17 December 2007

Mr Lyndon Rowe
Chairman
Economic Regulation Authority
PO Box 8469
Perth Business Centre
Western Australia 6849

Attention: Mr Russell Dumas
Director – Gas and Rail Access

By email to: russell.dumas@era.wa.gov.au

Dear Mr Rowe Lyndon

**Australian Pipeline Industry Association – Response to the Allen Consulting Group
Report "Railways (Access) Code 2000: Weighted Average Cost of Capital".**

The Australian Pipeline Industry Association (APIA) welcomes the opportunity to
comment on the October 2007 report by the Allen Consulting Group, "Railways
(Access) Code 2000: Weighted Average Cost of Capital" (the Report). APIA
understands that the Report is to be a major input to the ERA's 2008 review of the
regulated rates of return for Western Australian railway infrastructure.

While the findings of the Report and this rail infrastructure regulatory process do
not immediately affect APIA members directly, issues related to the rate of return
are of broader concern to regulated infrastructure industries, including the pipeline
industry that APIA represents. It is also noted that the Authority has indicated
that the Report is likely to be of interest to stakeholders involved in the gas access
regimes.

APIA's submission is attached.

Yours sincerely

CHERYL CARTWRIGHT
Chief Executive

The Australian Pipeline Industry Association Response to the Allen Consulting Group Report "Railways (Access) Code 2000: Weighted Average Cost of Capital" October 2007.

Introduction

The Australian Pipeline Industry Association (APIA) welcomes the opportunity to comment on the October 2007 report by the Allen Consulting Group (ACG) "Railways (Access) Code 2000: Weighted Average Cost of Capital" (the Report). The Railways (Access) Code 2000 (Schedule 4, clause 3) requires the Economic Regulation Authority (the Authority) to determine the Weighted Average Cost of Capital (WACC) for both urban and freight railway infrastructure each year and to conduct reviews at five-yearly intervals from 2003. APIA understands that the Report is to be a major input to the Authority's 2008 review of the regulated rates of return for Western Australian railway infrastructure.

While the findings of the Report and this rail infrastructure regulatory process do not immediately affect APIA members directly, issues related to the rate of return are of broader concern to regulated infrastructure industries, including the pipeline industry that APIA represents. It is also noted that the Authority has indicated that the Report is likely to be of interest to stakeholders involved in the gas access regimes. On that basis, APIA is particularly concerned that:

- general rate of return principles and methodologies may be established in the current process and then inappropriately transferred to regulatory processes involving pipelines; and
- specific rate of return calculation input variables may be established in the current process and then inappropriately transferred to the regulatory processes involving pipelines.

Given that the Authority also regulates pipelines in Western Australia, these concerns are certainly relevant. Please note that APIA's comments are directed more at matters of principle, than at the specifics of the determination for Western Australian railway infrastructure.

Comment on General Principles

Uncertainty in Determining Regulated Rates of Return

Using a CAPM-based WACC approach to estimate a rate of return involves a high degree of imprecision, due to the numerous assumptions involved. The result of applying the approach should be a range of reasonable outcomes. This has been previously recognised by the Authority where, in relation to gas pipeline rate of return decisions in various access arrangements, a reasonable range has been determined for the rate of return and a point estimate for the rate of return has been selected based on regulatory judgement[1]. APIA believes this approach is preferable to an approach in

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[1] For example Economic Regulation Authority, 2005, *Final Decision on the Proposed Access Arrangement for the Goldfields Gas Pipeline,* page 66.

which a rate of return is mechanically derived from theoretical models without consideration of:

- the reasonableness of the resulting cost of equity and debt;
- the risk that the models do not properly compensate investors for all risks relating to the investment in regulated infrastructure; and
- the consequential effect the determination will have on investment levels.

