 2.19 In rolling forward the Capital Base to 1 January 2005, Operator has therefore added actual New Facilities Investment from the period 1 January 2000 to 31 December 2004. Operator notes that, at the date of submission of the Proposed Revised Access Arrangement, actual New Facilities Investment for December 2004 was not available from its accounting systems, and an estimate was made for that month. Operator proposes replacing this estimate with the actual New Facilities Investment in December 2004 once the actual becomes available.
- 2.20 Before the Capital Base can be increased at the commencement of a new Access Arrangement Period (in accordance with section 8.15 of the Code), the actual New Facilities Investment in the immediately preceding Access Arrangement Period must be shown to satisfy the conditions of section 8.16(a) of the Code. Operator will provide the Regulator with a separate submission demonstrating that the actual New Facilities Investment between 1 January 2000 and 31 December 2004 satisfies the conditions of section 8.16(a). That submission will also demonstrate, in accordance with section 8.20, that the New Facilities Investment that is forecast to occur during the Access Arrangement Period is reasonably expected to pass the requirements of section 8.16 when it is forecast to occur.

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Depreciation

- 2.21 The return of capital – depreciation – taken into account in rolling forward the Capital Base to 1 January 2005 was the depreciation used in calculating the Reference Tariff to apply during the Access Arrangement Period of the Original Access Arrangement.
- 2.22 This depreciation was the return of capital to the Operator between 2000 to 2004. Any other amount of depreciation would imply an over- or under-recovery of capital over the life of the DBNGP, and would be inconsistent with the requirement of section 8.33(c) of the Code.

Roll forward of the Capital Base

- 2.23 The roll forward of the Capital Base from 1 January 2000 to 31 December 2004 is summarised in Table 2 of the Proposed Revised Access Arrangement Information.
- 2.24 The calculations supporting the roll forward of the Capital Base are presented in the tariff model which forms part of this submission (see section 7).

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3. Rate of Return

- 3.1 Section 8.30 of the Code requires:

"The Rate of Return used in determining a Reference Tariff should provide a return which is commensurate with prevailing conditions in the market for funds and the risk involved in delivering the Reference Service (as reflected in the terms and conditions on which the Reference Service is offered and any other risk associated with delivering the Reference Service.)"

- 3.2 Where a business is funded by a combination of equity and debt, the rate of return may be measured as an average of the cost of equity and the cost of debt, each cost being weighted, as appropriate, by the contribution of equity or debt to total financing. That is, the Rate of Return is measured as a weighted average cost of capital ("WACC").

- 3.3 Guidance on measuring the Rate of Return as a WACC is provided in section 8.31 of the Code:

"By way of example, the Rate of Return may be set on the basis of a weighted average of the return applicable to each source of funds (equity, debt and any other relevant source of funds). Such returns may be determined on the basis of a well accepted financial model, such as the Capital Asset Pricing Model. In general, the weighted average of the return on funds should be calculated by reference to a financing structure that reflects standard industry structures for a going concern and best practice. However, other approaches may be adopted where the Relevant Regulator is satisfied that to do so would be consistent with the objectives contained in section 8.1."

- 3.4 The WACC can be expressed in either post-tax or pre-tax terms.

- 3.5 The post-tax nominal form of the WACC is:

$$\text{WACC}_{\text{post-tax nominal}} = K_e \times E/V + K_d \times (1 - t) \times D/V,$$

where

K_e is the post-tax nominal cost of equity;

E/V is the proportion of equity in the total financing of the business;

K_d is the pre-tax nominal cost of debt;

t is the tax rate; and

D/V is the proportion of debt in the total financing of the business.

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- 3.6 This form of the WACC is applicable only if the taxation system does not provide for dividend imputation. If the taxation system recognises payment of tax at the corporate level, and shareholder payment of tax on dividends, as involving double taxation of the same income stream, and provides credits to shareholders for tax already paid at the corporate level, the calculation of the WACC should be modified to properly represent the additional element of shareholder return. The post-tax nominal WACC is, in these circumstances:

where

γ is the proportion of tax collected at the corporate level which is to be credited against personal tax payments.

- 3.7 Conversion from the post-tax nominal form of the WACC to the pre-tax real form has been the subject of debate in Australian regulatory approvals processes because tax is assessed only on a nominal net income stream. For the DBNGP, this conversion has been carried out using the forward transformation method (which was the method used by the Regulator in establishing the WACC for the Access Arrangement Period of the Original Access Arrangement, and in establishing WACC's for other covered pipelines).

- 3.8 First, the equivalent pre-tax nominal WACC was obtained by dividing by $(1 - t)$:

$$WACC_{\text{pre-tax nominal}} = K_e \times 1/[1 - t \times (1 - \gamma)] \times E/V + K_d \times D/V.$$

- 3.9 This pre-tax nominal WACC was then adjusted for expected inflation, using the Fisher equation, to provide a pre-tax real WACC:

$$WACC_{\text{pre-tax real}} = (1 + WACC_{\text{pre-tax nominal}})/(1 + \pi^e) - 1,$$

where

π^e is expected inflation.

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Determining the cost of equity

- 3.10 Despite continuing concern over aspects of the way in which it is derived, and doubt about its empirical validity, the CAPM remains a widely used method of estimating the cost of equity. The CAPM is a formalization of the notion that an investor in a risky asset requires additional return as compensation for bearing additional risk: the expected rate of return on a risky asset is the sum of the risk free rate of return (R_f), and a risk premium measured as the product of the excess return on a well-diversified portfolio of risky assets ($R_m - R_f$) and the “beta” of the risky asset. That is, the required rate of return for equity securities (K_e) is determined as:

$$\begin{aligned} K_e &= \text{risk free rate} + \text{risk premium} \\ &= R_f + \beta_e \times (R_m - R_f) \end{aligned}$$

where

β_e (equity beta) is a normalized measure of the covariance of the return on the risky equity securities with the return on a portfolio of all risky assets.

Determining the cost of debt

- 3.11 The risk-return relationship of the CAPM is applicable to any risky asset. Therefore, the expected rate of return on risky debt securities can be similarly estimated:

$$\begin{aligned} K_d &= \text{risk free rate} + \text{risk premium} \\ &= R_f + \beta_d \times (R_m - R_f). \end{aligned}$$

- 3.12 Estimation of the individual components of the debt risk premium – in particular, estimation of the debt beta (β_d) – is, however, uncommon. Instead, the observed yields on issued debt securities are used to directly estimate the risk premium $\beta_d \times (R_m - R_f)$. That is, the expected rate of return on debt is usually determined as:

$$K_d = R_f + \text{debt risk premium}$$

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Parameter values for Rate of Return determination

- 3.13 The Rate of Return for the DBNGP expressed as a WACC is a weighted average of the costs of the equity and debt that would be used to finance the pipeline, assuming (in accordance with section 8.31 of the Code) a capital structure that reflects standard industry structures for a going concern and best practice.
- 3.14 The cost of equity has been determined using the CAPM, and this requires estimates of:
- (1) the risk free rate of return;
 - (2) the equity beta; and
 - (3) the market risk premium.
- 3.15 The cost of debt is estimated as the sum of the risk free rate of return and a debt risk premium, with an adjustment being made for the costs of raising debt.
- 3.16 The WACC is calculated by averaging the cost of equity weighted by the proportion of equity in the total financing of the business, and the cost of debt weighted by the proportion of debt. This requires determination of the capital structure, or gearing for standard industry structures. The effects of taxation must also be taken into account, and this requires assigning a value to imputation credits.

Risk free rate of return and expected inflation

- 3.17 The risk free rate of return is a theoretical construct, and cannot be measured directly. In consequence, in applying the CAPM, consideration must be given to:
- (1) choice of a proxy for the (theoretical) asset which yields a risk free rate of return; and
 - (2) the period over which the return on the proxy – the estimate of the risk free rate of return – is to be measured.
- 3.18 Since the introduction of access regulation in Australia in the mid-1990s, there has been a vigorous debate on the appropriate proxy for the risk free asset. This debate had its origins in the Australian Competition and Consumer Commission's ("ACCC") continued use of proxies which delivered returns over periods that matched the periods for which it was setting regulated access prices.

