Report on the Determination of Remaining Mine Life and Rate of Return

From 1 July 2004

NSW Rail Access Undertaking

INDEPENDENT PRICING AND REGULATORY TRIBUNAL
of New South Wales

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OF NEW SOUTH WALES

REPORT ON THE DETERMINATION OF REMAINING MINE LIFE AND RATE OF RETURN

NSW RAIL ACCESS UNDERTAKING

From 1 July 2004

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The Tribunal members for this review are:

Dr Michael Keating AC, Chairman
Mr James Cox, CEO and Full Time Member
Ms Cristina Cifuentes, Part Time Member

Inquiries regarding this paper should be directed to:

Adrian Kemp ☎ 02 9290 8459
Sheridan Rapmund ☎ 02 9290 8430

Independent Pricing and Regulatory Tribunal of New South Wales
Level 2, 44 Market Street, Sydney NSW 2000
☎ (02) 9290 8400 Fax (02) 9290 2061
www.ipart.nsw.gov.au
All correspondence to: PO Box Q290, QVB Post Office NSW 1230

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1 INTRODUCTION

The Independent Pricing and Regulatory Tribunal of New South Wales (the Tribunal) has completed its review of the remaining mine life and the rate of return applicable under the NSW Rail Access Undertaking (The Undertaking). Based on this review, the Tribunal has determined the remaining mine life and the rate of return to apply to the Hunter Valley Coal Network from 1 July 2004 for a period of five years.

1.1 Overview of determination

The Tribunal has considered the submissions of stakeholders and the issues raised in the workshop in addition to conducting its own analysis.

The Tribunal has determined that for the purposes of the NSW Rail Access Undertaking:

- The remaining mine life from 1 July 2004 is 35 years.
- The rate of return from 1 July 2004 is 7.3 per cent on a real pre-tax basis.

This will apply to the current Access Undertakings of Australian Rail Track Corporation (ARTC) and RailCorp.

1.2 Structure of report

This report explains the Tribunal's determination, including why it reached its decisions and the process undertaken in reaching those decisions. It is structured as follows:

- Chapter 2 presents background on the NSW Hunter Valley Coal Network and the Rail Access Undertaking and outlines the review and decision-making process the Tribunal used to reach its decisions
- Chapter 3 presents the Tribunal's analysis on remaining mine life
- Chapter 4 presents the Tribunal's analysis on rate of return.

2 TRIBUNAL'S REVIEW AND DECISION-MAKING PROCESS

The Tribunal has made this determination in accordance with the NSW Rail Access Undertaking. The scope of the determination, and the process the Tribunal followed in conducting the review and reaching its decisions are outlined below.

2.1 Scope

Section 3.2(c) (iv) of Schedule 3 of the NSW Rail Access Undertaking (formerly the NSW Rail Access Regime) states:

> The estimate of remaining mine life will be reviewed and if necessary revised every five years from and including 1 July 2004 by IPART or an independent consultant appointed by IPART.

Section 2.1 of Schedule 3 of the NSW Rail Access Undertaking states:

> Rate of Return means a rate of return in percentage terms approved by IPART for a period of five years to be applied to the average of the Opening and Closing Regulatory Asset Base.

The remaining mine life and rate of return determined by the Tribunal are to apply to infrastructure owners of the Hunter Valley Coal Network, specifically Australian Rail Track Corporation (ARTC) and RailCorp.

This determination applies from 1 July 2004 for a period of 5 years.

2.2 Background to the review

In its 1999 review[1] the Tribunal determined the remaining mine life and rate of return to apply to the Hunter Valley Coal Network for the 5 years from 1 July 1999. Since that time there have been a number of changes to the industry.

The Hunter Valley Coal Network is comprised of 37 track sectors as defined by Schedule 6 of the NSW Rail Access Undertaking (Appendix 1). A map of the network is provided as Appendix 2.

When the Tribunal conducted its 1999 review, the ownership of the Hunter Valley Coal Network was vested in the Rail Access Corporation (RAC), which later became the Rail Infrastructure Corporation (RIC).

On 5th September 2004 Australian Rail Track Corporation (ARTC) commenced a 60 year lease from the NSW government of the NSW interstate rail network and the majority of the Hunter Valley coal network. Of the 37 sectors that the Undertaking defines as the Hunter Valley Coal Network and which comprise the current Regulatory Asset Base, ARTC has leased 32 while 5 are now owned by RailCorp.

To coincide with the leasing of the network by ARTC the NSW Rail Access Regime was amended and has become a Rail Access Undertaking.

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1 IPART, *Aspects of the NSW Rail Access Regime - Final Report*, 28 April 1999.

2.3 Tribunal's review process

The Tribunal's review process included undertaking its own research and analysis, and conducting public consultation. As part of this review, the Tribunal:

- invited infrastructure owners and stakeholders to submit their views, and received four written responses (see Appendix 3 for a list of submissions)
- engaged Booz Allen Hamilton (BAH) to prepare an estimate of remaining mine life
- invited stakeholders to comment on the BAH paper and rate of return, and received three written submissions
- held a public workshop on 23 February 2005 and invited the parties who made submissions to discuss relevant issues (see Appendix 3 for a list of participants).

Finally, the Tribunal considered all the information it obtained through its own investigations, submissions and public consultations.

2.4 Decision making

In reaching its decisions, the Tribunal considered the views of access providers, access seekers and end users. The Tribunal took into account the industry's concerns about investment in the Hunter Valley Coal Network in addition to changes in the industry since the Tribunal's 1999 review.