General Level of Regulated Rates of Return

APIA has concerns that lower rates of return and resultant lower prices are seen as inherently desirable by regulators as lower prices are more readily understood by, and communicated to, users and other stakeholders. However, a focus by regulators on infrastructure price reductions, without sufficient consideration of the long-term consequences of these actions, creates a real risk of a degradation of infrastructure, which would ultimately be to the detriment of users.

The regulatory judgement exercised by the Authority must have regard to the policy objectives of the regulation. Generally, infrastructure regulation is imposed in order to promote efficient infrastructure pricing and efficient infrastructure investment for the benefit of users and the community. This policy objective can only be met if there is an efficient and continuing level of investment in the infrastructure in question. Such investment will only occur if rates of return are sufficient to support investment in maintenance, as well as new and replacement assets. Moreover, rates of return must provide infrastructure investors with an opportunity to recover a reasonable return on their investment.

A rate of return chosen from the lower end of the range is likely to deter investment and it should be noted that underinvestment in the maintenance, augmentation and economic expansion of infrastructure cannot easily be reversed. It is important that the consequences of underestimating the rate of return are considered, given the uncertainty involved in calculating the WACC.

Application to Other Industries

APIA is concerned that the Authority may adopt the outcomes of this railway infrastructure review as a basis for future reviews in other industries, including gas pipelines, as part of the processes for revisions to access arrangements. There are several reasons why transferring such outcomes may be problematic. These include:

- There are likely to be fundamental operational, market, financing and economic differences between the railway infrastructure industry and other infrastructure industries, such as the pipeline industry. Any rate of return decision by the Authority must take into account the attributes and unique features and risks of each industry; and
- Regardless of differences between the railway infrastructure industry and other infrastructure industries, any rate of return decision for infrastructure return must be determined in the context of the legislative regime for that industry.

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However, there are certain principles associated with the determination of cost of capital that may be appropriate to apply uniformly across industries, such as:

- principles relating to CAPM and WACC methodology, such as the need to consider a range of rate of return outcomes;
- bond rate analysis, and inflation analysis and forecasting;
- debt margin methodology; and
- market risk premium methodology and calculation.

While some principles may be transferable, caution must be exercised before applying outcomes of a review of the cost of capital for railway businesses to other industries.

Comment on Methodologies and Parameters

The Real Risk Free Rate of Return and Inflation

The Report[2] notes that there are two methods of adjusting for inflation; of these, the indexation-method is favoured. Under this approach, the regulatory asset base and revenues are escalated for actual inflation and a real WACC is used.

APIA can see no reason why one particular method should be used over another, but in either case the estimate of inflation must be robust.

The Report[3] notes that "recent capital market evidence suggests that a bias may exist in using observed yields on real government bonds to derive the real risk free rate and, hence, the forecast rate of inflation ordinarily derived through the Fisher equation". As a consequence, the Report proposes that in order to derive forecast inflation and a real risk free rate the following steps should be taken:

- derive the nominal risk free rate from ten-year nominal government bonds;
- use regulatory judgement to establish a forecast of inflation from other sources; and
- use the Fisher equation to derive the real risk free rate.

APIA offers qualified support for this approach. While the approach recognises the relative bias in the Commonwealth Government Securities (CGS) market, APIA has concerns that it involves a high level of regulatory judgement to establish a forecast of inflation and does not recognise the absolute bias in this market[4].

Inflation forecast

The Report does not go so far as to recommend 3 per cent as a suitable forecast of inflation, however, it does note that this value has been used by the AER and by the ESCV in its draft decision for the Victorian Gas Access Arrangement Review

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[2] ACG, page 7.
[3] ACG, page 12.
[4] This issue has been raised previously with regulators. See for example the Powerlink 30 March 2007 Submission to the Powerlink Revenue Cap which discusses absolute bias in nominal bond yields

(GAAR). Both NERA[5] and CECG[6] have since tested the validity of the 3 per cent forecast. Both NERA and CECG demonstrated that this value was incorrect and a more appropriate estimate of inflation for the purposes of deriving the real risk free rate is 2.5 per cent to 2.6 per cent.