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- 3.19 This practice by the ACCC was questioned by the Australian Competition Tribunal in the GasNet decision.¹ In that decision the Tribunal contributed to resolution of the debate by finding in favour of GasNet. GasNet had argued (as had other Australian regulators), that a government bond with a term to maturity of five years was not the appropriate proxy for the risk free asset required for application of the CAPM in the context of gas pipelines. Where the life of the pipeline approximated 30 years, the use of a bond with 10 years to maturity was appropriate and accorded with conventional use of CAPM.
- 3.20 In the absence of government bonds with longer terms to maturity, the appropriate proxy for the risk free asset is a Commonwealth Government Treasury Bond with term to maturity of 10 years. Currently, the 10 years bond is best represented by the April 2015 Treasury Bond.
- 3.21 There is, however, no equivalent Commonwealth Government Indexed Treasury Bond maturing in April 2015 which can provide a corresponding estimate of the real risk free rate return. In the absence of an indexed bond maturing in 2015, the Commonwealth Government Indexed Treasury Bonds maturing in August 2010 and August 2015 have been used as the appropriate proxies. The real risk free rate of return has been estimated by interpolating between the yields on the 2010 and 2015 indexed bonds.
- 3.22 In an ideal world, the nominal and real risk free rates would be determined from the most recent available bond yields. Yields reported today incorporate the latest market information and expectations about future interest rates. The world is not, however, ideal, and today's reported bond yields (like yesterday's) contain a random component ("noise"). Some averaging of yields should reduce the effect of this noise on the estimate of the risk free rate of return, with longer-term averages achieving better noise reduction. However, longer term averaging introduces a bias because greater weight is given to superseded prior expectations.
- 3.23 For the purpose of estimating risk free rates to be used in applying the CAPM to determine the cost of equity for the DBNGP, bond yields have been averaged over 20 trading days. This is consistent with commercial and regulatory practice. An estimate of the nominal risk free rate of return has been obtained by averaging the yields on 10 years Commonwealth Government Treasury Bonds, as represented by the April 2015 bond, over the 20 trading days to 1 December 2004. The estimate obtained was 5.39%.
- 3.24 Similarly, an estimate of the real risk free rate of return can be obtained by interpolating between the yields on August 2010 and April 2015 Commonwealth

¹ *Application by GasNet Australia (Operations) Pty Ltd [2003] ACompT 6.*

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Government Indexed Treasury Bonds, on each of the 20 trading days to 1 December 2004, and averaging the results. The estimate of the real risk free rate of return obtained in this way was 2.77%.

- 3.25 An estimate of expected inflation (π^e) can be obtained from estimates of the nominal and real risk free rates of return using the Fisher equation:

$$\pi^e = (1 + R_{f, \text{nominal}})/(1 + R_{f, \text{real}}) - 1.$$

Estimates made in this way have limitations, but also have the advantage of consistency. The inflation estimate obtained incorporates the same market information and expectations as the estimates of the nominal and real risk free rates of return.

- 3.26 Applying the Fisher equation yields expected inflation of 2.55%.

Market risk premium

- 3.27 Measurement of the market risk premium is a contentious issue. In theory, the market risk premium is a measure of the premium over the risk-free rate of return that investors require for investment in a portfolio of risky assets. This premium is not directly observable, and must be estimated using econometric methods.
- 3.28 There are, now, a large number of studies which report estimates of the market risk premium for Australia. The results of some of these studies are summarised in Table 1.

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TABLE 1: ESTIMATES OF MARKET RISK PREMIUM, AUSTRALIA

ESTIMATE	PERIOD	MARKET RISK PREMIUM
Australian Graduate School of Management:		
Arithmetic mean including October 1987	1974 - 1995	6.2%
Arithmetic mean excluding October 1987	1974 - 1995	8.1%
Arithmetic mean ²	1974 - 1995	4.8%
Arithmetic mean including October 1987 ³	1974 – Sep 2000	6.2
Arithmetic mean excluding October 1987	1974 – Sep 2000	7.7
Officer (1989): arithmetic mean	1882 – 1987	7.9
Officer (1989 updated): arithmetic mean ⁴	1882 - 2001	7.2
Officer: arithmetic mean ⁵	1946 - 1991	6.0 to 6.5
Hathaway (1996) ⁶ :		
Arithmetic mean	1882-1991	7.7
Arithmetic mean	1947-1991	6.6
Gray (2001) ⁷	1883 – 2000	7.3
Dimson, Marsh and Staunton (2000) ⁸	1900 – 2000	7.6

3.29 These estimates of the market risk premium show a degree of variation, but are within the range 5% to 8%.

3.30 The view has been advanced by Australian regulators (including the Regulator) and by others, that estimates for more recent periods indicate a decline in the market risk premium. This may appear to be the case from the data presented in Table 1, but more recent estimates have had significantly larger standard errors. They are less reliable, and the conclusion that the market risk premium has fallen is more difficult to sustain.

² Independent expert report by Deloitte Touche Tohmatsu to Woodside Petroleum shareholders in relation to a takeover offer by Shell Investments, dated 19 December 2000.

³ ABN AMRO (1999), "Submission to the Office of the Regulator General Victoria Regarding 2001 Electricity Distribution Price Review; the Cost of Capital Financing", (Consultation Paper No. 4), page 12. Available at http://archive.esc.vic.gov.au/1999/electric/ConsPap4Resp_abnamro.pdf

⁴ ABN AMRO (1999), page 12.

⁵ Officer, R.R. (1992), "Rates of Return to Shares, Bond Yields and Inflation Rates: An Historical Perspective", as updated for a 1993 Seminar at the University of Melbourne.

⁶ ABN AMRO (1999), page 12.

⁷ S Gray, "Issues in Cost of Capital Estimation", 19 October 2001, available at http://www.esc.vic.gov.au/PDF/2001/SubUQBS_GasPosPapOct01.pdf

⁸ E Dimson, P Marsh and M Staunton (2000), "Risk and Return in the 20th and 21st Centuries", Business Strategy Review, 11(2): pages 1 to 18.

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- 3.31 Furthermore, post-1987 data are biased downwards because the market index used to measure the market risk premium does not capture the average value of imputation tax credits. Professor Robert Officer is of the view that the magnitude of this effect could be as much as 1%.⁹
- 3.32 On the basis of the evidence in Table 1, a market risk premium of 6.0% has been assumed for determination of the rate of return for the DBNGP. (This is consistent with the assumption made by the Regulator in its determination of the rate of return applicable during the Access Arrangement Period of the Original Access Arrangement.)

Equity beta

- 3.33 The betas of business entities with shares which are frequently traded on stock exchanges can be estimated directly from share price data. For entities, like the owners of the DBNGP, which are not listed, betas are usually estimated from the betas of comparable entities with frequently traded shares. In these circumstances, estimation clearly involves issues of judgement and degree (issues which are by no means eliminated when beta is estimated statistically from share market returns).
- 3.34 One of the determinants of beta is business capital structure, or gearing. Gearing varies across countries, industries and firms. In consequence, when the betas of comparable entities are used to estimate the beta of a business for which a WACC is required, adjustments must be made for differences in gearing. The effect of the gearing of a comparable entity is removed by de-levering, and the effect of the gearing of the business for which a WACC is required is introduced by re-levering the de-levered beta. The de-levered beta is often referred to as an asset beta (β_a), and the re-levered beta is referred to as an equity beta (β_e).
- 3.35 The calculation of the WACC for the DBNGP has used the simple de-levering/re-levering formula:

$$\beta_e = \beta_a + (\beta_a - \beta_d) \times D/E.^{10}$$

This formula was used by the Regulator in determining the rates of return proposed in its Draft and Final Decisions for the first DBNGP Access Arrangement.

⁹ *Jardine Fleming Capital Partners Limited, The Equity Risk Premium – An Australian Perspective, Trinity Best Practice Committee, September 2001.*

¹⁰ See Richard A Brealey and Stewart C Myers (1996). *Principles of Corporate Finance*. International edition. McGraw-Hill: New York.

