



# **COMMONWEALTH GRANTS COMMISSION**

**DISCUSSION PAPER CGC 2002/15**

**REVIEW OF THE MINING ASSESSMENT**

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## INTRODUCTION

1. Mining revenue accounts for \$1676 million (an average of \$89.96 per capita) or less than 3.5 per cent of total State own-source revenues in 2000-01. The Mining assessment, however, has a significant impact on the assessed relativities and the distribution of State grants, due to large differences in the revenue raising capacities among the States. In the 2002 Update, for example, the Mining assessment resulted in a redistribution of \$714.6 million in grants between the States (see Figure 1).

**Figure 1** IMPACT OF THE MINING ASSESSMENT ON STATE GRANTS, 2002 UPDATE



2. Mining royalties are levied on the extraction of natural resources. The large differences in revenue raising capacities reflect the differences in natural resource endowments among the States.

3. There are different views and practices about how royalties are levied. These lead to significant differences of opinion between the States over the appropriate base to use for the mining assessment. Some argue for using economic rent as the base, while others argue for value of production. The current assessment method uses neither, but instead uses adjusted value added.

4. Regardless of the choice of revenue base, the category is subject to significant data availability problems. Much of the data required for the current approach is not available and has to be estimated. This adds complexity to the assessment and reduces confidence in the result. Worse, the shift by the ABS from an establishments to a management unit basis for its mining data collections has reduced the availability of State breakdowns of mining data. As a consequence, data problems are increasing and the Mining assessment is becoming more complicated. As of the 2000-01 Mining collection,

the ABS will no longer publish capital expenditure data at the State level. Indeed, the data availability problems have reached the point where the Commission must consider whether the current assessment method will be sufficiently robust to achieve its intended purpose or whether practical considerations of data limitations dictate a change.

5. States have also raised issues with the current method, including:
  - whether the assessment should include off-shore oil and gas and, in the case of the Northern Territory, uranium (and, if so, how this should be done);
  - whether off-lease as well as on-lease exploration expenditure should be excluded from the estimate of the revenue base;
  - the appropriateness of an elasticity adjustment; and
  - the best way to assess State spending directed to supporting the development of mining projects.

6. This Discussion Paper outlines the current Mining assessment, the data availability problems and State concerns. It then discusses the issues raised by the States, particularly the choice of base, the problem of data availability and some practical options for resolving them. The final section draws some conclusions and makes recommendations for changes to the assessment. Issues relating to the appropriate treatment of State developmental policies are not addressed in this paper — they are considered in Discussion Paper CGC 2002/6 which deals with issues related to economic development.

## **THE CURRENT ASSESSMENT METHOD**

7. At present, the Mining category covers States' collections of royalties or rental equivalents levied on production of minerals. It excludes royalties or payments in lieu of royalties relating to off-shore petroleum and gas because off-shore activities are in the Commonwealth's jurisdiction and revenues States receive stem from negotiated revenue sharing arrangements with the Commonwealth. Those payments are currently viewed as specific purpose payments (SPPs) and treated by inclusion.

8. Up to 1999-2000, the category included amounts of quasi-royalties because Queensland had policies of raising some revenue in the form of excess profits from the rail haulage of black coal rather than as royalties. By 1 July 2000, however, Queensland had phased out special rail haulage contracts and all mines were charged the same royalty rates, depending on what they produced. Thus there were no special adjustments to include quasi-royalties in the revenue base for 2000-01, nor were they taken into account in calculating the revenue base.

9. Mining revenue is assessed by the proxy tax base method. The revenue base is an approximation of the 'profitability' of current mining production, although it is

actually calculated as adjusted value added of the mining industry. Value added of the mining industry is adjusted to:

- (i) add, for the years prior to 2000-01, the quasi-royalties for Queensland — estimated as the excess freight charges collected by Queensland (because freight charges are one of the expenses deducted from turnover to derive value added);
- (ii) subtract:
  - wages and salaries and related on-costs (payroll tax, workers' compensation and superannuation);
  - a five-year average of on-lease exploration expenses;
  - a ten-year average of capital expenditure (similar to depreciation costs); and
  - the adjusted value added for off-shore petroleum and gas and, for the Northern Territory, uranium (estimated in each case as value added of the product less related wages, salaries, related on-costs, annual on-lease exploration expenditure and annual capital expenditure); and
- (iii) apply an elasticity adjustment to take account of the impact of differences in royalty rates among States on production levels.

10. Conceptually, the assessment does not seem complex. However, the calculations are complicated because a lot of the data they require are not available and have to be estimated. For example, value added, wages and salaries, capital expenditure, and on-lease exploration expenditure for off-shore oil and gas cannot be separately identified and have to be estimated. The extent of estimation raises the question whether the assessment is robust.

11. It is useful to note that in deciding on the current assessment in the 1999 Review, the Commission addressed many of the issues confronting this Review.

