



BHP Petroleum

13 June 2001

The National Access Regime Inquiry
Productivity Commission
P O Box 80
Belconnen
ACT 2615

Dear Sir/Madam

Further to our submission dated 31 May 2001. Please find attached an additional brief submission that was prepared for BHP Petroleum by Professor David Johnstone of the University of Wollongong. The submission responds to a number of specific questions on DORC that the Commission raised in its position paper. We accidentally left it out of our 31 May submission.

At the public hearing in Sydney last week BHP was asked about apparent conflicting statements in our February and May submissions relating to the cost of DORC based regulation. We clarify our position below.

The approach taken to date in determining a Covered Pipelines DORC under the National Gas Access Code (the Code) has, while inaccurate, been cheap to operate as demonstrated on page 74 of our 12 February 2001 submission. This is for three reasons:

1. The Code only requires that a Covered Pipelines DORC is determined once being at the commencement of coverage and;
2. It is deemed that any pipeline that comes into existence after the commencement of the Code is optimised so its actual capital base is used for tariffing purposes.
3. The DORC studies commissioned by stakeholders and relied upon by regulators have not been true DORC studies. Rather they have been cheap (\$100,000's) estimates developed by engineering consultants that have relied upon extremely broad and sweeping assumptions.

A pure approach to DORC requires that an asset be re-optimised at every regulatory review to take account of technological advances that have occurred in the previous review period (say 5 years). This approach has been adopted under the National Electricity Code. If a true DORC was done for each periodic review DORC based access would be extremely expensive to administer.

In contrast a DAC based approach is extremely cheap to accurately implement and administer as all the information already exists for accounting purposes. All that is required for regulatory purposes is a simple integration of the asset owners accounts.

Yours sincerely

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Brief Response to Questions Raised by the Productivity Commission

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23 May, 2001

1. Are outcomes under (indexed) DAC significantly different from those under DORC?

With Regard to Existing Assets.

To the extent that indexed DAC is less than DORC, there will be a significant tariff effect. If as observed by Davis (1999) capital costs based on DORC typically make up 70% of the tariff stream, a DAC valuation equal to 75% of DORC will bring about an immediate tariff reduction of 17.5%. More generally, if $DAC = DORC \times k$, the tariff reduction is $100[1 - (0.7k + 0.3)]\%$. For example:

<i>DAC as a proportion of DORC</i>	<i>Tariff Reduction</i>
0.9	7%
0.8	14%
0.7	21%
0.6	34%
0.5	40%

With Regard to New Assets

The underlying economic rationale of the tariff model is that asset owners earn a “market” rate of return on their investments. This is achieved equally whether new investments are brought onto the regulatory balance sheet (RAB) at DORC or DAC; or more precisely at ORC or AC, since for new assets there is no depreciation. Moreover, for a new asset $RC = AC$ by definition, and assuming the investment is “optimised” (i.e. there is no lower cost way to get the same result), $ORC = OAC = AC$. Provided that subsequent asset revaluations are precluded under either an ORC or AC approach, it makes no difference practically whether the amount spent on new assets, and added to the RAB, is called RC or AC (ORC or OAC). Either way, the PV of the ensuing tariff

stream is equal to the cash amount invested and hence the NPV (at $r=WACC$) is zero, as expected of an efficient capital market.

2. Would adopting a DAC approach yield appropriate investment incentives?

Given that for new assets $DORC \equiv DAC$, it is curious that a view persists that unless regulators adopt DORC, there will be insufficient incentive for asset owners to invest. It is clearly in the asset owners' interests that regulators work under this presumption. From their standpoint, any use of DAC, even if only for new assets, would leave the gate open for a shift away from DORC for existing assets also, and hence possibly large tariff losses (see above). This would explain why the premise that DORC is a prerequisite for new investment has been voiced so frequently during the Australian regulatory debate. Less explicably, however, regulators seem to have accepted the investment inducing advantages of DORC on technical grounds.

For there to be any difference between DORC and DAC in regard to new assets, regulators must envisage that DORC and DOAC asset values (and thus periodic tariff flows) will not remain the same over time despite their initial equivalence. This could be for two reasons. The first is that DORC and DAC depreciation patterns may be different. This is a likely explanation given that the ACCC advocates "competition depreciation" as essential to DORC, but not DAC. Of itself, however, a difference in depreciation flows makes no difference to the NPV of the tariff stream (see above) and hence does not explain why DORC rather than DAC is technically necessary to secure new investment. A better explanation is that regulators foresee subsequent asset revaluations (book value increases without new investment) under one approach but not the other, or by different criteria under the two valuation schemes. Indeed, in its *Draft Statement of Principles*, the ACCC clearly acknowledged its anticipation of periodic DORC revaluations:

The NEC [National Electricity Code] does not preclude the regulator from periodically revaluing the regulatory asset base according to a valuation methodology such as DORC. (ACCC 1999, p.49)

The Admissibility of Future Revaluations. The "no free lunches" principle rules out asset revaluations – that is, increases in RAB by mere book entry – unless these are treated as income, using the extension of the usual tariff equation explained above. There is, however, some confusion surrounding this principle, caused by the regulators' determination of WACC in real (i.e. net of inflation) terms, and the technical mechanism used to achieve this effect.