The Tribunal also considered the estimate of remaining mine life prepared for it by Booz Allen Hamilton and its own analysis on the rate of return.

For further information relating to the Tribunal's review, including copies of submissions and the workshop transcript see IPART's website: www.ipart.nsw.gov.au.

3 TRIBUNAL'S ASSESSMENT OF REMAINING MINE LIFE

Section 3.2(c)(iv) of Schedule 3 of the NSW Rail Access Undertaking (formerly the NSW Rail Access Regime) states:

The estimate of remaining mine life will be reviewed and if necessary revised every five years from and including 1 July 2004 by IPART or an independent consultant appointed by IPART.

The Tribunal determined that the remaining mine life from 1 July 2004 is 35 years. This chapter outlines the key findings of the consultancy undertaken by Booz Allen Hamilton to review the mine life. It also outlines the key reasons for the Tribunal's decision.

3.1 Role of remaining mine life

The remaining mine life is used in the Undertaking as a proxy for the remaining useful life of the relevant sectors of the Hunter Valley coal network. Depreciation is calculated on a straight-line basis using this estimate of the useful life of the assets. Consequently a reduction in the remaining mine life has the effect of increasing the annual depreciation that the infrastructure owner is able to recover, albeit over fewer years.

3.2 Background on setting of current remaining mine life

The Rail Access Undertaking prescribes the initial estimate of the remaining mine life as 40 years from 1 July 1999 (Schedule 3, Clause 3.2(c)(iii)). This is based on IPART's Final Report *Aspects of the NSW Rail Access Regime,* dated 28 April 1999. Section 6.6.2 of this report, *The remaining life of Hunter Valley coal mines*, states:

> As noted in section 6.4, RAC's submission states that 30 years is the best estimate of the foreseeable average remaining life of the Hunter Coal mines.
>
> The Minerals Council estimates that 50 years is a more realistic view of the remaining life of the Hunter Valley coal mines…
>
> On balance, and with the limited information presented to it, IPART believes it is reasonable to assume that the average remaining Hunter Valley coal mine life is approximately 40 years.

The report goes on to reiterate "from the information available to it, IPART believes that 40 years, commencing from July 1999, is the most accurate and reasonable estimate of the remaining life of the Hunter Valley coal mines" [2].

In 2000 the Tribunal engaged Booz Allen Hamilton (BAH) to develop a Depreciated Optimised Replacement Cost (DORC) valuation of RIC's Hunter Valley coal network. As part of this process, BAH prepared a draft working paper entitled *Mine life in the Hunter Valley region* (Draft Working Paper No.2, September 2000).

2 IPART, *Aspects of the NSW Rail Access Regime – Final Report*, 1999, p 47.

In that paper BAH presented six alternative methods by which to estimate remaining mine life. The outcomes range from 26.4 to 39.1 years. The option recommended by BAH as the 'preferred methodology for estimating mine life' corresponded to a remaining mine life of 33 years (BAH define this as years remaining after 1999).

3.3 BAH report on remaining mine life

In June 2004 the Tribunal requested BAH to advise and report on the appropriate mine life remaining in the Hunter Valley. The scope of this report differed from the 2000 report in that the Undertaking now defines the Hunter Valley network as consisting of those sectors of track listed in Schedule 6. Therefore BAH considered only mines using these sectors of track as opposed to considering Category 1 and 2 mines – the classification previously used in the Regime at the time of the 2000 report. That said, while the labels have changed, *essentially the same mines are being considered*.

The approach taken by BAH to estimate the remaining mine life is the same as that used in its 2000 report. First, BAH estimates the remaining mine life of each of the relevant mines currently in existence; this was done by dividing the most recent estimate of marketable reserves[3] by current production rates.

Second, BAH uses three methodologies for determining an aggregate remaining mine life across the Hunter Valley. These are:

1. A simple average of individual mine lives.
2. A production weighted average based on the contribution of each mine to actual total production.
3. A full capacity production approach, which assumes all mines produce at their full capacity.

Third, BAH repeats the methodologies above, for the existing mines plus the mines scheduled to come into operation during the five year period over which the mine life is to apply. It was assumed that these new mines would start production half way through the regulatory period.

The outcomes from this review are six options, as presented in Table 3.1 (taken from the BAH report).

[3] Marketable reserves are the tonnages of coal that will be available for sale.

Table 3.1 Remaining mine life as at 1 July 2004

	Option 1 (Unweighted average approach: existing mines only)	**Option 2** (Weighted average approach: existing mines only)	**Option 3** (Full capacity production approach: existing mines only)	**Option 4** (Unweighted average approach: existing and prospect mines)	**Option 5** (Weighted average approach: existing and prospect mines)	**Option 6** (Full capacity production approach: existing and prospect mines)
Remaining mine life	**33.7**	**26.9**	**26.5**	**33.2**	**27.5**	**26.2**

Source: Booz Allen Hamilton report[4].

BAH's recommended approach was the production weighted average (Options 2 and 5). BAH considered that the simple average Options 1 and 4 may exaggerate the future life because a few medium to small mines have long lives. BAH indicated that Options 3 and 6 may underestimate future life as assumed productivity improvements may not eventuate.

The production weighted average in Options 2 (existing mines only) and 5 (existing plus prospective mines) produced similar estimates of remaining mine life.

BAH considers that "an assessment allowing for the inclusion of prospect mines would be more appropriate, as this recognises that mine development will continue within the current regulatory period"[5]. Consequently BAH recommended Option 5 and estimated the remaining mine life to be 27.5 years from 1 July 2004. This is considerably shorter than the implied current regime estimate of 35 years, but is consistent with BAH's 2000 estimate of 33 years, which corresponds to 28 years remaining from 1 July 2004.