'The major issues for the review were whether or not to:

- (i) use as the revenue base value of production, adjusted value added or economic rent;
- (ii) deduct off-lease exploration expenditure from the revenue base;
- (iii) have a separate adjustment for on-lease exploration expenditure;
- (iv) assess a rate of return on capital expenditure; and
- (v) assess an elasticity adjustment.'

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<sup>1</sup> Commonwealth Grants Commission, Report on General Revenue Grant Relativities, 1999, Volume II, Methods, Assessments and Analysis, p 211.

12. In making its decisions on these issues, the Commission saw the current assessment as reflecting, in a reasonable, reliable and practical way, what States do (or try to do), given the structural differences in their mining sectors.

## **DATA AVAILABILITY**

13. The extent of the data problem is outlined in Appendix B and summarised in Table 1. In the Table, the degree of shading indicates the extent of availability of the data. As can be seen, all cells have some shading and the problem of data unavailability permeates the whole of the Mining assessment to a greater or lesser extent.

14. Some idea of the data availability problem can be gained by considering the base as mining value added less:

- labour costs;
- a ten year average of capital expenditures; and
- a discounted five year average of on-lease exploration costs.

15. For a start, data on value added are not available for the final year of the assessment period. In the 2002 Update, the revenue base for 2000-01 was estimated by adjusting the revenue base for 1999-2000 in proportion to the change in actual revenue, other than that due to changes in royalty rates. However, this is a longstanding issue and the States accept the current projection process.

16. For the four years ended 1999-2000, mining value added was compiled by:

- aggregating the available data on value added for coal, oil and gas and minerals with estimates of value added for construction materials and mining nec, obtained by dissecting data which are only available at the national level for most years; and
- excluding value added for off-shore oil and gas and, in the case of the Northern Territory, uranium. The data are not available for these two exclusions – they are estimated by apportioning total value added for all minerals between off-shore oil and gas (and uranium) and all other minerals on the basis of the proportions of value of production.

**Table 1** MINING ASSESSMENT, DATA AVAILABILITY BY BROAD AREA

	<b>Mining (excluding Construction Materials and Mining nec)</b>	<b>Construction Materials</b>	<b>Mining nec</b>	<b>Off-shore Oil &amp; Gas</b>	<b>Uranium</b>
<b>Value added</b>	Available (except for last year of the assessment period)	Available (but only on a national basis and not for the last year of the assessment period)	Available (but only on a national basis and not for the last year of the assessment period)	Unavailable	Unavailable
<b>Quasi-royalties</b>	Unavailable	Not Relevant	Not Relevant	Not Relevant	Not Relevant
<b>Wage and Salary Expenses</b>	Available (except for last year of the assessment period and except for salary on-costs)	Unavailable	Unavailable	Unavailable	Unavailable
<b>Capital Expenditure</b>	Available (at least up until now and except for last year of the assessment period)	Unavailable	Unavailable	Unavailable	Unavailable
<b>On-Lease Exploration Expenditure</b>	Available (but not from the ABS and except for last year of the assessment period)	Unavailable	Unavailable	Unavailable	Unavailable

17. Data on labour costs are available for all years for coal, oil and gas, and minerals, but not for construction materials and mining nec — we have to estimate these missing data. Data for the off-shore labour cost, capital and on-lease expenditure adjustments are also not available and have to be estimated.

18. The amount of unavailable data is increasing. The shift by the ABS from an establishments to a management unit or operations basis in its Mining data collections means that the State dissections required are becoming less frequently available. As a result, many of the State adjustments must also now be estimated. As well, as from the 2000-01 Mining Collection (the results of which will be available in October 2002), the ABS will no longer publish data on capital expenditure for mining at the State level. This will make the adjustment to deduct capital expenditure virtually impossible.

19. Data unavailability poses a clear threat to the sustainability of the current Mining assessment because it raises serious questions of confidence over the accuracy and

reliability of the assessment. In the case of Victoria, for example, the Off-shore Oil and Gas adjustment exceeds the base. As a result, even modest errors in the Off-shore Oil and Gas adjustment can lead to significant errors in that State's assessed base. While the problems in relation to Western Australia and the Northern Territory are not as acute as for Victoria, they are still significant — the Off-shore Oil and Gas adjustments for Western Australia and the Northern Territory (and Uranium adjustments for the Northern Territory) account for more than 25 per cent of the base in each State. In the case of the Northern Territory, the Off-shore Oil and Gas adjustment has also increased significantly in recent years.

20. Similarly, capital expenditure also accounts for a significant share of value added in mining and, in South Australia and the Northern Territory for example, can exceed value added. Capital expenditure also fluctuates significantly from year to year. As a result, it will be difficult to estimate these data with a high degree of accuracy, with consequential adverse implications for the reliability and accuracy of the Mining assessment.