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- 3.36 Use of the simple de-levering/re-levering formula requires estimation of the debt beta (β_d). β_d can, in theory, be estimated by “reverse-engineering” the CAPM:
- $$\beta_d = (K_d - R_f)/(R_m - R_f).$$
- “Reverse engineering”, using the values for K_d , R_f and $(R_m - R_f)$ now proposed for the DBNGP produces a debt beta of 0.20.
- 3.37 Estimates of β_d are usually small and, in practice, a value of zero is sometimes used. Use of a lower value of the debt beta in the simple de-levering/re-levering formula produces a higher equity beta. A value for β_d as low as zero is difficult to justify, and a value of 0.20 is now proposed. This was the value used by the Regulator to calculate the Rate of Return of its Final Decision for the first DBNGP Access Arrangement.
- 3.38 Australian Graduate School of Management estimates of the equity betas for a number of Australian companies which are commonly taken as being comparable to other gas utilities are set out in Table 2. In each case, the asset beta has been calculated using the simple de-levering/re-levering formula and a debt beta of 0.20.

TABLE 2: AGSM EQUITY BETAS DE-LEVERED AND RE-LEVERED

COMPANY	DECEMBER 2003 AGSM EQUITY BETA	GEARING USED TO DE-LEVER EQUITY BETA	ASSET BETA	EQUITY BETA RE-LEVERED - 60% GEARING
AGL	-0.06	38%	0.04	-0.20
APT	0.37	36%	0.31	0.47
Alinta	0.05	65%	0.15	0.07
GasNet	0.30	77%	0.22	0.26
Envestra	0.36	54%	0.27	0.38
Average			0.20	0.20

The de-levered/re-levered betas shown in Table 2 are low relative to the equity betas which have been adopted in recent decisions on regulated access prices. These betas have been close to 1.0, and in some cases they have exceeded 1.0.

- 3.39 In its Draft and Final Decisions for the first DBNGP Access Arrangement, the Regulator proposed an asset beta of 0.60. Using the simple de-levering/re-levering formula, a debt beta of 0.20, and a gearing of 60%, the corresponding equity beta is 1.20.
- 3.40 A similarly high equity beta (1.33) was adopted by the Regulator in its Amended Draft Decision for the Goldfields Gas Pipeline. In that decision, the Regulator noted the recent cautionary approach of other Australian regulators who, when

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confronted with relatively low measured values for beta, and a paucity of empirical data, adopted equity betas of 1.0. Furthermore, the Regulator expressed the view that the major Western Australian gas transmission pipelines may be exposed to a greater level of systematic risk than transmission pipelines and distribution systems in the Eastern States. This was because the Western Australian pipelines served markets with a higher proportion of mining and mineral processing operations.

- 3.41 In these circumstances, retention of the asset beta of the Final Decision for the first DBNGP Access Arrangement – 0.60 – is entirely appropriate.

Gearing

- 3.42 In determining the gearing to be used in estimating a WACC, it is standard practice to examine the observed gearing levels of other businesses in the same industry. There are, however, very few “pure” gas transmission businesses in Australia which can be used as comparators for the DBNGP.
- 3.43 The gearing of Australian energy businesses which have interests in gas pipeline systems (not necessarily transmission systems) are set out in Table 3.

TABLE 3: OBSERVED GEARING OF GAS PIPELINE BUSINESSES

COMPANY	2001	2002	2004	AVERAGE
AGL	46%	40%	29%	38%
APT	54%	56%	51%	54%
Alinta	39%	32%	36%	36%
GasNet	67%	66%	64%	65%
Envestra	81%	78%	72%	77%
Average	57%	54%	50%	54%
Source: <i>Bloomberg</i>				

- 3.44 Of the companies listed in Table 3, only two can be considered “pure” gas transmission businesses. These two are Australian Pipeline Trust (“APT”) and GasNet. The other companies listed in the table either have interests in gas distribution pipeline systems, or are significantly more diversified into business activities regarded as being of higher risk than the provision of gas transmission services.
- 3.45 The averages of the observed gearings of APT and GasNet are 54% and 65%, respectively. The midpoint of this range is, approximately, 60%; it is the gearing

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that has emerged as the regulatory benchmark for regulated gas pipeline businesses.

- 3.46 A gearing of 60% has therefore been used for the rate of return calculation for the DBNGP.

Cost of debt

- 3.47 The cost of debt has been calculated as the risk free rate, plus an appropriate debt margin, plus an allowance for the costs of raising debt.
- 3.48 A critical determinant of the debt margin is the credit rating of the business for which a rate of return is being estimated. Table 4 indicates the published long term credit ratings for a number of Australian energy businesses which have interests in gas pipeline systems.

TABLE 4: CREDIT RATINGS OF ENERGY BUSINESSES

COMPANY	LONG TERM CREDIT RATING
AGL	A
Alinta Ltd	BBB
Envestra	BBB
GasNet Australia	BBB
Source: <i>Standard & Poor's, Industry Report Card, Australian Utilities, 18 October 2004</i>	

- 3.49 In a decision on the Moomba to Sydney Pipeline, the Australian Competition Tribunal considered the evidence presented in Table 4 above, and found that it supported a credit rating of BBB.¹¹ In particular, the Tribunal found that AGL was not within the class of pipeline companies, and should be ignored for the purpose of assessing a credit rating for the Moomba to Sydney Pipeline. On this basis, a credit rating of BBB has been selected for the DBNGP.
- 3.50 Data from the Commonwealth Bank of Australia's Spectrum service ("CBA Spectrum") has been used to estimate the risk premium for debt issued by a business with a BBB credit rating. The average of the CBA Spectrum debt risk premium for BBB rated bonds over the 20 days to 1 December 2004 was 111 basis points.
- 3.51 In addition to the direct costs (represented by the return required by the lender), a business using debt finance incurs transactions costs associated with raising

¹¹ Application by East Australian Pipeline Limited [2004] ACompT 8, paragraphs 54 – 67.

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debt. An allowance of 25 basis points has been made for these debt issuance costs, consistent with the value used by the Australian Competition Tribunal in its GasNet decision.

- 3.52 Taking a debt margin of 111 basis points and adding a margin for debt issuance costs of 25 basis points, yields a gross margin of 136 basis points above the risk free rate.

Taxation: dividend imputation

- 3.53 Under the dividend imputation provisions of the Australian taxation system, domestic equity investors receive a credit – a franking credit – which is attached to any dividends paid out of after-tax company profits. This credit is a component of the return to equity investors, and should be considered in determining the cost of equity for the purpose of establishing a WACC.
- 3.54 The proportion of tax collected at the corporate level which is to be credited against personal tax payments is denoted by γ .
- 3.55 Despite further research in the area, there remains considerable uncertainty around the estimation of γ . More recent research indicates a value closer to zero than earlier estimates, which were above 50%.¹²
- 3.56 A more definitive view on the value of γ will only be formed as more research is undertaken. In these circumstances, a value of γ of 50% has been used in estimation of the rate of return for the DBNGP.

Rate of Return

- 3.57 The calculation of the Rate of Return for the DBNGP, using the methods and parameter values described in section 3 of this submission, is set out in Table 4 of the Proposed Revised Access Arrangement Information.
- 3.58 The calculations supporting the determination of the Rate of Return are presented in the tariff model which forms part of this submission (see section 7).
- 3.59 A pre-tax real weighted average of the costs of equity and debt has been used to calculate the return component of the total revenue for the DBNGP. That pre-tax real WACC is 7.24%.

¹² See, for example, Cannavan, Damien, Frank Finn and Stephen F Gray (2004), "The Value of Dividend Imputation Tax Credits in Australia", *Journal of Financial Economics*, vol 73, no. 1.