Comparison of the two BAH reports indicates that there has not been substantial change in expected remaining mine life in the Hunter region.

BAH's modified report which divided the Hunter Valley network between the two owners recommended a remaining mine life of 27.6 years for ARTC and 26.7 years for RailCorp.

4 The complete Booz Allen Hamilton report is on the Tribunal's website, www.ipart.nsw.gov.au.

5 Booz Allen Hamilton report September 2004, p 16.

3.4 Consultation with Stakeholders

The Tribunal placed the BAH report on the IPART website, at the same time as writing to key stakeholders[6] seeking their views.

In particular, the Tribunal sought comments from stakeholders on:

- the BAH review of remaining mine life
- appropriate mine life and relevant factors for consideration
- whether a common remaining mine life is appropriate for the parts of the Hunter Valley coal network leased by ARTC and the parts of the Hunter Valley coal network owned by RailCorp.

The Tribunal received three written responses on remaining mine life.

The Tribunal then invited the stakeholders that made submissions to participate in a workshop to discuss remaining mine life.

3.5 Stakeholder views on remaining mine life

RailCorp indicated to the Tribunal that it is not seeking a different remaining mine life from that determined by the Tribunal for ARTC. RailCorp also elected not to participate in the roundtable discussion[7]. The submissions received from stakeholders are summarised below.

Table 3.2 Summary of submissions

Stakeholder	Remaining Mine Life	Comments
ARTC	Would not object to prescription of a remaining mine life of up to 35 years	• Supports the use of remaining mine life as basis for depreciation • Lack of information limits ability to estimate remaining mine life.
Pacific National	Believes 35 years represents a reasonable compromise and supports this outcome	• BAH unduly conservative • No indication of any change in the underlying economics of the Hunter Valley region.
NSW Minerals Council	Prepared to accept a continuation of the current remaining mine life of 35 years	• Questions the validity of the concept of a remaining mine life as a basis for determining rail track depreciation • Remaining useful life of Hunter Valley rail network is a more appropriate basis for depreciation • 27.5 years is unrealistically short; evidence suggests 45 years • Prospective mines included but reserves omitted

6 The stakeholders that the Tribunal has previously consulted with on Rail Access are ARTC, RailCorp, Pacific National, NSW Minerals Council, Port Waratah Coal Services, Xstrata, Coal & Allied, Bloomfield Collieries, BHP Billiton and Queensland Rail.

7 A representative of RailCorp was present in the audience during the workshop.

3.6 Tribunal's decision on remaining mine life

All three submissions to the review of remaining mine life demonstrated acceptance of a 35 year remaining mine life from 1 July 2004. This represents maintenance of the status quo; in 1999 the Tribunal determined a 40 year remaining mine life to apply from 1 July 1999.

Stakeholders reiterated this position at the workshop[8]:

> David Marchant, CEO of ARTC "we don't have a problem with the 35 years now"[9].
>
> Paul Bugler, Pacific National "35 years makes good sense…our view is 35 years is a good outcome"[10].
>
> Kenn Clacher, NSW Minerals Council "we are happy to stick with the 35 years"[11].

Given the absence of evidence that suggests material change has occurred in expected remaining mine life and the acceptance of a 35 year remaining mine life by all stakeholders the Tribunal has determined a remaining mine life of 35 years from 1 July 2004 for both infrastructure owners, which is consistent with the remaining mine life currently being used in the Undertaking.

8 The workshop transcript is on the Tribunal's website, www.ipart.nsw.gov.au.
9 Workshop transcript p 4, line 9.
10 Workshop transcript p 4, lines 31-33.
11 Workshop transcript p 4, lines 25-26.

4 RATE OF RETURN

The Tribunal determined that the rate of return from 1 July 2004 for a period of five years is 7.3 per cent on a real pre-tax basis. This chapter outlines the key reasons for the Tribunal's decision.

4.1 Background

The Tribunal is required under Section 2.1 of Schedule 3 of the NSW Rail Access Undertaking to review the rate of return every five years. In its 1999 Final Decision, the Tribunal allowed a maximum rate of return of 8.0 per cent on a real pre-tax basis on rail infrastructure assets for the period from 1 July 1999 to 1 July 2004. Schedule 3, Clause 2.1 of the Undertaking specifies that:

> Rate of return means a rate of return in percentage terms approved by IPART for a period of five years to be applied to the average of the opening and closing regulatory asset base. The rate of return approved by IPART for the period from 1 July 1999 is 8.0 percent on a real, pre-tax basis.

Schedule 3.1 of the NSW Rail Access Undertaking contains a set of principles which the rail infrastructure owner must use in negotiating access prices:

a) Access revenue from every access seeker must at least meet the direct cost imposed by that access seeker. In addition, for any sector or group of sectors, revenue from access seekers together with line sector Community Service Obligations (CSOs) should, as an objective, meet the full incremental cost of those sectors (**floor test**),

b) For any access seeker, or group of access seekers, access revenue must not exceed the full economic cost of the sectors which are required on a stand alone basis for the access seeker or group of access seekers (**ceiling test**), and

c) Total corporation access revenue together with line sector CSOs must not exceed the stand alone full economic cost of the entire NSW rail network.

Part of the allowed access revenue is determined by the rate of return. The rate of return is applied to the regulatory asset base to yield a return on assets. The rate of return, or cost of capital is determined with reference to the weighted average cost of capital (WACC), which is a weighted average of the cost of debt and equity. Regulatory decisions in Australia have generally determined the cost of debt as a margin over the risk free rate, while the cost of equity is calculated using the Capital Asset Pricing Model (CAPM).