## STATE CONCERNS

21. Some States raised concerns about the current assessment. **New South Wales, South Australia** and the **ACT**, however, made no comments<sup>2</sup>.

22. Of the States that commented on the assessment, **Victoria** opposed deduction of infrastructure costs and of a rate of return on capital; supported deduction of off-lease but not on-lease exploration expenditures; and proposed application of a greater elasticity adjustment for Victoria. On the other hand, **Queensland** argued that an elasticity adjustment should not be applied.

23. **Western Australia** submitted that there should be a full review of the Mining assessment to ensure the assessment methods do not penalise States for adopting successful long-run resource development policies. As far as the revenue base used in the assessment is concerned, Western Australia argued that economic rent (equal to profit less a return to equity capital) is the most appropriate base because it defines what is ultimately available for the State to tax (that is, the capacity to pay). Such a base could allow deductions for off-lease exploration expenditure, a return on capital and State expenditure on industry assistance.

24. **Tasmania** supported the current assessment and rejected the Western Australian proposal regarding expenditure on industry assistance. It proposed that such spending should be assessed as a disability in the Services to Industry categories.

25. The **Northern Territory** proposed that profit be used as the tax base, but with deductions for the cost of capital, exploration expenditure and assistance to industry.

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<sup>2</sup> This does not mean they will not have any comments during the remainder of the Review. New South Wales' main submission dealt only with land and conveyances as revenue issues and reserved the right to comment on other assessments later in the Review process.

They also proposed an adjustment to value added from bauxite production, given that the original royalty agreements for bauxite were negotiated by the Commonwealth. The Northern Territory also opposed inclusion in the assessment of what it termed ‘quasi-royalties’, which are royalties collected by the Commonwealth but returned to the Territory for on-passing to the Indigenous land owners.

26. In summary, Victoria, Queensland and Tasmania either generally support or have not raised questions about the thrust of the current approach. The Northern Territory and Western Australia argued for adopting a different approach to the base — the Northern Territory for a profit approach and Western Australia for an economic rent approach. States also have concerns about some of the adjustments in the current assessment, including the elasticity adjustment.

27. However, States may not have been fully aware of the extent of data unavailability and its implications for the assessment methods when they prepared their submissions.

### **WHAT STATES ACTUALLY DO, WHAT THEY MIGHT DO AND THE APPROPRIATE BASE**

28. The issue of the appropriate base for the Mining assessment has received considerable attention in previous Reviews (for a brief history of the Mining assessment, see Attachment A), with the choice of base used depending on a decision by the Commission between ‘what States do’, ‘what States might ideally do’ and ‘how to make the base as comparable as possible in practice’. In making this decision, the Commission balanced what States actually do, how States view royalties (which in turn determines what States do, or would like to do) and what base measure would be most comparable across the different types of mining production.

#### ***State Perceptions of Royalties***

29. As indicated in the Commission’s *1995 Reports on Research in Progress* (Volume 1, p. 151), State views of royalties appear to fall into one of two categories — royalties as:

- a return for the opportunity to exploit a natural resource; or
- a share of the fruits of a joint venture in processing minerals.

30. Where States view royalties as a payment for the opportunity to exploit a resource, the royalty is based on the value of the resource in the ground, irrespective of what the company does with it once it has extracted it. As a consequence, these States usually set the royalty as a percentage of the value of production or a given dollar amount per volume of production ex mine, with the royalty levied irrespective of whether or not the project is profitable. Under this perspective, royalty rates vary with type of ore, ore grade and, possibly, with the size and structure of mining projects.

31. Under the ‘joint venture’ view, States would collect royalties as either a share of expected profit or economic rent from a project. If a project was unprofitable over a year, royalties from it would be zero or, under a pure rent tax, negative.

### ***What Do States Do?***

32. How States actually levy mineral royalties is not only affected by the above views, but also by practical considerations, such as the ease with which royalty regimes are operated/managed, risks to revenue, compliance costs, and possibly historical factors. Thus a State that has a particular view may not necessarily act completely according to that view and may at times adopt a different or modified approach.

33. For example, each mine is different from other mines in some way, making it difficult to determine the economic rent generated (and rent is also affected by other factors, such as output prices) and to calculate a rent-based royalty regime for each mine. It is easier to set up royalty regimes according to broad industry structures, say oil and gas, coal and other minerals. Such an approach could take account of major structural differences, such as open-cut versus underground mining. Thus, even an economic rent minded government may in fact adopt a broad brush approach.

34. As can be seen from Attachment D (sourced from the Western Australian Department of Minerals and Resources publication *Australia – State Taxes and Charges Applicable to Mining*<sup>3</sup>), New South Wales, Victoria, Queensland, Western Australia and South Australia levy royalties on a value of production (or an ad valorem) basis<sup>4</sup>. There are differences in what value is used, but the common approach is value of production. In this sense, most States appear to focus on royalties as a charge for the opportunity to exploit a resource.