There are two methods by which to calculate the "return on capital" element of the tariff formula so as to lock in a given real rate of interest. The first is to leave the initial RAB unchanged (except for period depreciation) and multiply this figure by the nominal interest rate equivalent to the given real rate. For example, to achieve a real rate r_r , the RAB is multiplied by the nominal rate

$$r_n = (1 + r_r)(1 + i) - 1$$

where i is the rate of inflation.

The second method, thus far generally adopted by regulators, is to first “inflate” (i.e. re-scale) the RAB by multiplying it by $(1+i)$ and then multiply this new RAB figure by the given real interest rate r_r . The result (dollar amount) is obviously the same using either mathematical approach. The disadvantage of the regulators’ approach is that it gives the impression of breaking the “no revaluations” principle.¹ Whether in fact it does depends on answers to the following two questions:

- (i) Is the criterion that new investment earn NPV=0 intended to hold in nominal or real terms? If it is determined that the appropriate (“market equivalent”) return to investors is some fixed *real* rate (e.g. 7.75% real), then increasing RAB by the inflation factor $(1+i)$ before multiplying by that interest rate is admissible, and technically does not break the NPV=0 (no revaluations) rule. Whittington (1997, p.6) understood that this is what was intended when he argued that asset users bear all inflation risk.
- (ii) Is it intended that the Tobin’s q argument will be applied continuously over time rather than merely as a way to get an initial RAB? The dynamic rather than static application of q would involve repeated DORC revaluations, applicable whenever the cost of entry (asset replication by a competitor) increases. Revaluation according to this criterion amounts to inflating RAB not by a general price index (such as the CPI) but by an industry (asset) specific index. The scale factor is not $(1+i)$ but something much more narrowly related to the construction costs of the specific infrastructure assets in question (and therefore much more subjective). Changes to RAB made on this basis are likely to break the “no free lunches” (NPV=0) rule. If the replacement cost of infrastructure assets rises by more than the general inflation rate, then the asset owner gains a tariff increase in real terms and thus a real NPV windfall. The reverse is also true, meaning that in theory the owner runs the risk of asset replacement costs, and thus tariffs, not keeping pace with inflation.

Depending on the answers to these questions, the relative effects of DORC versus DAC in regards to new investments can be summarised as follows.

- (i) If DAC and DORC are inflated according to the same price index – say the CPI – then the corresponding tariffs flowing from new investments will always be the same (assuming the same depreciation scheme).
- (ii) If DORC is inflated according to an industry (asset) specific index and DAC according to a more general price index such as the CPI (“indexed DAC”), the choice in regard to new assets between DAC and DORC is effectively a choice

¹ Aware of this problem, some regulators have shifted calculations onto an explicitly nominal basis (i.e. dollar return on capital = nominal RAB × nominal WACC); see for example the discussion in ACCC (1999, pp.24, 32) and the calculations of IPART 2000, p.112.

between tariffs anchored to the CPI and tariffs based on industry specific price shifts. This amounts to a choice between two different inflation rates. These rates might differ markedly if for instance new technology was to reduce the price (replacement cost) of energy transmission infrastructure assets while asset prices in the wider economy increased. Generally, however, both sets of prices are likely to increase, in which case the tariff effect of a choice between DAC and DORC for new assets will tend to be small compared to its effect in regard to existing assets

The results above indicate that DORC has no theoretical advantage over (indexed) DAC in encouraging new investment. Apart from any differences caused by different depreciation schemes, DAC based tariffs will follow a similar pattern over time as those based on DORC. Both will increase with price increases, DAC with the CPI and DORC with whatever index or revaluations are allowed by regulators. Indeed, an investor who does not want to risk real tariff reductions as a result of technical advancements (reductions in infrastructure costs) will prefer DAC over DORC. If DORC has any advantage as far as encouraging new investment, it is that asset owners will see it as more able than DAC to be manipulated upwards at a rate in excess of general price increases. This is, of course, hardly the kind of advantage that should be welcomed.

3. Will prudence reviews be a cost-effective way of addressing concerns about cost padding under DAC?

The potential for cost padding is no different under DAC than DORC. This presumes that DAC is actually DOAC (depreciated optimised actual cost) for the same reasons of preventing cost padding as DRC is redefined as DOAC. The process of prudence reviews or “optimisation” is not something applicable only to replacement cost (RC) asset valuation. It applies just as effectively (or ineffectively) to actual cost (AC) valuations.

Either way, it is the regulator’s job to determine whether new investment is “optimal” or overkill.

If anything, the incentive for gold-plating and cost-padding is greater under DORC than DOAC, because of the potential under DORC for future upward re-valuations. The asset owner will be motivated to get as much new investment as possible onto the RAB (regulatory asset base), with the thought that later this will be revalued upwards and produce an even more inflated tariff stream.