The Tribunal's general approach is to calculate a feasible WACC range and then choose a point within this range as the regulatory rate of return.

In a submission to the 1999 review of the Access Regime, the Rail Access Corporation (RAC) proposed that the Regime should specify both a ceiling and average rate of return. The argument utilised was that to achieve an average rate of return equal to the WACC some projects will earn less than the WACC so a few must be allowed to earn more. RAC argued that the combinatorial test precludes returns greater than standalone costs.

In its 1999 decision, the Tribunal decided to determine a maximum rate of return which is a ceiling rate. The final decision was to allow for a real pre-tax maximum rate of return of 8.0 per cent which was derived from the following parameters:

Table 4.1 1999 feasible WACC range

Parameter	Value
Nominal risk free rate	5.4%
Real risk free rate	3.5%
Inflation	1.8%
Market risk premium	5.0-6.0
Debt margin	1.0%
Equity beta	0.70 – 1.0
Asset beta	0.29 – 0.55
Debt beta	0.10 – 0.08
Debt to total assets	60% - 50%
Gamma	0.5 – 0.3
Tax rate	36%
Cost of equity (nominal post tax)	8.90% - 11.39%
WACC (nominal post tax)	5.23% - 6.91%
Nominal pre-tax WACC (market practice method)	8.71% - 10.80%
Real pre-tax WACC (Macquarie method)	5.26% - 7.86%
Real pre-tax WACC (market practice method)	6.27% - 8.84%
Real pre-tax WACC	**5.3% - 8.8%**

4.2 Summary of the Tribunal's decision

The Tribunal has determined a rate of return of 7.3 per cent on a real pre-tax basis for the sectors of the Hunter Valley Coal Network leased by ARTC and owned by RailCorp to apply from 1 July 2004.

The Tribunal considered public submissions and comments made at the workshop held in February 2005. It considers that the discussion at the workshop indicated that the users of the Hunter Valley rail infrastructure are prepared to accept a rate of return that facilitates the necessary investment in the infrastructure. This rate of return is within a range of 7.1 to 7.5 per cent, which also falls within the feasible WACC range computed by the Tribunal and presented in Table 4.2.

The Tribunal is of the view that a rate of return of 7.3 per cent is appropriate for the following reasons:

- The revised WACC range of 5.5 per cent to 8.0 per cent reflects changes in market conditions since the Tribunal's 1999 determination.
- The Tribunal has decided to maintain its practice of setting a rate of return above the mid-point of the range.

- Stakeholders appeared willing to accept a rate of return range of 7.1 to 7.5 per cent at the public workshop.
- A rate of return of 7.3 per cent is the midpoint of this range.

The parameters used to calculate the WACC range are shown in Table 4.2.

Table 4.2 2005 rail access rate of return

Parameter	Value
Nominal risk free rate (27/04/05)	5.5%
Inflation (27/04/05)	2.7%
Real risk free rate (27/04/05)	2.7%
Market risk premium	5.5-6.5
Debt margin	1.13%-1.23%
Debt to total assets	60-50%
Dividend imputation factor (gamma)	0.5-0.3
Tax rate	30%
Equity beta[12]	0.7-1.0
Cost of equity (nominal post-tax)	9.4-12.0%
Cost of debt (nominal pre-tax)	6.6-6.7%
WACC (real pre-tax)	**5.5-8.0%**
WACC mid-point	**6.6%**

Table 4.2 indicates that the use of parameters reflecting current market conditions yields a slightly lower range (5.5 to 8.0 per cent) compared to the range used in the 1999 decision (5.3 to 8.8 per cent). The reduction in the rate of return range[13] can be attributed to:

- A reduction in the statutory tax rate form 36 to 30 per cent.
- An increase in the inflation forecast from 1.8 to 2.7 per cent.

These reductions have been partly offset by:

- An increase in the debt margin from 1.0 per cent in 1999 to 1.13 to 1.23 per cent in 2005.
- An increase in the market risk premium from 5.0 to 6.0 per cent to 5.5 to 6.5 per cent.

12 The Tribunal has directly estimated the equity beta, that is assumed that the equity beta has remained unchanged since the 1999 decision. The implied asset beta range using a debt beta of zero, a cost of debt of 6.7 per cent, a tax rate of 30 per cent and a gamma of 0.4, is 0.32 to 0.46.

13 The range also narrowed because the Tribunal uses only one transformation methodology (market transformation), rather than a combination of the market and reverse transformation as in the 1999 decision.

4.3 Summary of stakeholder views

In conducting this review the Tribunal took into account the views of stakeholders expressed in written submissions to the Tribunal and at the workshop on rate of return held in February 2005.

While ARTC argued in its written submissions that the rate for return should not be different to that of the 1999 decisions, taking into account the changes in the statutory tax rate, the inflation forecast and the debt margin, both Pacific National and the Minerals Council argued for a reduction of the rate of return on the grounds that the systematic risk faced by ARTC relating to the Hunter Valley rail assets has declined since the 1999 decision.

ARTC also argued that it is essential that the rate of return allowable to the infrastructure owner be sufficient to create an environment where efficient investment in network capacity and/or performance is encouraged.

Table 4.3 summarises the written submissions on the rate of return received by the Tribunal.