35. Table 2 shows that royalty rates (defined as a percentage of value of production) vary significantly from State to State. The differences reflect the differing output mix of the States and the differences in the royalty rates for different mineral products. New South Wales, Queensland, Western Australia and South Australia have a significant proportion of coal and/or oil and gas in their output, which also have a high overall effective royalty rate. These mining outputs often also have relatively low costs of production (net of exploration costs).

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<sup>3</sup> The most recent issue of this publication is the 1999 edition. State data returns indicate, however, that there have been only minor changes in royalty regimes since 1999.

<sup>4</sup> The actual definition of value of production differs from State to State. New South Wales levies royalties on gross proceeds or ex-mine value; Victoria on sales value; Western Australia on realised value; Queensland on fob or value or gross proceeds; and South Australia on an assessed value basis.

**Table 2** STATE AVERAGE EFFECTIVE MINING TAX RATES, 1999-2000 (a)

	Average Tax Rate
	%
NSW	3.63
Vic	2.02
Qld	7.59
WA	4.08
SA	4.50
Tas	4.18
ACT	na
NT	2.23
Australian average rate	3.91
Australian average rates for:	
Oil and gas	9.43
Coal	5.28
Other minerals	2.90

(a) Calculated as the revenue as a percentage of value of production

36. States may take account of the mine profitability rate in some way when setting royalty rates. Tasmania, for example, does this directly by levying royalties on both an ad valorem and a profits basis. The Northern Territory levies royalties on net profits.

37. Other States take account of profitability indirectly by varying the royalty rate according to:

- price (Western Australia for example currently charges a different gold royalty rate depending on whether the gold price is above or below A\$500 per ounce<sup>5</sup>);
- the type of mine (New South Wales and Queensland for example levy higher coal royalties on open cut mines than on underground mines);  
or
- project — States can implement State Agreement Acts for particular mines (such as for Broken Hill or Olympic Dam).

38. State Agreements can be complicated and the degree to which profit or economic rent is taken into account is by no means clear. Considerations such as a desire to attract investment or create employment also influence the conditions in such Agreements.

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<sup>5</sup> However, this is only a transitional arrangement.

39. States have also contributed to the infrastructure (roads, rail, port, pipeline etc) necessary to support mining projects. In doing so, they are in practical terms undertaking a ‘joint venture’ with the operators of the mining projects — the infrastructure can be viewed as the State’s equity contribution to the venture. Alternatively, it could be said that a State’s contribution to infrastructure investment reduces the costs of mining production and increases the economic rent accruing to the miner, and the State may expect to receive a higher return from royalties. The current assessment method, however, does not deduct government expenditure on assisting the mining industry from the revenue base. Such expenditure is under review by the Commission in response to issues related to economic development (see Discussion Paper CGC 2002/6).

### *What States Might Like To Do*

40. The literature shows that different royalty regimes may have different impacts on mining production, with consequent implications for economic efficiency. The most economically efficient royalty regimes — in the sense that they have least impact on investment and production decisions — are those based on economic rent. Indeed, pure rent royalties should have no impact on investment, production or total rent since they affect the supernormal profit only, leaving input and output decisions unchanged<sup>6</sup>. As a result, economic rent based royalties would be the preferred regime if the priority was simply efficiency and the associated operational and compliance costs were reasonable.

41. Similarly, profit-based royalties are generally more economically efficient than ad valorem and volume based royalties<sup>7</sup>, but are not quite as efficient as pure rent royalties. This is because accounting profit-based royalties may understate economic costs, thereby overstating profits (or economic rent) and thus overtax. In particular, capital assets may be understated because of inflation or due to restrictive company tax legislation with respect to the deductibility of exploration expenditure. Further, there may be no recognition of the opportunity cost of capital (Industry Commission, 1991, p. 365).

42. In any case, while economic rent may be the ideal revenue base from an efficiency perspective, it may not suit States entirely from measurement and risk-sharing perspectives. As well as sharing in successes, a pure rent tax would result in a State compensating companies for unprofitable mines. This raises a potential moral hazard problem — if a mine is unprofitable or earns less than normal profits, is it because the underlying economic rent is low or negative, or is it because the mine management is not doing a good job? Some (most) States may, as a consequence, quite rationally prefer to

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<sup>6</sup> This is not strictly correct. To the extent that an economic rent based royalty shares the risk of a mining project between government and the mining company, the regime may impact on the decisions of risk averse firms. However, to the extent that the mining company can spread their project risk through, for example, the share market, the extent of this risk distortion is probably negligible. At the same time, the government may end up carrying a disproportionate share of risky (and, possibly low return) projects.