CECG was requested by the Victorian gas distribution businesses to review the ESCV's methodology for calculating the real expected yield from nominal Commonwealth Government bonds. CECG concluded that the methodology is appropriate for determining the real risk free rate, provided the correct nominal risk free rate has been identified. However, CECG found that the practical implementation of this methodology is flawed in three important ways:

- The ESCV's methodology attempts to estimate the average inflation rate over ten years by only having regard to short-term forecasts (2 years) of CPI;
- The ESCV's selection of forecasts detailed in table 10.4 in its draft decision for the Victorian Gas Access Arrangement Review is not representative of all credible forecasts and one of the forecasts that is included is clearly not credible as a forecast of investor expectations (namely the Melbourne Institute Survey of Consumer Inflationary Expectations); and
- The ESCV appears to make an error in its attribution of a 3.08 per cent forecast of inflation to KPMG.

Similarly NERA was requested by APIA, ENA and ETNOF to review the ESCV's methodology for estimating the real risk free rate. Consistent with the advice of CECG, NERA concluded that the 'methodology adopted by the ESC when estimating the real risk free rate is an acceptable alternative, assuming there is no underlying bias in the nominal risk free rate'[7]. NERA's findings were consistent with CECG – NERA noted that there are a "number of shortcomings with the 3 per cent inflation rate forecast utilised by the ESCV to estimate the ten-year real risk free rate".

NERA's concerns stem from:

- the ESCV's draft decision to use a two-year inflation rate forecast horizon when deriving an effective ten-year real risk free rate;
- the emphasis the ESCV has placed on the upper bound of the Reserve Bank of Australia's inflation target band when selecting the 3 per cent inflation rate forecast; and
- the composition and size of the inflation rate forecast sample set developed by the ESCV for the purposes of identifying the "market-based expectations of inflation".

Both the CECG and NERA analyses correct for the errors made by the ESCV in the GAAR Draft Decision. Based on their analyses CECG and NERA respectively conclude:

In my view, the mean of a comprehensive sample of professional forecasts is the best estimate of financier's [sic] expectations of inflation. Having regard to the evidence

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[5] NERA, ESC Draft Decision: Inflation Expectations, October 2007.
[6] CECG, A methodology for estimating expected inflation, October 2007.
[7] NERA, page i.

> *presented in this statement it is my view that 2.5% is the best estimate of expected inflation over a ten year period and is consistent with the requirements of Section 8.30 and section 8.2(e) of the Gas Code.*[8]

and:

> *An inflation rate estimate of between 2.5% to 2.6% would accord with the current market expectations of the inflation rate that is expected to prevail over the next ten years and is consistent with the views of both the RBA and the Commonwealth Treasury*[9].

APIA considers that an inflation forecast of 3 per cent is not based on the best available information and should be rejected. Further, there is compelling evidence that a ten-year forecast of inflation, which is consistent with the use of the ten-year bond rate, is within the range of 2.5 per cent to 2.6 per cent, which is more in line with the RBA's mid point.

Absolute Bias

As previously mentioned, APIA has concerns regarding the approach to estimating the risk free rate proposed by ACG as it does not recognise the absolute bias in the CGS market. The absolute bias (attributable to a uniqueness premium in the yields on nominal CGS) was recognised by NERA[10] and further quantified by the NERA report's author, who has since established the consulting firm CECG. CECG[11] have updated research on the absolute bias for the latest market data. CECG estimate conservatively that the bias in estimates of the nominal risk free rate is currently 76 basis points (bp). However, if the long-term position (as represented by the premium as measured in 2003 of 39 bp) is deducted to estimate the movement since then, the current absolute bias not included in the market risk premium (MRP) is estimated at 37 bp.