Table 4.3 Rate of return parameters proposed in stakeholder submissions

Parameter	NSW Minerals Council	Pacific National	ARTC
Nominal risk free rate	5.57%	5.39%	-
Real risk free rate	3.06%	2.74%	-
Inflation	2.43%	2.58%	-
Market risk premium	5.0 – 6.0%	7.0%	6.0 – 8.0%
Debt margin	1.0%	1.2%	-
Equity beta	0.4 – 0.6	0.58 – 0.73	-
Asset beta	0.22 – 0.34	0.30	-
Debt beta	0.10 – 0.08	0.09	-
Debt to total assets	60 - 50%	60 - 50%	50 - 40%
Gamma	0.55 - 0.45	0.5 - 0.3	0.5 - 0.3
Tax rate	30%	30%	30%
Cost of equity (nominal post tax)	7.6 – 9.2%	9.45 - 10.53%	-
WACC (nominal post tax)	5.2 – 6.1%	6.24 – 6.49%	-
Nominal pre-tax WACC (market practice method)	7.4 – 8.8%	8.91- 9.28%	-
Real pre-tax WACC (Macquarie method)	3.9 – 5.2%	-	-
Real pre-tax WACC (market practice method)	4.9 – 6.2%	6.17 – 6.53%	-
Real pre tax WACC	**3.9 – 6.2%**	**6.17 – 6.53%**	**-**
Proposed rate of return	**5.0%**	**6.5%**	**-**

Despite the divergent views expressed in written submissions, there was agreement at the stakeholder workshop that 7.1 per cent to 7.5 per cent on a real pre-tax basis represented an appropriate rate of return range.

At the workshop, ARTC stated that:

> Our present rate of return from shareholders' requirements is about 7.3 to 7.4 real. Our calculations come out somewhere between 7.1 and 7.5 once you take the capex, and resulting debt structuring framework and the corporate tax framework out, but that is based on a 45 per cent debt. In reality regulators would go to 50 per cent, or 55. That changes it by 0.2 per cent. We are obviously looking at a situation where the return comes out somewhere around the real rate of 7.1 to 7.5 because at that point we have enough to be able to actually get the capital and move forward with the bankers taking a risk framework around that[14].

Pacific National commented on ARTC's proposed rate of return range by saying that:

> To our thinking, clearly investment in the rail infrastructure in the Hunter Valley is of paramount importance to every stakeholder. I don't think anybody is dissenting from that, and that would lead PN to the conclusion that where there is an element of doubt, perhaps that should go to the infrastructure owner. We certainly are not keen on an outcome that would inhibit investment and the sort of range that David mentioned before of 7.1 to 7.5 per cent certainly would not be something that we would complain about. Our view is that, as I say, there is in the current environment reason to give benefit of the doubt to the infrastructure owner and ensure the investment takes place rather than put that investment in jeopardy[15].

The Minerals Council commented that:

> As Paul (Pacific National) said, there's no doubt that all players in this issue have a vital interest in investment happening and the council members in particular are the most affected by investment, or lack of it, in this Hunter Valley rail network so that the council's members are keen to get a result that all the players are happy with[16].

Finally, Rio Tinto, a member of the Minerals Council added that:

> …there is a keenness, and I actually believe an expectation, that investment occurs without delay in the Hunter Valley (…) IPART and its work is there to make sure that there is a proper balance between the interests of the access seekers and the access providers. I suppose as well, as far as the industry goes, I am aware the industry is prepared to work through and discuss all matters relating to this and also subsequent ACCC issues in how it all comes together to make sure the interests of both the access seekers and providers are effectively met[17].

4.4 Tribunal's WACC parameter decisions

The following sections discuss the reasons for the Tribunal's decisions on each of the parameters used to calculate the WACC range.

14 Workshop transcript p 35, lines 23-24.
15 Workshop transcript p 39, lines 19-33.
16 Workshop transcript p 44, lines 26-31.
17 Workshop transcript p 45, line 42 – p 46, line 16.

4.4.1 Nominal risk free rate and inflation

The Tribunal has used the nominal and real risk free rates (calculated as the 20-day averages of the ten year Commonwealth Government Bonds and Treasury indexed bonds with similar maturity) to derive inflation for the WACC calculation (using the Fisher equation). The 20 day averages for the nominal and real risk free rate and implied inflation at 27 April 2005 are shown in Table 4.4 below.

Table 4.4 Interest rates and implied inflation calculated at 27 April 2004

	Value (%)*
Nominal risk free rate	5.5
Real risk free rate	2.7
Implied inflation	2.7

* Calculated as the 20 day average of the ten year Commonwealth Government Bond indicator rate as prepared by Lewis Securities Ltd and published daily in the Australian Financial Review and the 20 day average of yields of the 2015 Treasury indexed bond, to 27 April 2005.

4.4.2 Market Risk Premium

The market risk premium (MRP) represents the additional return over the risk free rate of return that an investor requires for the risk of investing in a diversified equity portfolio. In its 1999 decision the Tribunal used a range for the MRP of 5.0 to 6.0 per cent, in acknowledgement of the uncertainty associated with historical studies of the MRP.

The Tribunal's decision is to increase the range of the MRP to 5.5 to 6.5 per cent. The Tribunal has maintained the use of a range for the MRP due to the large variability in observed MRP as estimated for example by the Centre for Research in Finance at the Australian Graduate School of Management[18].

In arriving at this decision the Tribunal had regard to evidence from long term historical MRP studies. Table 4.5 provides a summary of the MRP studies considered.