<sup>7</sup> The reality may be more complicated and this may not necessarily always be the case. For example, a mine with an apparently larger amount of profit may in fact have very low profitability if it uses much more capital. According to a rent royalty regime, this may not be taxed at all, but under a profit royalty regime, it is taxed. If its value of production is very large, then under a regime based on the value of production, it may in fact be taxed to a lesser degree than under a profit based regime and hence is closer to a rent based regime.

forgo a tax on rent and accept the efficiency consequences of taxing a more reliable base such as value of production. This may also explain why no State or the Commonwealth imposes a pure rent tax.

***Options for the Revenue Base***

43. There are a number of possible choices for the base for the Mining assessment, ranging between value of production and economic rent. Neither of the extremes is what every State does or is what every State argues that they do. What States do on average is somewhere in the middle, although it appears closer to value of production. The hierarchy of possible bases, with value of production as the starting point, is set out in Figure 2.

44. The questions to answer in the choice of base for the assessment thus become:

- (i) ‘what do States actually do’ as opposed to ‘what States should do if efficiency of the royalty regime were the main objective’; and
- (ii) of the feasible bases, which is practical and comparable, given the data available?

**Figure 2** POSSIBLE BASES FOR THE MINING ASSESSMENT

Base	Definition
Value of Production	Industry turnover plus change in inventory.
Value Added	Value of production less intermediate input costs
Net operating surplus	Value added less wages and salaries, labour on-costs and depreciation (which is approximately equivalent to adjusted value added, the current base)
Profit	Net operating surplus less interest and financial charges
Economic Rent	Profit less a return to equity financed capital

45. Because of structural differences, no State levies a uniform royalty rate over all mineral products, but has differential rates over different types of minerals. Given this observation and the views expressed in some State submissions, it is not unreasonable to conclude that in their decision making processes States may aim to collect a proportion of the economic rent but also take account of other factors such as the desirability of minimising information, measurement and transactions costs and other policy considerations. The result is that the effects of their actions are closer to profit (which approximates the current base) than to economic rent. However, for further practical reasons, possibly including ease of public understanding, they tend to express their decisions in terms of a base closer to the value of production end of the spectrum. As a

result, there often seems to be a difference between what State governments do and what they would ideally like to do.

46. In the hierarchy of Figure 2, the current adjusted value added approach to the base lies between a pure value of production approach and a pure economic rent approach, although it is closer to the latter in that it allows for the capital component of value added.

47. A value of production approach may be affected by differences between States in the structure of their mining industries. Both value added and adjusted value added approaches remove some of the effects of structural differences, resulting in better comparisons between the States.

## **IMPLICATIONS FOR THE ASSESSMENT**

48. We do not think an economic rent based approach should or could be adopted. There is no evidence that States fully apply this approach in their royalty regimes. There are also practical difficulties in determining the level of normal returns and the capital stocks used in the calculation of those normal returns. The assumptions associated with these issues would be critical in an economic rent based assessment. The emerging data problems (which would affect an economic rent approach more than they affect the current adjusted value added assessment) would further undermine the viability of this approach. Thus, an economic rent approach is less attractive than the alternatives for conceptual and practical reasons.

49. Taking account of what States actually do and data availability, there are three broad practical options for the Mining assessment base:

- (i) the current base (perhaps including some minor changes);
- (ii) value of production as the base, but adjusted for the structural differences of broad mining products using the effective tax rates; and
- (iii) value added as the base, adjusted for the structural differences of broad mining products based on the effective tax rates.

### ***The Current Adjusted Value Added Base***

50. There are good conceptual reasons for continuing with the current base, but there are also serious and increasing data problems and the assessment is complex. As postulated earlier, States seem to base their royalties on something between value of production and profits, with the implication that adjusted value added is a reasonable compromise for 'what States do'. However, given the data issues, the sustainability of an adjusted value added-based assessment must be considered.

51. As noted earlier, data availability is a major and increasing problem in calculating adjusted value added. The principal data problems concern the estimates

necessary to include the adjusted value added for gemstones (included in the ABS category 'Other Minerals') and construction materials, and to exclude that for Off-shore Oil and Gas and, for the Northern Territory, Uranium. As from the 2000-01 Mining Collection, further estimates will be necessary to make the capital expenditure adjustment because the ABS will no longer publish capital expenditure data for each State.

52. These adjustments to value added are often of a similar order of magnitude to value added itself and, as a consequence, they have a significant impact on the calculated base for each State, and hence on the assessment. As well, these adjustments fluctuate markedly from year to year and are difficult to estimate reliably.

53. Overall, we are inclined to the view that, for practical reasons, the current method will not be sustainable.

### ***Royalty Rate Adjusted Value of Production Base***

54. By comparison to the current approach, a value of production-based assessment would face relatively few data problems (particularly in terms of the off-shore oil and gas adjustments), apart from the need to ensure that production is valued as consistently as possible across States, mines and minerals. Use of value of production as the base might also make it possible to use actual data rather than estimates for the final year of the assessment period. It would also simplify the Mining assessment by eliminating most of the adjustments needed to calculate adjusted value added.