CECG's final conclusion is that an upward adjustment for 37 bp for the absolute bias found in yields on nominal CGS should be made to the nominal CGS yields to remove the bias that would otherwise accrue to the estimate of the risk free rate.

On the basis of the evidence, APIA considers that the estimation of the real risk free rate should take into account the relative and absolute biases in the CGS market and if the Fisher transformation is used to derive the real risk free rate, an appropriate inflation forecast must be used. APIA therefore recommends the following approach to derive a real risk free rate:

- derive the nominal risk free rate from ten-year nominal government bonds with an adjustment of 37 bp for the absolute bias;
- use regulatory judgement to establish a forecast rate of inflation aligned to the period over which the risk free bond is relevant, ie ten years. The best

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[8] CECG, page 17.
[9] NERA, page 14
[10] NERA, Absolute Bias in (Nominal) Commonwealth Government Securities, June 2007.
[11] CECG, Choosing a Proxy for the Nominal Risk Free Rate, October 2007.

available information indicates that the forecast ten-year inflation rate is currently 2.5 per cent to 2.6 per cent; and

- use the Fisher equation to derive the real risk free rate.

Debt Margin

APIA notes that the Report[12] has estimated the debt margin from 'fair value yields' from CBA Spectrum and Bloomberg, comparing these to yields of actual corporate securities. There has recently been a distinct increase in the cost of debt over the yield on CGS. This instability in the corporate bond market has reduced the predictive power of the methodologies that are based on historic data. Consequently, a degree of conservatism may be required when setting the debt margin.

Market Risk Premium (MRP)

The Report's point estimate of MRP of 6 per cent is within a reasonable range of MRP values; however APIA has serious concerns that this has been represented by the Report as the upper limit of MRP values rather than the lower limit of MRP values. The Report has reached its position after having regard to evidence from:

- Capital Research13 and the South Australian Centre for Economic Studies14 (SACES)
- Brailsford et al15
- Gray and Officer16
- Future expectations from AMP[17].

While the Report has noted that Gray and Officer have disputed the findings of Capital Research and SACES, they have omitted the fact that the work of Gray and Officer has demonstrated major methodological flaws in these two reports. The two reports have made *ad hoc* adjustments to historical data for unanticipated events. This approach has been demonstrated by Gray and Officer to be incorrect as the unanticipated events are the reason that the market risk premium exists. The unadjusted data sets used by Capital Research and SACES indicate a historical MRP of 6.4 per cent to 7.7 per cent. For this reason, APIA considers that the work of Capital Research and SACES should either be rejected, or accepted as amended by Gray and Officer.

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[12] ACG, page 21.

[13] Capital Research Ltd (2005), Australian Market Risk Premium, January, Submission to the ESC Victoria in response to the Position Paper issued in relation to the 2005 electricity distribution price review.

[14] South Australian Centre for Economic Studies (SACES) 2005, The Market Risk Premium for Australian Regulatory Decisions, April 2005.

[15] Brailsford, T., J. Handley, and K. Maheswaran 2006, A re-examination of the historical equity risk premium in Australia, 1 August. Working Paper, UQ Business School, and Department of Finance, University of Melbourne.

[16] Gray, S and Officer, R.R. 2005, A review of the market risk premium and commentary on two recent papers, A report prepared for the Energy Networks Association, August 2005.

[17] AMP 2006, The equity risk premium – is it enough? Oliver's insights, AMP Capital Investors, Edition 13, May 2006.

Further the Report has relied on the findings of Brailsford *et al*, claiming that this evidence demonstrates that when using the geometric average approach the MRP is in the range of 3.8 per cent to 6 per cent and the arithmetic average returns are in the range of 5.1 per cent to 7.3 per cent[18].