The data in Table 4.5 indicates that estimates of the market risk premium depend considerably on the underlying methodology used, and the time periods chosen for study, as evidenced by the range of estimates available. The high and low of all the studies in Table 4.5 are 5.8 and 7.9 per cent the mid-point being 6.9 per cent. However, the most recent study conducted by the AGSM indicates that the Australian market risk premium as measured by an arithmetic average including October 1987 is 5.8 per cent.

[18] Centre for Research in Finance, AGSM, *Risk Premium Estimates for Investors in Fully Paid Australian Listed Equity – January 1974 to December 2003*, Report prepared for IPART, 2004.

Table 4.5 Market Risk Premium Studies

Source	Methodology	Period	MRP
AGSM	Arithmetic average, incl. Oct 1987	1974-2003	5.8%
	Arithmetic average, excl. Oct 1987	1974-2003	7.1%
Officer	Arithmetic mean[19]	1882-1987	7.9%
	Arithmetic mean[20]	1882-2001	7.2%
	Arithmetic mean[21]	1946-1991	6.0-6.5%
Hathaway[22]	Arithmetic mean	1882-1991	7.7%
	Arithmetic mean	1947-1991	6.6%
Dimson, Marsh & Staunton[23]	Arithmetic mean	1900-2000	7.6%
Gray[24]	Arithmetic mean	1883-2000	7.3%

4.4.3 Debt margin

The Tribunal's decision on the appropriate level of debt margin is in the range of 1.13 to 1.23 per cent including an allowance of 0.125 per cent for debt raising costs.

The debt margin represents the cost of debt a company has to pay above the nominal risk free rate. The debt margin is related to current market interest rates on corporate bonds, the maturity of debt, the assumed capital structure and the credit rating. The Tribunal has determined the debt margin by:

- Assuming BBB+ to BBB rated corporate debt with a 10 year maturity (to best reflect the expected life over which these assets are expected to generate cash flows).
- Using a 20-day average of yields obtained from CBASpectrum[25].

The 20-day average for BBB+ to BBB rated debt as at 27 April 2005 was 101 to 110 basis points.

19 Officer, R. "Rates of return to shares, bond yields and inflation rates: An historical perspective", in *Share Markets and Portfolio Theory; Readings and Australian Evidence*, 2ed, University of Queensland Press, 1992.

20 Provided by Professor Officer to the Essential Services Commission (Review of Gas Access Arrangements, Final Decision, October 2001). Original information published in Officer, R. "Rates of return to shares, bond yields and inflation rates: An historical perspective", in *Share Markets and Portfolio Theory; Readings and Australian Evidence*, 2ed, University of Queensland Press, 1992.

21 Officer, R. "Rates of return to shares, bond yields and inflation rates: An historical perspective", in *Share Markets and Portfolio Theory; Readings and Australian Evidence*, 2ed, University of Queensland Press, 1992.

22 Hathaway, N. *unpublished manuscript.* "Australian Equity Risk Premium" in *Valuation and the Cost of Capital Under an Imputation Tax System*, Cost of Capital Seminar, Melbourne Business School, University of Melbourne, August 1996.

23 Cited in: E. Dimson, P. Marsh and M. Staunton, *Triumph of the Optimist: 101 years of Global Investment Returns*, Princeton University Press, 2002.

24 Gray, S. "Issues in Cost of Capital Estimation", UQ Business Schools, University of Queensland, 19 October 2001.

25 CBASpectrum is a database service from the Commonwealth Bank of Australia. The database estimates fair yield curves for Australian corporate debt.

In the Tribunal's decisions for electricity network distribution services in 2004 and the AGLGN revised access arrangement, the Tribunal included an allowance for debt raising costs based on reasonable estimates by consultants. This decision reflects market evidence that suggests that long-term investments (other than project finance) of more than five years may be difficult to obtain in the Australian market. This implies that businesses frequently have to refinance their debt and incur costs in doing so.

Allowances for debt raising costs suggested in previous consultancy reports by ABNAmro and Westpac suggest values from 12.5 to 25 basis points. Based on this information and informal discussions with credit risk managers at the Commonwealth Bank, the Tribunal has allowed for a debt raising allowance of 12.5 basis points.

4.4.4 Gearing level

When determining the level of gearing used to calculate WACC, the Tribunal adopts a benchmark capital structure, rather than the actual financing structure, to ensure that customers will not bear the cost associated with an inefficient financing structure.

The Tribunal's decision on the appropriate level of gearing is a range of 50 to 60 per cent. The Tribunal believes that there is no new evidence suggesting that efficient gearing ratios have changed since the 1999 determination.

4.4.5 Dividend imputation factor (gamma)

Under the Australian dividend imputation system, investors receive a tax credit (franking credit) for the company tax paid. This ensures the investor is not taxed twice on their investment returns; once at the company level and once on the personal tax level.

The value of imputation tax credits is represented in the capital asset pricing model (CAPM) by 'gamma'. The rational behind including the value of gamma in the CAPM is that if investors are receiving a tax credit from their investment, they would accept an investment with a lower return than if there were no tax credits attached to this investment. The gamma is an important input in the CAPM as a high value, one for example, would reduce the cost of capital considerably.

The Tribunal's decision is to continue using a gamma range of 0.3 to 0.5 as in its 1999 determination.

In arriving at this decision, the Tribunal had regard to a number of studies where gamma has been estimated[26]. These studies indicate that the gamma value is anywhere between zero and one.