55. There are, however, (as shown in Table 2) differences between the States in the royalty rates levied and it would be necessary to determine whether these differences reflect capacity or policy differences. *Prima facie*, part of the differences in rates between the States reflects differences in mining industry structure (and profitability), which essentially would reflect differences in relative revenue raising capacity in a standard policy environment. In particular, examination of effective royalty rates for major groups of minerals indicates a trend across many States to impose higher royalties on some minerals than others. Fully capturing the differences between the States in revenue raising capacity for mining would necessitate allowances for the interstate differences in the structure of their mining industries.

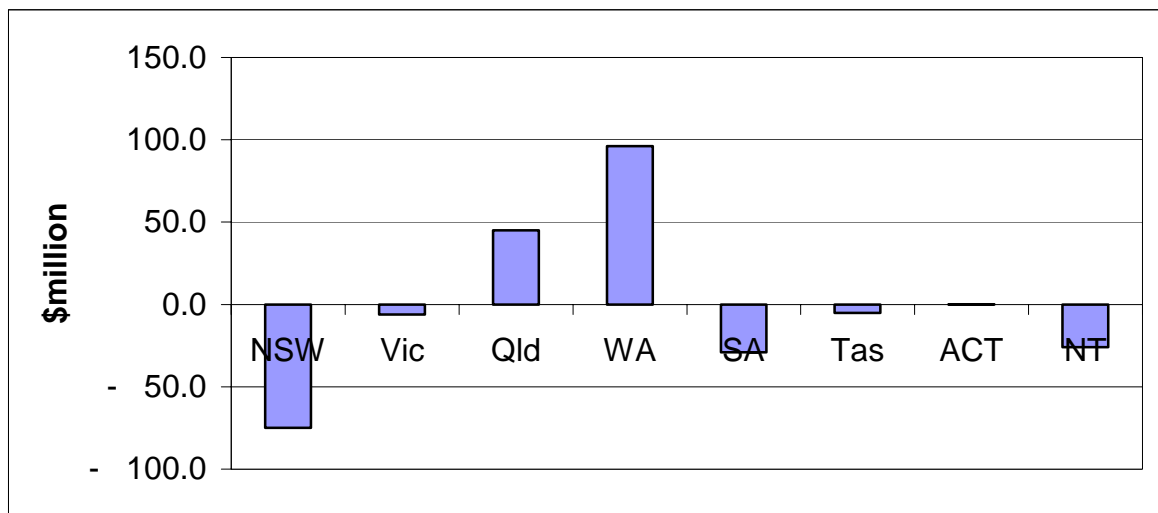
56. A possible approach to making those allowances would be to adjust value of production data by differences in the royalty rates of broad mineral products, such as oil and gas, coal and other metallic minerals. Quality/cost/profitability differences between different groups of minerals may be broadly captured by the differences in the royalty rates applied to them. As shown in Table 2, for example, oil and gas has an Australian average effective royalty rate of nearly twice that of other minerals. This presumably reflects the lower costs of mining coal relative to the costs incurred in mining metallic minerals. It would be possible to allow for structure and cost differences by increasing the value of production of coal in each State by the ratio of the Australian average royalty rate on coal to that on other minerals. Similarly, we could increase the value of on-shore oil and gas production in each State by the ratio of the average Australian royalty rate on oil and gas to the royalty rate on other minerals (average effective royalties on oil and gas are higher than

those on coal). These adjusted values of production could be then aggregated to form a royalty rate adjusted measure of value of production.

57. This kind of adjustment is not project specific, but it is consistent with the practice in most States in the sense that most royalty rates appear to be based around broad types of product rather than projects. This adjustment approach is also equivalent to disaggregating value of production into the corresponding sub-categories and assessing the sub-categories individually.

58. Figure 3 shows the impact on State grants of a royalty rate adjusted value of production assessment. As can be seen, the capacities of New South Wales and (to a lesser extent) Victoria are assessed to be higher under this assessment compared with the current one, largely as a result of the dominance of coal in their mining sectors (after off-shore oil and gas production is excluded in Victoria). Another possibility could be that the assessment does not capture the full impact of differences in production costs — costs of coal production in New South Wales (due to underground mines) may be higher than in Queensland (mainly open-cut mines), and that coal production in Victoria is dominated by low value brown coal. If the latter is the case, a further broad adjustment to value of production for cost and quality differences of various types of mineral production may be required. South Australia is similarly affected as a result of the importance of on-shore oil and gas production in that State. Queensland and Western Australia, on the other hand, gain from this approach relative to the current assessment.