APIA has reviewed the evidence from Brailsford *et al* and is concerned that the Report has presented both the arithmetic and geometric average MRP results. The conclusions of Brailsford *et al* are quite clear and are contrary to the values in the Report:

> "Relative to bonds (bills), the equity premium has averaged 6.3 per cent (6.8 per cent pa over 1958-2005, which is a period of relatively good data quality."[19]

Subject to the comments immediately below, APIA believes that the Brailsford *et al* MRP should be 6.3 per cent relative to bonds.

APIA considers that the Report has inappropriately placed weight on forward-looking MRP estimates derived from sources with vested interests. Forward-looking MRP estimates are not robust, both in terms of their wide range of estimation error and their potential for bias. Results from surveying market practitioners have little analytical basis and may be biased towards lower estimates. APIA does not consider that views of those with a vested interest in a lower MRP should be given weight in determining an MRP for regulatory purposes.

While there are various methodologies available to estimate the MRP, there is a strong basis for relying on long-term historic averages as set out by KPMG[20]. KPMG demonstrates that evidence based on the historical MRP in Australia provides support for an MRP in the range of 6 per cent to 8 per cent[21].

APIA believes that there is a strong argument that the Australian MRP range is from 6 per cent to 8 per cent. While 6 per cent as recommended by the Report lies within a range of reasonable values, it needs to be recognised that it is in fact the lower end of the range, not the upper, as proposed by the Report.

Equity Beta

APIA agrees with the Report[22] that beta values are specific to the nature of the regulated business or activity and as such regulatory decisions on beta values in one industry have little value as precedent in another regulated industry.

It should be recognised that in the CAPM approach being used, the beta should be an expected (ie forward-looking) beta. As this beta is not observable, practitioners use historic betas as proxies for expected betas. Historical betas are estimated by

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[18] ACG page 25.

[19] Brailsford et al, Abstract.

[20] KPMG, 2008 Gas Access Arrangement Review - Weighted Average Cost of Capital, March 2007, pages 22-24.

[21] Ibid page 25.

[22] ACG page 30.

calculating the covariance of returns on an asset and the market, divided by the variance of the market[23]. This raises concerns as:

- the beta is based on historical data and therefore may be influenced by historical factors which are not relevant to cost of capital expectations for the asset under consideration. For example, a beta estimated on historical data may not reflect the expected beta.
- the beta is based on comparator company data and therefore may be influenced by company specific factors which are not relevant to cost of capital expectations for the asset under consideration.

Despite the difficulties in estimating the beta, the Report has made a recommendation based on its own analysis for lower equity betas than previously for railway infrastructure. (APIA acknowledges that the Report recommends a higher asset beta for freight rail infrastructure, which then becomes a lower equity beta due to financing adjustments.) While the systematic risk for railway infrastructure is not comparable to that for pipeline and energy infrastructure, APIA cautions the Authority against making any significant changes to the equity beta solely in reliance on the analysis of a single report. The experience of the gas distribution industry in Victoria demonstrates the dangers of relying on a single report when considering complex variables such as equity beta. Attachment 1 provides an overview of this experience.

In summary there were significant differences between the ESCV's adviser, ACG, and other experts in the Victorian gas review, and on the basis that ACG's work for the Authority may be open to similar disagreement, APIA urges the Authority to consider a broader range of evidence than that provided by ACG.

Thus, while the details of the equity beta calculation may not be immediately relevant, reliance on a single adviser may be problematic if the adviser does not have all available information, or otherwise arrives at a decision that is not reasonable.

Selection of Comparator Firms

Many of the financial market inputs used in calculating rates of return are based on the selection of comparator firms. APIA has concerns about:

- the adequacy of the sample size of Australian comparator firms for infrastructure (given the relatively small number of true comparators in the market); and
- the appropriateness of using international firms as comparators.

Overall, great care should be taken in selecting comparators.

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[23] A beta calculated in this way would reflect a geared beta and therefore would reflect financial risk to equity holders associated with the company's gearing.

Conclusion

APIA suggests that specific rate of return calculation input variables must be estimated after considering the best available information, rather than the views of one consultant.