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4. Non Capital Costs

- 4.1 On 27 October 2004, the consortium comprising Alcoa of Australia Limited, Alinta Limited, and Diversified Utility and Energy Trust ("DUET") completed its acquisition of the DBNGP by way of an acquisition of shares and units in the relevant entities which are the direct owners of the pipeline.
- 4.2 [Deleted – confidential and commercial in confidence]
- 4.3 [Deleted – confidential and commercial in confidence], most of these services are to be provided by either DBNGP (WA) Nominees Pty Ltd and DBNGP (WA) Transmission Pty Ltd, or by Alinta Network Services Pty Limited ("ANS"). [Deleted – confidential and commercial in confidence], ANS will operate, manage and construct, or procure the operation, management and construction of the DBNGP, and provide some corporate services. [Deleted – confidential and commercial in confidence]
- 4.4 The Non Capital Costs for the Proposed Revised Access Arrangement have been developed from:
- (1) cost estimates [Deleted – confidential and commercial in confidence];
 - (2) adjustments to those estimates now recognised as necessary once transition to the new owners and a company structure has been effected;
 - (3) estimates of pipeline and compressor plant maintenance costs prepared by [Deleted – confidential and commercial in confidence] staff responsible for maintenance of the DBNGP; and
 - (4) estimates of fuel gas costs made by forecasting the quantity of gas used in operating and maintaining the DBNGP, and applying the price at which gas is to be purchased, [Deleted – confidential and commercial in confidence]
- 4.5 [Deleted – confidential and commercial in confidence]

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[DELETED – CONFIDENTIAL AND COMMERCIAL IN CONFIDENCE]

- 4.6 Operator has forecast the Non Capital Costs for the remaining four years of the Access Arrangement Period by:
- (1) escalating the labour component of the recurrent costs for 2005 at a labour escalation rate (discussed below), and the non-labour component at forecast CPI;
 - (2) making year-by-year estimates of each of the items of non recurrent cost.

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Labour rate escalation

- 4.7 Operator has escalated the labour cost portion of Non Capital Costs annually at a the rate of increase in the CPI, plus 2% (that is, Operator has assumed a 2% per annum real increase in labour rates). This assumption has been made in the light of continuing upward pressure on labour rates in the Western Australian resources sector.
- 4.8 Shortage of skilled labour is a critical issue in the resources sector.
- 4.9 In 2003, the State Government had formed a working group comprising representatives from the Department of Education and Training, the Chamber of Minerals and Energy and the Australian Petroleum Production and Exploration Association to address the skills shortage.
- 4.10 A statement issued on the launch a resourced industry employment survey, on 9 December 2003, noted:
- "A shortage of skilled professional workers in Western Australia's booming resources industry is the focus of a new survey released today.*
- Launching the Resources Industry Employment Survey, Education and Training Minister Alan Carpenter said the shortage was one of the biggest issues facing the resources sector."*
- 4.11 A study of the Western Australian resource sector labour market, recently commissioned by the Department of Education and Training, predicts increasing labour demand over the period 2003 to 2007, tightening labour supply and, in consequence, rising wage rates. Within the five sub-sectors within the resource sector examined by the study, labour demand as a proportion of current sector employment was highest in electricity, gas and water at 12.4%, compared with an average of 5.9% for the sector as a whole. The study noted:
- "The impact of the employment demand generated by development projects is proportional to the size of the project workforce and the number of people currently employed in the related industry sector. Strong employment demand will intensify competition to recruit skilled workers, aggravate existing recruitment difficulties and potentially escalate wage rates and inflate incentive payments.*
- Electricity, gas and water projects will have a considerable impact on the sector labour market as the forecast project workforce amounts to 12.4% of current employment in that sector."*¹³

¹³ Western Australian Department of Education and Training. Western Australian Development Projects: Employment Demand and Predicted Skill Requirements 2003 – 2007. Prepared by Argus Research. April 2004.

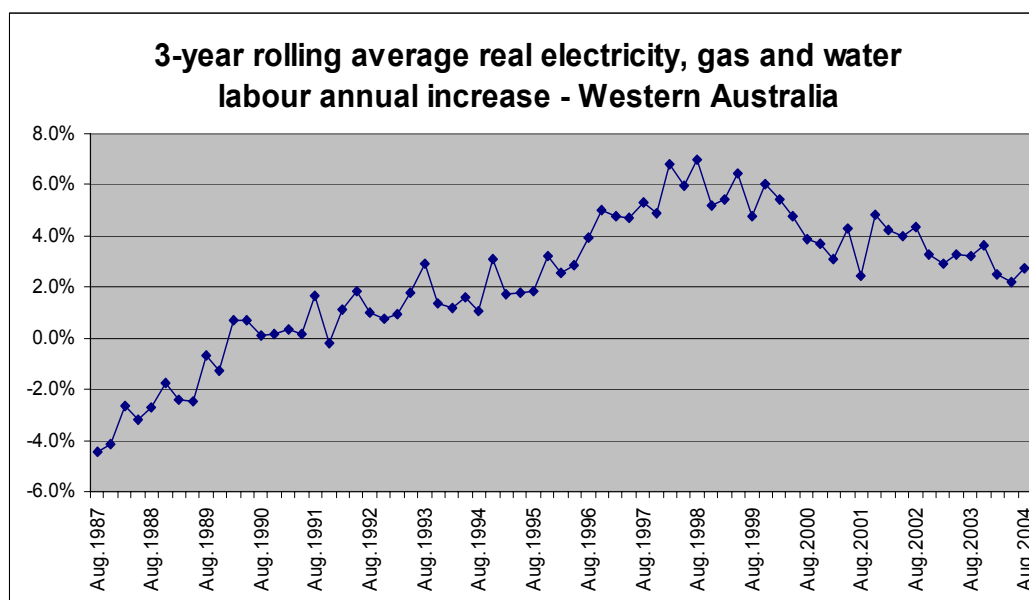
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- 4.12 Over the last ten years, average labour costs have increased by 6.5% per annum (approximately 4.0% real) in the electricity, gas and water sector, as compared with 4.5% per annum (approximately 2.1% real) for all other sectors of the Western Australian economy. Figure 1 shows that since 2000, the 3-year rolling average of real annual increase in the cost of labour in electricity, gas and water in Western Australia has been between 2% and 5%. The current skills shortage in the resources sector is likely to ensure that the trend of real increase in labour rates for electricity, gas and water is likely to continue during the Access Arrangement Period.

Figure 1: Real increase in electricity, gas and water labour rates in Western Australia



- 4.13 Operator has therefore assumed that real labour rates will increase at 3% per annum during the Access Arrangement Period.
- 4.14 The effect of this increase on labour costs may be reduced if Operator can achieve further efficiency gains. The scope for these gains is, however, limited by the fact that one-off post-privatisation efficiencies are likely now to have been achieved. Nevertheless, Operator considers that a 1% per annum efficiency improvement is a reasonable target over the Access Arrangement Period.

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- 4.15 The net impact of a forecast 3% per annum real increase in labour rates, and a forecast 1% per annum efficiency improvement in labour usage, is a forecast 2% per annum real increase in labour-related costs. Operator has therefore applied a 2% per annum real increase in labour rates in estimating Non Capital Costs for the Access Arrangement Period.

Fuel gas

- 4.16 The cost of fuel gas has been estimated from forecasts of:
- (1) the quantity of gas used as compressor fuel; and
 - (2) the quantity of gas used in all other operational activities, including gas used as fuel in gas engine alternators and heaters, gas replacing gas which has leaked from the DBNGP, and gas replacing gas vented during maintenance activities.
- 4.17 [Deleted – confidential and commercial in confidence]
- 4.18 [Deleted – confidential and commercial in confidence]

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4.19 [Deleted – confidential and commercial in confidence]

4.20 [Deleted – confidential and commercial in confidence]

4.21 [Deleted – confidential and commercial in confidence]

4.22 [Deleted – confidential and commercial in confidence]

4.23 [Deleted – confidential and commercial in confidence]

Other Non Capital Costs

4.24 Paragraphs 4.27 to 4.32 of this submission outline particular non capital cost items that the Operator has included in the Total Revenue calculation, and provides justification for the inclusion of these items.

Equity Raising Costs

4.25 The Initial Capital Base of a covered pipeline is a measure of the value of physical assets, and return of that value through depreciation does not compensate a service provider for capital raising expenses. In particular, it does not compensate the service provider for the costs of raising equity which include fees paid to financial institutions for structuring the issue, preparing and distributing information and undertaking presentations to prospective investors.

4.26 For its Final Decision on revisions to the Access Arrangement for GasNet's Victorian transmission system, the ACCC obtained data on the costs of a number of major Australian infrastructure equity issues, most of which were in the electricity and gas industries. The ACCC found that these costs were in the range of 2.1% to 5.77% of total equity raised. Amortised in perpetuity, these figures amounted to between 0.130% and 0.363% of equity raised. The ACCC was of the view that an average of these annual costs represented an appropriate Australian benchmark, and determined that equity raising costs of 0.224% of the value of regulated equity per year should be allowed in GasNet's total revenue. The ACCC noted that US data implied an annualised equity raising cost of 0.48% of regulated equity value – over double that allowed for GasNet.