**Figure 3** CHANGES IN STATE GRANTS (ADJUSTED VALUE OF PRODUCTION)



***Royalty Rate Adjusted Value Added Approach***

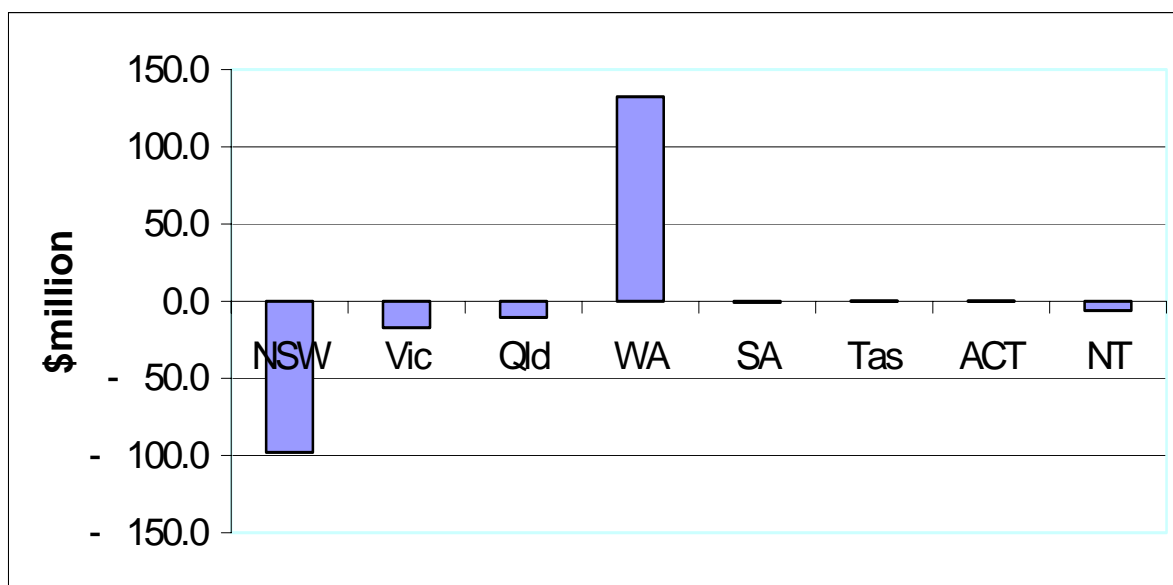
59. Similar to the royalty rate adjusted value of production approach, a royalty rate adjusted value added approach would use value added of mining production as the base but would adjust it for differences in average effective royalty rates between different types of mining.

60. Figure 4 shows the grant implications of such an approach. New South Wales, Victoria and Queensland would be adversely affected and Western Australia would gain from such an assessment.

61. This assessment differs from the current adjusted value added based assessment in that it is more firmly based on value added — the current adjustments for wages, capital expenditure and on-lease exploration would not be made.

62. This proposed assessment would, however, face some data availability constraints, as compared to the value of production based approach. Specifically, the ABS value added data are not disaggregated into coal, oil and gas, and metallic minerals for Victoria, Tasmania and the Northern Territory, although this is not a problem for Tasmania since it does not produce any oil or gas or much coal. For New South Wales and Western Australia, coal and oil and gas are not separated from each other. Again, this is not a problem for New South Wales since its oil and gas production is negligible. As a result, it would be necessary to rely on value of production data to estimate the impact of some

**Figure 4** CHANGES IN STATE GRANTS (ROYALTY ADJUSTED VALUE ADDED)



mining outputs<sup>8</sup>. Nevertheless, the extent to which estimates must be made for this approach is less than for the current adjusted value added approach.

<sup>8</sup> In the above simulation, the value of production shares in States other than Queensland were used to split their value added data.

## OTHER ISSUES

63. As well as the choice of base, there are also questions as to what to include in or exclude from the base. For example, the Northern Territory has raised the issue of ‘quasi-royalties’, by which they mean mining royalties paid by the Commonwealth to Indigenous groups through the States. It would also be desirable to consider whether off-shore oil and gas (and uranium in the Northern Territory) should continue to be excluded from the revenue base. As well, a number of States have raised the issue of off-lease exploration expenditures and whether they should continue to be excluded from the base. Finally, Queensland has raised the issue of the size of the elasticity adjustment and whether it is necessary.

64. The first of these issues is relevant under the current adjusted value added method, but not under the two alternative methods. It is dealt with first in this section and then followed by issues that are relevant under the two alternative methods.

### *Issues Related Only to the Current Method*

65. **Off-lease exploration expenditure.** Over the longer term, off-lease exploration expenditure can be viewed as a prerequisite for generating mining output and, in turn, royalty income. Theoretically, off-lease exploration expenditure could be seen as the initial capital investment when a mineral project is started, thus reflecting the value of exploration in discovering the mineral deposit and making it worthwhile to mine. Off-lease exploration expenditure only translates into increases in mining production (and the mining revenue base) with a (sometimes significant) lag and not all expenditure leads to new projects.