The Tribunal's view is that assuming the marginal investor in Australian equities is domestic, under the *New Business Tax System (Miscellaneous) Act (No. 1) 2000* imputation tax credits should have a value greater than zero. The Tribunal has decided to maintain its current approach to assign some value to gamma by using a range of 0.3 to 0.5. The Tribunal believes that this range reflects both the uncertainty surrounding the value

[26] See for example, Cannavan, Finn & Gray, *The value of dividend imputation tax credits in Australia,* Journal of Financial Economics 73,1,pp 167-197; Bellamy, D and S. Gray (2004). *Using Stock Price Changes to Estimate the Value of Dividend Franking Credits.* Working Paper University of Queensland, Business School; Chu, H., Partington G. *The market value of dividends: evidence from a new method*, working paper, UTS, 2001.

investors attach to imputation tax credits as well as the different franking credit distribution rates of companies.

4.4.6 Tax rate

Consistent with the 1999 determination, and decisions made by the Tribunal in other industries, the Tribunal's decision is to use the statutory tax rate. This has fallen to 30 per cent since the 1999 determination.

4.4.7 Equity beta

The equity beta is a measure of the extent to which the return for a security varies in line with the return of the market as a whole. A business with an equity beta greater than the market average of one would be expected to have a higher rate of return compared with the market average, as it represents a riskier segment of the market. Equally, a business with an equity beta less than one would be expected to have a lower rate of return than the market, as it represents a less risky segment of the market.

Estimating betas empirically requires information on the economic returns to a particular entity (that is, dividends and any returns to capital, and the change in the market value of the asset). This information is available only for entities that are listed on the stock exchange.

ARTC argues that since the Tribunal's 1999 decision, there have been changes in the operation of the Hunter Valley coal supply chain. There is now a more coordinated approach to coal chain management with a view to maximising the efficiency of the coal supply chain as a whole, and this has significantly diminished the ability of any one party (including the infrastructure owner) to influence operations in the region (to maximise its own return), significantly increasing operational and financial risk.

The Minerals Council contends that there have been a number of developments since 1999 that warrant a reduction in the equity beta. These include the adoption and implementation of the unders and overs account; the elimination of the possibility that the value of the Regulatory Asset Base will be reduced through future re-optimisation of the Hunter rail network; the consolidation of ownership of Hunter mining operations into larger internationally based companies with a reduced risk of default on outstanding charges and the lease to ARTC which implicitly recognises that the Hunter rail network will serve a key role in Australia's future transport network and not be stranded at the end of its use for coal exports. Given these factors, the Minerals Council submits that the equity beta range should be reduced to 0.4 to 0.6.

Pacific National also submits that the equity beta should be reduced. This argument is based on a consultancy report prepared by NECG which estimates an asset beta for ARTC on the basis of comparing Rail Infrastructure Corporation's financial accounting performance over the past three years with market returns over the same period.

The Tribunal is not convinced that the changes identified by the Minerals Council warrant a reduction in the equity beta. All of the issues raised are not believed to affect the non-diversifiable risks facing the rail network, and are therefore not appropriately included in the CAPM. The Tribunal has however considered these issues as part of its choice of a rate of return within the WACC range.

The Tribunal has therefore not found sufficient evidence that the risk profile of the Hunter Valley Coal Rail network owner has changed since 1999 and consequently finds no change in the equity beta appropriate. As such a range of 0.7 to 1.0 has been adopted.

4.4.8 Debt beta

The debt beta reflects the risk of a debt security and how it correlates with the market. The debt beta mainly reflects the default risk of debt securities. The relative riskiness of an individual security is reflected in the issuing company's credit rating. The debt beta is in practice unobservable and unmeasurable and is solely used in the equity beta conversion formula.

In its 1999 determination the Tribunal used a debt beta range of 0.08 to 0.10. For this decision, the Tribunal has decided to use a debt beta assumption of zero, consistent with its recent decision for the AGLGN access arrangement review and evidence of market practice contained in independent expert reports[27].

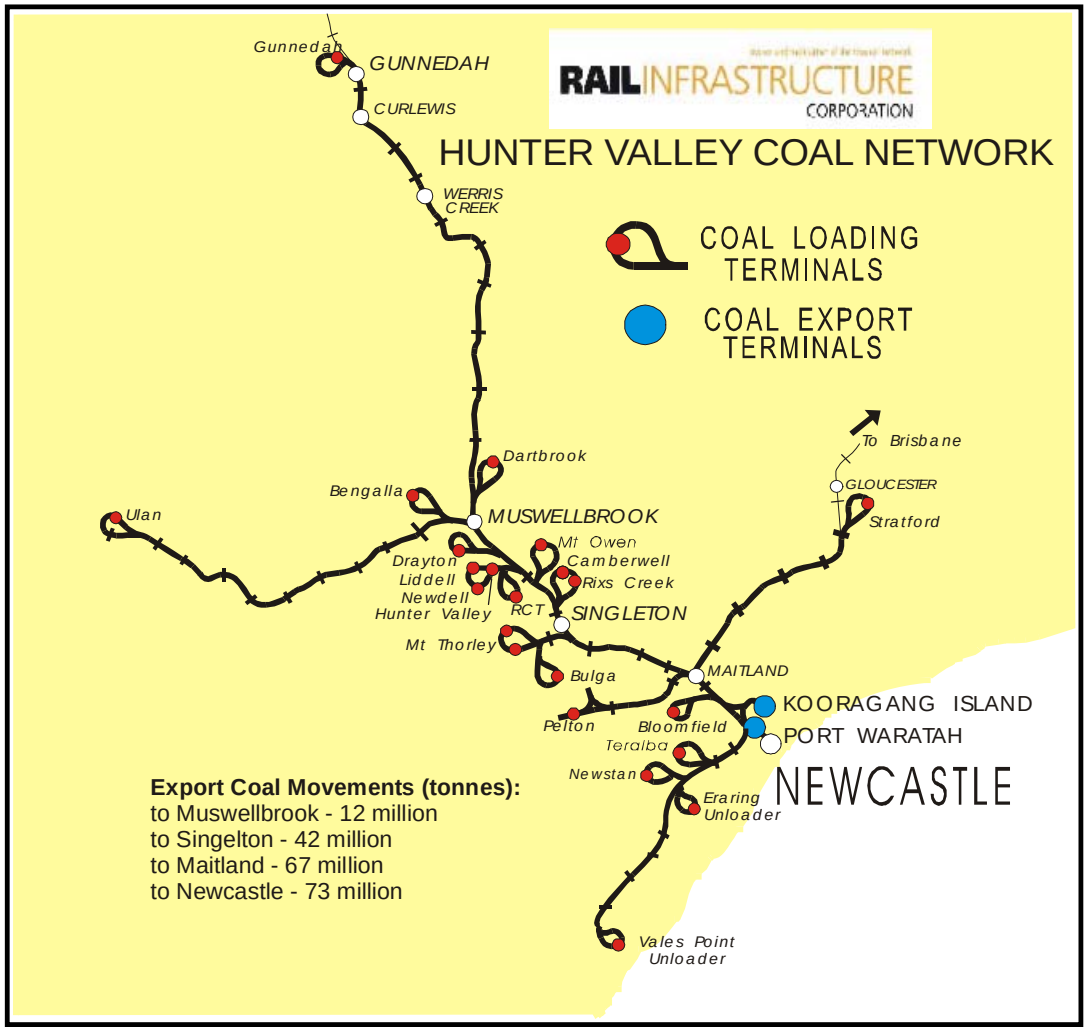
[27] See for example, Grant Samuel, KPMG, Price Waterhouse Coopers, from 2003 to 2005.