4.27 Operator has therefore included equity raising costs amounting to 0.224% of regulated equity value in the estimate of Non Capital Costs for next Access Arrangement Period.

Allowance for Asymmetric Risks

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- 4.28 Operator has also included in the estimate of Non Capital Costs an allowance of \$0.2 million (\$ 2005) for the following risks for which it is not otherwise compensated in the Total Revenue determination:
- (1) extortion and bomb threats;
 - (2) insurer credit risk;
 - (3) employment practices risk;
 - (4) key person risk; and
 - (5) uplift liability.
- 4.29 Operator's allowance of \$0.2 million for these asymmetric risks is entirely consistent with the allowance which the Australian Competition Tribunal found to be appropriate in its GasNet decision.¹⁴

Liquidated Damages Insurance

- 4.30 Also included in the Operator's estimates of Non Capital Costs for the Access Arrangement Period are amounts between \$0.7 million and \$3.6 million for liquidated damages insurance. Operator is required to provide this insurance in accordance with clause 16.8(d) of certain existing transportation contracts. This clause requires Operator to insure against the risks of delays in completing pipeline expansions or against Operator's liability for liquidated damages to shippers for failing to provide requested Capacity by the date previously agreed. Insurers have declined to quote on this insurance, and Operator has had to make its own assessment of the cost based on its prior experience with insurance of this type.

Comparisons

- 4.31 Despite the inherent limitations of such an exercise, Operator has sought to benchmark its proposed Non Capital Costs for the DBNGP against equivalent costs for six other Australian gas transmission pipelines. Actual Non Capital Costs for the six pipelines were not available in sufficient detail to enable comparison and Operator used, for this purpose, data for 2004 from proposed access arrangement information submitted to regulators for other covered transmission pipelines.
- 4.32 In making the comparisons, Operator has excluded fuel gas costs from total Non Capital Costs. These costs are specific to particular pipeline configurations and,

¹⁴ Application by GasNet Australia (Operations) Pty Ltd [2003] ACompT 6.

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in a number of instances, fuel gas is provided by shippers rather than by the service provider.

4.33 Operator compared:

- (1) Non Capital Costs (excluding cost of fuel gas) per kilometre per unit of throughput; and
- (2) Non Capital Costs (excluding cost of fuel gas) per kilometre per compressor station.

4.34 On each measure, the DBNGP ranked second lowest among the six pipelines compared, providing assurance that Operator's estimates of Non Capital Costs for the pipeline are reasonable.

4.35 The data for the comparisons, and the calculated benchmarks are presented in Table 8

TABLE 8: BENCHMARKED NON CAPITAL COSTS FOR 2004

		DBNGP ^a	Moomba-Sydney Pipeline ^b	GasNet Pipeline System ^c	Goldfields Gas Pipeline ^b	Moomba-Adelaide Pipeline ^{b,d}	Amadeus-Darwin Pipeline ^b
Inputs							
Gas throughput	PJ	221.0	95.4	224.9	69.0	95.0	16.9
Pipeline length	Km	1,523	1,938	1,434	1,378	1,259	1,513
No. of compressor stations		10	3	3	2	8	1
Non Capital Costs excl. fuel gas	\$m	40.85	24.96	18.56	12.71	15.94	8.75
Benchmarks							
Non Capital Costs excl. fuel gas per km per GJ	\$/km/GJ	128	135	58	134	133	342
Non Capital Costs excl. fuel gas per km per compressor station	\$/km/CS	2,830	4,293	4,314	4,612	1,583	5,785

Notes:

- ^a Proposed Non Capital Costs for 2005 expressed in 2004 dollars.
- ^b Not inclusive of fuel gas because this is provided by shippers.
- ^c Excluding fuel gas costs for Brooklyn compressor station operation to transport gas from Longford to refill Western Underground Storage.
- ^d Gas throughput assumed to be 95 PJ per annum, on the basis that MAPS capacity is fully utilised.

Sources of input data:

MSP: Australian Pipeline Trust Moomba Sydney Pipeline Access Arrangement Information July 2003.

GasNet: ACCC GasNet Australia Access Arrangement Information, 23 December 2003.

GGT: Goldfields Gas Pipeline Access Arrangement Information 15 December 1999.

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MAP: Epic Energy South Australia Pty Ltd Revised Access Arrangement Information for the Moomba to Adelaide Natural Gas Pipeline, 22 January 2002.

ADP: NT Gas Pty Ltd Access Arrangement Information for the Amadeus Basin to Darwin Pipeline February 2002.

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5. Capacity and throughput forecasts

- 5.1 The contracted Full Haul capacity of the pipeline, and the throughput forecasts, are key inputs into the calculation of the Reference Tariff for the DBNGP.
- 5.2 Full Haul is defined in the Proposed Revised Access Arrangement to mean, in relation to a Gas transportation service, a situation where the outlet point is downstream of Compressor Station 9 on the DBNGP, regardless of the location of the inlet point, but does not include Back Haul.
- 5.3 The contracted Full Haul capacity forecast is for the contracted capacity [Deleted – confidential and commercial in confidence] as negotiated by shippers immediately prior to the completion of the purchase of the DBNGP by the consortium comprising Alcoa of Australia Limited, Alinta Limited, and DUET.
- 5.4 The contracted Full Haul capacity forecast supports the requirement for a very substantial expansion of pipeline capacity during the Access Arrangement Period. The forecast New Facilities Investment associated with that expansion is reasonably expected to pass the requirements in section 8.16(a) of the Code when that investment is forecast to occur (Operator will provide the Regulator with a separate submission demonstrating that the forecast New Facilities Investment satisfies the conditions of section 8.16(a)), and has been taken into account in determining the Reference Tariff in accordance with section 8.20.
- 5.5 The corresponding throughput forecast is an input into the calculation of the cost of fuel gas, which comprises between 32 percent and 44 percent of the Non Capital Costs of the DBNGP during the Access Arrangement Period.

Western Australian gas market: demand

- 5.6 Australian Bureau of Agricultural and Resource Economics ("ABARE") estimates indicate that total primary energy consumption in Western Australia is currently 767 PJ per year, of which 369 PJ is natural gas. Roughly 100 PJ of this total is used in the production of oil, gas and LNG. Of the remaining 269 PJ, about 201 PJ, or 75%, is consumed in the South West of the State, in the Perth metropolitan area, the primary market for the DBNGP. An additional 25 PJ is used as feedstock for LPG and ammonia production in the South West.
- 5.7 Western Australia produces over 20 % of the current world supply of alumina, at three refineries operated by Alcoa, and a fourth refinery operated by Worsley Alumina. The three Alcoa refineries are located at Kwinana, Pinjarra and Wagerup, and the Worsley refinery is further south, near Collie.
- 5.8 [Deleted – confidential and commercial in confidence]

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- 5.9 [Deleted – confidential and commercial in confidence].
- 5.10 Most of the base load electricity generation requirement in the South West is supplied by coal-fired power stations, with a smaller quantity coming from cogeneration facilities and, more recently, from Western Power's new combined cycle plant, Cockburn 1. Other standalone gas-fired generators are used for intermediate and peaking service. As the electricity market continues to grow, it is expected that gas will play a larger role in the fuel mix, as both new plants are built and the utilisation of intermediate and peaking existing plants increase, assuming that gas continues to be available at competitive prices.
- 5.11 The gas retail sector includes use by households as well as by commercial and small industrial establishments. Because of the mild climate, consumer preferences, and building practices, use of gas in the residential sector for space heating is very limited. [Deleted – confidential and commercial in confidence]

Western Australian gas market: supply

- 5.12 Gas supply to the DBNGP comes from the gas fields in the Carnarvon Basin in the North West of the State.
- 5.13 Average production and year end reserves for the developed fields and major undeveloped fields are shown in Table 9.