APIA is concerned that the Authority may adopt the outcomes of this railway infrastructure review as a basis for future reviews in other industries, including gas pipelines. Transferring rate of return outcomes should be undertaken with great care, as there are fundamental operational, market, financing and economic differences between the railway infrastructure industry and other infrastructure industries, and any rate of return decision by the Authority must take into account the attributes and unique features and risks of each industry.

Attachment 1: ACG and Equity Beta – Victorian Gas Distribution Experience

In the gas distribution review currently in progress in Victoria, ACG presented evidence to the ESCV suggesting that the average equity beta estimates for a set of comparable Australian entities has changed over time. The ESC, in its draft decision, proposed that the equity beta for the gas distribution businesses be 0.7 instead of the well-established value of 1.0. This radical reduction in the equity beta resulted in a significant body of work being developed with the assistance of NERA[24], CECG and SFG. This work demonstrates that the ACG analysis was not based on best estimates and should be rejected. The conclusion is that the value of 1.0 should be retained.

NERA investigated the structure of securities used by ACG for their set of comparables and reviewed the US evidence on equity betas and return on equity.

In its review of the structure of the comparables used by ACG, NERA found that a number of the securities are hybrid securities consisting of both debt and equity. A number are trusts with capital distributions, some with untaxed distributions. Other comparables have been the subject of merger and acquisition activity. Consequently, betas for the entire group will almost certainly understate the true equity beta risk for the businesses.

NERA considered a range of available methodologies for estimating the US equity beta. It is observed that US regulatory decisions have a long term average implied equity beta of 1.15 and 1.17 for electricity and gas decisions respectively. A discounted cash flow analysis of the nine US gas distribution and transmission businesses identified by ACG were shown to have an average implied equity beta of 1.12 and a median implied equity beta of 1.05.

SFG[25] was requested to assess the economic reasonableness of the ACG beta estimates. SFG found that the ACG estimates were not economically reasonable for the following reasons:

- The range is based on a comparable data set that is not representative of the Victorian gas distribution businesses;
- the beta estimates are unstable;
- the beta estimates are not a reasonable reflection of the gas businesses' systematic risk in the market as a whole;
- the beta estimates are unreasonable when compared with the cost of debt; and
- the method applied by ACG delivers spurious results when applied to other proxy groups.

SFG concluded that the estimates derived from the ACG data are so statistically unreliable that they are meaningless and unusable.

CECG's report[26] demonstrates that using the standard CAPM derived by Sharpe in 1964 is appropriate when using a beta of 1. However, deficiencies in the Sharpe

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[24] NERA, Equity Beta for Gas Distribution, October 2007.
[25] SFG, Equity beta estimates for Victorian gas distribution businesses, October 2007.
[26] CECG, Estimating Relative Risk in the Market for Funds, October 2007.

model become evident when beta diverges from 1.0. The model understates the cost of equity when beta is less than 1.0, and the understatement increases as the beta decreases. The opposite is the case where beta is greater than 1.0. These observations are particularly relevant given that Authority is considering a beta as low as 0.38 for the passenger sector.

The Sharpe CAPM has been investigated, tested and improved on over time. The most advanced understanding of the CAPM has come from Merton (1973) which showed that the beta represents a portion of the relative risk between individual equities and the whole market. The other risk element relates to covariance with future investment opportunities in the equities market. This result flows from a relaxation of the highly unrealistic assumption in the Sharpe CAPM that all wealth is consumed on a single day in the future (ie Merton generalised the Sharpe CAPM from a single period model to a multi-period "inter-temporal" CAPM).

When empirical evidence of the cost of capital for utilities is taken directly from the market for funds it suggests, consistent with the general findings of the finance literature that the Sharpe CAPM will result in a biased estimate of the cost of equity. CECG concluded that the best estimate of the relative risk for the Victorian gas businesses is therefore 1.0 or more.