APPENDIX 1 HUNTER VALLEY COAL NETWORK

NSW Rail Access Undertaking Schedule 6

SECTOR	ROUTE KM
ARTC Infrastructure	
441 SANDY HOLLOW JCT TO ULAN COLLIERY JCT	103.42
418 CAMBERWELL JUNCTION TO GLENNIES CREEK	6.89
419 GLENNIES CREEK TO NEWDELL JUNCTION	8.59
448 MUSWELLBROOK TO BENGALLA	5.20
449 BENGALLA TO SANDY HOLLOW	37.98
460 TELERAH TO FARLEY	0.50
423 MUSWELLBROOK TO DARTBROOK JCT	7.53
422 DRAYTONS JCT TO MUSWELLBROOK	17.04
421 NEWDELL JCT TO DRAYTONS JCT	9.57
417 WHITTINGHAM TO CAMBERWELL JCT	12.66
428 BRANXTON TO WHITTINGHAM	18.57
416 FARLEY TO BRANXTON	21.59
415 MAITLAND TO FARLEY	1.29
510 THORNTON TO MAITLAND (VIA COAL)	10.40
509 SANDGATE TO THORNTON (VIA COAL)	12.33
504 HANBURY JCT TO SANDGATE (VIA COAL)	1.64
503 WARATAH TO HANBURY JCT (VIA COAL)	2.26
502 SCHOLEY ST JCT TO WARATAH (VIA COAL)	1.40
411 ISLINGTON JCT TO WARATAH	1.50
410 WOODVILLE JCT TO ISLINGTON JCT	0.87
500 ISLINGTON JCT TO SCHOLEY ST JCT	0.49
501 SCHOLEY ST JCT TO PORT WARATAH	4.94
506 KOORAGANG EAST JCT TO SANDGATE	0.87
505 HANBURY JCT TO KOORAGANG EAST JCT	1.11
507 KOORAGANG EAST JCT TO KOORAGANG ISLAND	9.20
532 WHITTINGHAM TO SAXONVALE JCT	7.97
534 SAXONVALE JCT TO MOUNT THORLEY	4.97
536 NEWDELL BRANCH	2.66
457 DUNGOG TO CRAVEN	46.54
456 MARTINS CREEK TO DUNGOG	26.70
451 TELERAH TO MARTINS CREEK	23.60
450 MAITLAND TO TELARAH	2.16
RailCorp Infrastructure	
497 BROADMEADOW TO WOODVILLE JCT	0.85
407 ADAMSTOWN TO BROADMEADOW (VIA MAIN)	1.60
490 SULPHIDE JCT TO ADAMSTOWN	8.05
406 COCKLE CREEK TO SULPHIDE JCT	3.15
405 NEWSTAN JCT TO COCKLE CREEK	7.18

APPENDIX 2 MAP OF HUNTER VALLEY COAL NETWORK



APPENDIX 3 LIST OF SUBMISSIONS AND WORKSHOP PARTICIPANTS

The Tribunal received submissions from the following organisations:

Australian Rail Track Corporation
NSW Minerals Council
Pacific National
RailCorp

The participants at the workshop on 23 February 2005 were:

Australian Rail Track Corporation
Booz Allen Hamilton
NSW Minerals Council
Pacific National

Also attending the workshop was:

RailCorp

APPENDIX 4 ABBREVIATIONS USED IN THIS REPORT

ARTC	Australian Rail Track Corporation
BAH	Booz Allen Hamilton
DORC	Depreciated Optimised Replacement Cost
MRP	Market Risk Premium
RAB	Regulatory Asset Base
RAC	Rail Access Corporation
RIC	Rail Infrastructure Corporation (formerly RAC)
WACC	Weighted Average Cost of Capital