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TABLE 9: WESTERN AUSTRALIAN GAS FIELDS PRODUCTION AND RESERVES - 2003

	AVERAGE PRODUCTION	PROVED RESERVES	PROVED PLUS PROBABLE RESERVES	LIFE AT CURRENT PRODUCTION RATE	OPERATOR
	PJ	PJ	PJ	Years	
Developed areas					
Greater North West Shelf	2,520	20,200	27,500	29.8	Woodside
Harriet area fields	106	404	522	13.5	Apache
East Spar	101	290	384	10.4	Apache
Griffin-Chinook	29	11	25	2.3	BHP
Thevenard/Tubridgi	14	12	16	3.1	Chevron Texaco
Perth Basin fields	22	15	32	4	Various
Other associated gas	17	3	4	0.7	Various
Undeveloped fields					
Greater Gorgon		31,500	41,400		Chevron Texaco
Jansz		5,240	14,800		Exxon Mobil
Scarborough		4,980	6,360		Exxon Mobil
John Brookes		850	1050		Apache
Macedon		380	715		BHP
Other Carnarvon fields		375	626		Apache/others
Browse Basin		17,700	28,400		Woodside/others
Bonaparte Basin		1,350	1,820		Various
Whicher Range		0	0		Amity
Source: <i>Department of Industry and Resources, Western Australia</i>					

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DBNGP gas transportation forecasts

- 5.14 [Deleted – confidential and commercial in confidence]
- 5.15 [Deleted – confidential and commercial in confidence].
- 5.16 [Deleted – confidential and commercial in confidence]

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5.17 [Deleted – confidential and commercial in confidence]

5.18 As mentioned in the Operator's Submission #2, many of the existing shippers for Full Haul capacity on the DBNGP renegotiated their contracts with the Operator and Nominees in October 2004. The terms of these renegotiated contracts extend beyond the end of the Access Arrangement Period.

[Deleted – confidential and commercial in confidence]

5.19 [Deleted – confidential and commercial in confidence].

[Deleted – confidential and commercial in confidence]

5.20 [Deleted – confidential and commercial in confidence].

5.21 [Deleted – confidential and commercial in confidence]

5.22 [Deleted – confidential and commercial in confidence].

5.23 [Deleted – confidential and commercial in confidence].

5.24 [Deleted – confidential and commercial in confidence].

[Deleted – confidential and commercial in confidence]

5.25 [Deleted – confidential and commercial in confidence].

5.26 [Deleted – confidential and commercial in confidence].

5.27 [Deleted – confidential and commercial in confidence]

5.28 [Deleted – confidential and commercial in confidence]

5.29 [Deleted – confidential and commercial in confidence].

5.30 [Deleted – confidential and commercial in confidence]

[Deleted – confidential and commercial in confidence]

5.31 [Deleted – confidential and commercial in confidence]

[Deleted – confidential and commercial in confidence]

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5.32 [Deleted – confidential and commercial in confidence]

[Deleted – confidential and commercial in confidence]

5.33 [Deleted – confidential and commercial in confidence].

5.34 [Deleted – confidential and commercial in confidence].

5.35 [Deleted – confidential and commercial in confidence]

5.36 [Deleted – confidential and commercial in confidence].

5.37 [Deleted – confidential and commercial in confidence]

Market risks

5.38 The forecasts of the contracted capacity and throughput for the DBNGP during the Access Arrangement Period are based on information available at the time the Proposed Revised Access Arrangement was prepared. Actual capacities and volumes may, however, be substantially different due to changes in future general economic and market conditions that may impact gas users and their suppliers. The following are six major uncertainties impacting on the realization of the forecasts:

- (1) the extent and pace of expansion of the alumina and electricity industries;
- (2) outcome of gas versus coal competition in the electricity market;
- (3) the extent and timing of expansion of the DBNGP;
- (4) availability and price of new gas supplies from the Gorgon field or other developments in the North West;
- (5) actual amounts of LPGs in the DBNGP gas stream;
- (6) volume growth in other industries; and
- (7) pipeline bypass.

5.39 [Deleted – confidential and commercial in confidence].

5.40 [Deleted – confidential and commercial in confidence].

5.41 [Deleted – confidential and commercial in confidence].

5.42 [Deleted – confidential and commercial in confidence].

5.43 [Deleted – confidential and commercial in confidence].

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- 5.44 [Deleted – confidential and commercial in confidence]
- 5.45 [Deleted – confidential and commercial in confidence].

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6. Total Revenue and Reference Tariff

- 6.1 When applied to the contracted Full Haul capacity and throughput forecasts for the Access Arrangement Period, the Reference Tariff of the Proposed Revised Access Arrangement yields a forecast of revenue which has a present value equal to the present value of the costs of delivering the Reference Service during that period.
- 6.2 The costs of delivering the Reference Service during the Access Arrangement Period have been determined by subtracting the costs of providing Part Haul Services from the Total Revenue.
- 6.3 The Total Revenue has been calculated using the cost of service methodology described in section 8.4 of the Code, wherein the Total Revenue is equal to the cost of providing all Services calculated on the basis of:
- (1) a return on the value of the capital assets that form the DBNGP or are otherwise used to provide Services;
 - (2) depreciation;
 - (3) the Non Capital Costs incurred in providing all Services.
- 6.4 The Non Capital Costs have been discussed in section 4 of this submission, and they are set out in Table 8 of the Proposed Revised Access Arrangement Information. The Non Capital Costs used in calculating the Total Revenue for the Access Arrangement Period are costs of operating and maintaining the DBNGP during the period 2005 to 2010 expressed in nominal (that is, escalated) terms.
- 6.5 Depreciation has been calculated on the assets comprising the Capital Base at 1 January 2005, that Capital base having been rolled forward from the Initial Capital Base in the manner described in section 2 of this submission. Depreciation has also been calculated on the New facilities Investment forecast to be made during the Access Arrangement Period. In each case depreciation has been calculated using the straight line method applied to the nominal values of the assets in each of four asset groups. Those four asset groups are:
- (1) pipeline assets;
 - (2) compressor station assets;
 - (3) metering assets; and
 - (4) other assets.

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- 6.6 The asset lives assumed for the calculation of depreciation are set out in Table 5 of the Proposed Revised Access Arrangement Information. The Depreciation Schedule itself is set out in Table 6 of the Proposed Revised Access Arrangement Information.
- 6.7 The return on the value of the capital assets that form the DBNGP has been calculated using a pre-tax real rate of return of 7.24%. The determination of that Rate of Return was discussed in section 3 of this submission. To determine the return in each year of the Access Arrangement Period, the pre-tax real rate of return was applied to the nominal value of the assets comprising the DBNGP in each year of the Access Arrangement Period.
- 6.8 The resulting Total Revenue for the Access Arrangement Period is set out in Table 9 of the Proposed Revised Access Arrangement Information.
- 6.9 [Deleted – confidential and commercial in confidence]
- 6.10 A base tariff for the DBNGP at 1 January 2005, escalating at 100% of the annual increase in the CPI in accordance with section 7.11 of the Proposed Revised Access Arrangement, was established. That base tariff was divided into a Capacity Reservation Tariff and a Commodity Tariff so that the Commodity Tariff is expected to recover from Full haul Shippers the cost of fuel gas used in delivering the Reference Service.

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- 6.11 The Capacity Reservation Tariff and the Commodity Tariff together comprise the Reference Tariff of the Proposed Revised Access Arrangement. The base tariff and, by implication, the Reference Tariff, have been set in such a way that when the Reference Tariff is applied to the contracted Full Haul capacity and throughput forecasts, a forecast of revenue is obtained which has a present value equal to the present value of the costs of delivering the Reference Service during the Access Arrangement Period. (In each case the present value is calculated using, as the discount rate, the pre-tax nominal weighted average cost of capital of 9.98% set out in Table 4 of the Proposed Revised Access Arrangement Information.)
- 6.12 In determining the Reference Tariff, the costs of delivering the Reference Service have been allocated to Services provided to Shippers with Full Haul Access Contracts entered into prior to the commencement of the Access Arrangement Period as if those Shippers had been provided with the Reference Service.
- 6.13 [Deleted – confidential and commercial in confidence]

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7. [Deleted – confidential and commercial in confidence]

7.1 [Deleted – confidential and commercial in confidence].

7.2 [Deleted – confidential and commercial in confidence].

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8. Fixed Principles

- 8.1 Clause 7.16 of the Access Arrangement sets out a single reference tariff principle not subject to review:

"The methodology for determination of the Capital Base at the commencement of each year of the Access Arrangement Period as set out in clause 7.3 is a fixed principle in accordance with section 8.47 of the Code."

- 8.2 Operator has retained this Fixed Principle in section 7.13(a)(i) of the Proposed Revised Access Arrangement. Operator has also included two new Fixed Principles, in sections 7.13(a)(ii) and 7.13(a)(iii), to be applied in the application of the Reference Tariff Policy.
- 8.3 There are good economic reasons for the establishment of Fixed Principles that have application beyond a single Access Arrangement Period. Such principles help reduce investment risk by assuring that regulated tariffs are consistently defined over time, and are not subject to inconsistent and after-the-fact adjustment. A reference tariff policy with fixed principles which have this effect is a reference tariff policy designed to not distort investment decisions in pipeline transportation systems, as required by section 8.1(d) of the Code.¹⁵
- 8.4 A reference tariff policy incorporating Fixed Principles which have the effect of assuring that regulated tariffs are consistently defined over time, and are not subject to inconsistent and after-the-fact adjustment, is also consistent with the objectives of sections 8.1(a) and 8.1(b) of the Code. Such Fixed Principles assist in "providing the Service Provider with the opportunity to earn a stream of revenue that covers the efficient costs of delivering the Reference Service over the expected life of the assets used in delivering that Service", and in "replicating the outcome of a competitive market."
- 8.5 In a competitive market, investments in long-lived assets are based on ex ante expectations of future returns, which themselves are based on expectations of demand, costs and other market conditions. There is no a priori reason to believe that the future outcomes will be biased one way or the other. Under regulation, however, there is an inherent asymmetry introduced into these expectations because the possible rates of return that might be earned are attenuated on the upside. The application of Fixed Principles, such as those contemplated under the Code, helps reduce the expectation of investors that ex

¹⁵ The arguments presented in this paragraph, and in the paragraphs which follow, were developed earlier, for Operator's prior owner, by regulatory consultants, The Brattle Group.

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- post modifications to the Reference Tariff will be asymmetric. The result is a regime that more closely mimics a competitive market.
- 8.6 Section 8.48 of the Code elaborates: "a Fixed Principle may include any Structural Element, but in assessing whether a Structural Element may be a Fixed Principle regard must be had to the interests of the Service Provider and the interests of Users and Prospective Users." "Structural Element" (defined in section 10 of the Code) means any principle or methodology that is used in the calculation of a Reference Tariff where that principle or methodology is not a Market Variable Element and has been structured for Reference Tariff making purposes over a longer period than a single Access Arrangement Period, and includes the Depreciation Schedule, the financing structure that is assumed for the purposes of Section 8.30, and that part of the Rate of Return (calculated pursuant to section 8.30) that exceeds the return that could be earned on an asset that does not bear any market risk."
- 8.7 The process envisaged by the Code appears to be: first, determine which elements or methods of Reference Tariff determination are Market Variable Elements. Then, of the remaining elements, assess whether those are Structural Elements and which should be Fixed Principles, having regard to the interests of the Service Provider and Users.
- 8.8 The definition of "Structural Element" in section 10 of the Code clearly indicates that two elements of rate of return determination are Structural. These two elements are the return in excess of the risk-free rate, and the financing structure assumed (that is, the gearing or capital structure).
- 8.9 With respect to the element of the return that is in excess of the risk-free rate, under the CAPM the factors which define that amount include:
- (1) the market risk premium;
 - (2) the equity beta (determined from an asset beta and a debt beta), and
 - (3) gamma, the franking or tax imputation ratio.
- 8.10 It is in the interests of both Operator and Shippers for these components of the estimated rate of return in excess of the risk free rate to be treated as Fixed Principles. If the estimation is done properly, it ensures that the Service Provider is permitted the opportunity to earn a rate of return commensurate with the business risk underlying the investment. Shippers are protected because, if properly estimated, the return is fair, and would be equivalent to what the firm would earn in a competitive market (that is, it does not include monopoly returns).
- 8.11 The definition of "Structural Element" also indicates that the gearing assumed for Rate of Return determination is a Structural Element. That the gearing is a Structural Element, and the subject of a Fixed Principle, is in the interests of

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- Operator and Shippers. Within a reasonable range, the exact gearing should not be a matter of great importance because economic theory and empirical analysis suggests that the cost of capital is relatively insensitive to gearing levels. As is demonstrated in Table 3 of this submission, it is common to observe a wide range of capital structures within a single industry, even when the level of competition is such that one would expect firms with inefficient capital structures to be driven out. Thus, for theoretical and practical reasons, it makes great sense to treat the gearing ratio as a Fixed Principle.
- 8.12 Operator has therefore incorporated, as its second Fixed Principle, the method of determination of the Rate of Return as set out in sections 7.5 and 7.6 of the of the Proposed Revised Access Arrangement, and the elements used in that determination set out in section 7.6(d).
- 8.13 That Fixed Principles help reduce investment risk by assuring that regulated tariffs are consistently defined over time, and are not subject to inconsistent and after-the-fact adjustment, is critically important to the members of the consortium that acquired the DBNGP in October 2004. They are an adjunct to the contracts negotiated with existing shippers prior to completion of the purchase. Like those contracts, they effect the reduction in uncertainty that is essential for pipelines financially, because once an initial investment in a pipeline is made, the physical assets in the ground cannot be easily or economically redeployed to other alternative uses.
- 8.14 Operator has therefore included as a third Fixed Principle in its Proposed Revised Access Arrangement, a principle which has the effect of providing a degree of certainty in the total (regulated and unregulated) revenue stream which provides the return on and return of the financing for pipeline acquisition. This third Fixed Principle, set out in section 7.13(a)(iii) of the Proposed Revised Access Arrangement, precludes revenues earned under contracts negotiated with existing shippers prior to commencement of the Access Arrangement Period from being taken into account directly or indirectly in the setting of a Reference Tariff, or in determining or applying a Reference Tariff Policy which is to apply on or after 1 January 2011.
- 8.15 Section 8.47 of the Code provides that a Fixed Principle is fixed for a defined period. That defined period is the Fixed Period. Consistent with its overall objective of providing a degree of certainty in the total (regulated and unregulated) revenue stream which provides the return on and return of the financing for pipeline acquisition, Operator has, in section 7.13(b) of the Proposed Revised Access Arrangement, set the Fixed Period as the period until 31 December 2031. This was the time horizon of the financial modelling undertaken by the consortium members to determine the price they would pay for the DBNGP.

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9. Efficiency carryover mechanism

- 9.1 Section 8.44 of the Code requires that, wherever the relevant regulator considers appropriate, an access arrangement contain an incentive mechanism that permits the service provider to retain all, or any share of, any returns to the service provider from the sale of the reference service:
- (1) during an Access Arrangement Period, that exceed the level of returns expected for that Access Arrangement Period; or
 - (2) during a period (commencing at the start of an Access Arrangement and including two or more Access Arrangement Periods) approved by the Relevant Regulator, that exceed the level of returns expected for that period.
- 9.2 An incentive mechanism of this type is particularly appropriate where the Relevant Regulator is of the view that the additional returns are attributable (at least in part), to the efforts of the service provider, and may result from, among other things, lower non capital costs or greater sales of services than forecast.
- 9.3 The price path of section 7.11 of the Proposed Revised Access Arrangement is an incentive mechanism. If Operator can increase sales of the Reference Service, or reduce its costs (in particular, its Non Capital Costs), during the Access Arrangement Period its profits will be increased. Those increased profits are retained at least until the Reference Tariff is redetermined at the commencement of the next Access Arrangement Period.
- 9.4 Price path incentive mechanisms generally have two inherent problems:
- (1) a service provider's incentives are skewed towards making additional returns early in an access arrangement period (which it gets to keep for the remainder of that period), and losses later in the access arrangement period, which the regulator may then inappropriately factor into higher costs and higher tariffs during the next access arrangement period; and
 - (2) the incentive effect is relatively weak: the service provider retains the benefits of any additional returns only over the remainder of the current access arrangement period.

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- 9.5 Farrant Consultancy, in a discussion paper prepared for the Regulator, has noted that in a typical regulatory situation, with the service provider retaining the benefits of any additional returns only over the remainder of the current access arrangement period, the service provider's share of the additional returns is a relatively low 19%.¹⁶
- 9.6 Operator has proposed, in sections 7.12(b) and 7.12(c) of the Proposed Revised Access Arrangement, a form of incentive mechanism – an efficiency carryover mechanism – which, at least partially, corrects the problems of the price path identified in paragraph 9.4 above. Operator's proposed efficiency carryover mechanism removes any incentive for Operator to skew the timing of reductions in Non Capital Costs below the benchmarks adopted for the setting of the Reference Tariff, and provides added incentive to make these reductions. The reductions in Non Capital Costs below the regulatory benchmarks are loosely referred to as "efficiency gains". The expression "efficiency losses" is sometimes used where Non Capital Costs rise above the regulatory benchmarks.
- 9.7 In accordance with Operator's proposed efficiency carryover mechanism, efficiency gains made during the Access Arrangement Period are included as an element of the Total Revenue for the purpose of determining the Reference Tariff for the next Access Arrangement Period. They increase the Total Revenue for that next period, and Operator is then "rewarded" with a higher Reference Tariff. If, however, efficiency losses are realized, the efficiency carryover mechanism works, symmetrically, to penalize Operator with a lower Reference Tariff in the next Access Arrangement Period.
- 9.8 The efficiency carryover mechanism proposed by Operator has the following features:
- (1) the mechanism would have effect from the date on which revisions to the Access Arrangement are approved by the Regulator, and the carryovers resulting from efficiency gains/losses made in the period 2005 to 2010, would be included in the Total Revenue for the Access Arrangement Period commencing on 1 January 2011;
 - (2) efficiency gains made by Operator are assumed to be permanent gains, and the efficiency carryover in each year is the incremental improvement in efficiency in that year, over and above the improvements that have been achieved in previous years;
 - (3) Operator is to retain efficiency gains/losses for 10 years regardless of the year in which those gains/losses occur, ensuring that Operator faces the same incentives to deliver efficiency gains throughout the Access Arrangement Period, and providing a sharing of benefits between Operator and shippers in the ratio of approximately 50:50;

¹⁶ Farrant Consultancy, "Incentive Mechanisms for Code Regulated Gas Pipeline Systems". Discussion Paper prepared for the Economic Regulation Authority of Western Australia, March 2004, page 39.

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- (4) efficiency gains/losses in the final year of the Access Arrangement Period are to be set to zero.
- 9.9 The efficiency gains/losses in the final year of the Access Arrangement Period should be set to zero because, at that time, the time at which the Reference Tariff for the next Access Arrangement Period is to be determined, the actual costs for that final year are not likely to be known. In consequence, any efficiency gains/losses which might subsequently be revealed will be reflected in the forecast Non Capital Costs for the next Access Arrangement Period, and will not be reflected in the Reference Tariff for that next period. Permanent efficiency gains/losses in prior years will, however, continue in the next Access Arrangement Period, increasing/lowering the Total Revenue for that period, and increasing/lowering the Reference Tariff. Operator will, therefore, be rewarded/penalised for the efficiency gains/losses made in the last year of the prior Access Arrangement period, even though no explicit allowance is made for those gains/losses in Reference Tariff determination.
- 9.10 Operator is of the view that a proper application of the Code and regulatory precedent clearly support its proposed efficiency carryover mechanism. Similar mechanisms have been approved by regulators in other jurisdictions including:
- (1) GasNet's efficiency carryover mechanism in its access arrangement for the Victorian gas transmission system – approved by the ACCC;
 - (2) efficiency carryover mechanisms for the Envestra, Alinta and TXU gas distribution systems in Victoria – approved by the Victorian Essential Services Commission;
 - (3) efficiency carryover mechanisms for Victorian electricity distribution businesses Citipower, Powercor, Alinta, TXU and AGL – approved by the Essential Services Commission;
 - (4) the efficiency carryover mechanism for the ETSA Utilities electricity distribution system in South Australia (Essential Services Commission of South Australia, Draft Decision).
- 9.11 Operator will face the risk of a negative efficiency carryovers over an extended period if the benchmark Non Capital Costs approved by the Regulator for determination of the Reference Tariff for the Access Arrangement Period, are lower than the Non Capital Costs used to determine the proposed Reference Tariff of the Proposed Revisions to the Access Arrangement. Therefore, Operator proposes only to include the efficiency carryover mechanism in the Access Arrangement for the DBNGP if it is satisfied that it is not exposed to unreasonable negative efficiency carryover risk as a result of any decision concerning Non Capital Costs made by the Regulator.

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10. Approval of Proposed Revised Access Arrangement

- 10.1 In developing the Reference Tariff Policy of the Proposed Revised Access Arrangement, and in applying that policy in the determination of the Reference Tariff, Operator has sought to ensure that the revenue to be generated from the forecast sales of all Services over the Access Arrangement Period (the Total Revenue) is established consistently with the principles of section 8 of the Code, and in accordance with the cost of service methodology described in section 8.4.
- 10.2 This was the purpose of section 7.2 of the Proposed Revised Access Arrangement, and the application of that section has been explained in section 6 of this submission.
- 10.3 In developing the Reference Tariff Policy of the Proposed Revised Access Arrangement, and in applying that policy in the determination of the Reference Tariff, Operator has sought to ensure that, to the extent that the DBNGP is used to provide a number of Services, that portion of Total Revenue that the Reference Tariff is designed to recover is calculated consistently with the principles contained in section 8 of the Code.
- 10.4 This was the purpose of section 7.9 of the Proposed Revised Access Arrangement, and the application of that section has been explained in section 6 of this submission.
- 10.5 In developing the Reference Tariff Policy of the Proposed Revised Access Arrangement, and in applying that policy in the determination of the Reference Tariff, Operator has sought to ensure that the Reference Tariff is designed so that the portion of Total Revenue to be recovered from a Reference Service is recovered from Shippers using of that Reference Service consistently with the principles contained in section 8 of the Code.
- 10.6 This was the purpose of section 7.10 of the Proposed Revised Access Arrangement, and the application of that section has been explained in section 6 of this submission.
- 10.7 In developing the Reference Tariff Policy of the Proposed Revised Access Arrangement, and in applying that policy in the determination of the Reference Tariff, Operator has sought to ensure that the Reference Tariff Policy incorporates incentive mechanisms which are consistent with the principles contained in section 8 of the Code.
- 10.8 This was the purpose of sections 7.11 and 7.12 of the Proposed Revised Access Arrangement. The rationale for their inclusion in the Reference Tariff Policy, and their application, has been explained in section 9 of this submission.

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- 10.9 In developing the Reference Tariff Policy of the Proposed Revised Access Arrangement, and in applying that policy in the determination of the Reference Tariff, Operator has sought to ensure that forecasts required in setting the Reference Tariff represent best estimates arrived at on a reasonable basis.
- 10.10 This was the purpose of section 7.4 of the Proposed Revised Access Arrangement in respect of forecast New Facilities Investment. The justification for these forecasts in accordance with section 8.16 of the Code is to be explained in a further submission to the Regulator.
- 10.11 It was also the purpose of section 7.6 of the Proposed Revised Access Arrangement in respect of the Rate of Return. The forecasting of the Rate of Return has been explained in section 3 of this submission.
- 10.12 It was the purpose of section 7.8 of the Proposed Revised Access Arrangement in respect of the Non Capital Costs. The forecasting of the Non Capital costs has been explained in section 4 of this submission.
- 10.13 The setting of the Reference Tariff also requires the forecasting of contacted Full Haul capacity in the DBNGP, and the associated pipeline throughput, as best estimates arrived at on a reasonable basis. The forecasting of capacity and throughput have been explained in section 5 of this submission.
- 10.14 The pre-conditions to the Regulator's approval of the Proposed Revised Access Arrangement, as set out in section 8.2 of the Code, are, in Operators view, satisfied. The way is open for the Regulator to approve the Proposed Revised Access Arrangement.

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11. [Deleted – confidential and commercial in confidence]

11.1 [Deleted – confidential and commercial in confidence].

11.2 [Deleted – confidential and commercial in confidence].

11.3 [Deleted – confidential and commercial in confidence]