66. If off-lease exploration expenditure were to be taken into account in calculating the mining revenue base, the issue becomes: what off-lease exploration expenditure should be excluded? This issue involves at least the following questions.

- (i) Should any adjustment cover all off-lease exploration expenditure or only that which eventually resulted in successful projects?
- (ii) How far back in time should any adjustment go —the previous five years (like the on-lease exploration adjustment), the last ten years (like the capital expenditure adjustment) and so on?

67. It is also possible, depending on how the Australian Bureau of Statistics measures capital expenditure, that the capital expenditure deduction in the existing adjusted value added approach may include some of the off-lease exploration expenditure, and further deduction of it would be double counting.

68. The Commission has an open mind on the issue of an off-lease exploration cost adjustment if the current adjusted value added approach were to be retained. It invites further comments States may wish to make on the issue.

69. However, the question of whether off-lease exploration expenditures should or should not be included in the base would not arise if either the adjusted value of production base or the royalty rate adjusted value added base were to be adopted for the Mining assessment.

### ***Other Issues***

70. **Payments through the States.** Currently, royalties paid to Indigenous land owners through the Northern Territory government are excluded from the equalisation budget. There is no reason to believe that this treatment should change since the payments do not form part of the Territory's revenue.

71. **Off-shore Oil and Gas, and Uranium.** In the case of off-shore oil and gas, the adjusted value added is currently excluded from the revenue base of Victoria, Western Australia and the Northern Territory. (The adjusted value added for uranium is also excluded from the Northern Territory's base.) The revenue from off-shore oil and gas, and uranium in these States is collected by the Commonwealth and any revenues the States receive from those activities is in the form of revenue-sharing payments from the Commonwealth. Like the Commonwealth, the Commission currently treats the revenue sharing payments to the States as specific purpose payments. States needs are, therefore, assessed by the actual per capita (APC) method (that is, as the difference between the standard per capita revenues and the actual per capita amount received by each State). This approach is based on the premise that the revenues are largely unaffected by State revenue raising policies.

72. We propose that, as from the 2004 Review, these revenue sharing payments be reclassified to a notional off-shore oil, gas and uranium sub-category of Mining Revenue. Needs for that sub-category would be assessed by an APC assessment. The proposed change would present the receipts as State revenue rather than as SPPs. It is purely a presentational change and would leave State relativities and grants unchanged. It would, however, simplify the explanation of the main causes of interstate differences in relativities.

73. **Treatment of Bauxite in the Northern Territory.** The Northern Territory argued that the adjusted value added for bauxite should be excluded from its revenue base because the royalty rates were, in the main, set by the Commonwealth and the Territory cannot vary them until the long term contracts expire. Such an adjustment would further complicate the mining assessment, especially since the data required to make it would have to be estimated. Moreover, the mining contracts covering bauxite production in the Northern Territory are progressively coming under the control of the Northern Territory. Excluding all bauxite production from the Territory's revenue base would overstate the effects of any constraints on its revenue raising policies arising from past Commonwealth actions, especially since Territory determined royalty rates already apply to some mines.

74. An allowance to reflect the current inability to apply the standard royalty rates to some bauxite mines may be justified, however, if the current royalty rates are noticeably below those the Territory might have imposed under its own policies. Any such adjustment might be based in part on the revenue foregone by the Northern Territory

because of the difference between the rates that would apply under its current royalty regime and the lower rates imposed by the Commonwealth. The Commission is still considering this issue. However, information on the proportion of the value of bauxite production in the Territory that is still subject to long term Commonwealth contracts is required to inform a decision on the materiality of the issue.

75. **The elasticity adjustment.** Queensland has argued that the elasticity adjustment should be eliminated or greatly reduced if the current adjusted value added approach is continued.

76. The historic context of the elasticity adjustment is outlined in Attachment C, which indicates that there are conceptual grounds for making an elasticity adjustment. However, while effective tax rates vary significantly from State to State and could lead to elasticity effects, the size of the appropriate elasticity adjustment is difficult to determine.

77. As noted in the Queensland submission, the mining industry is a ‘price-taker’ for the bulk of its output, which is sold on world markets. As a result, a change in a State’s royalty rate would be expected to lead to an offsetting change in net return to producers and in production. However, the research presented in the Queensland submission indicates that increases in the royalty rate reduce value added only slightly, with an implied elasticity of -0.48 at most — well below the -3 assumed by the Commission in the current Mining assessment<sup>9</sup>. These results are complemented by earlier microeconomic simulation studies by the Industry Commission and the Australian Bureau of Agricultural and Resource Economics which imply revenue elasticities ranging from -0.22 to -0.85.

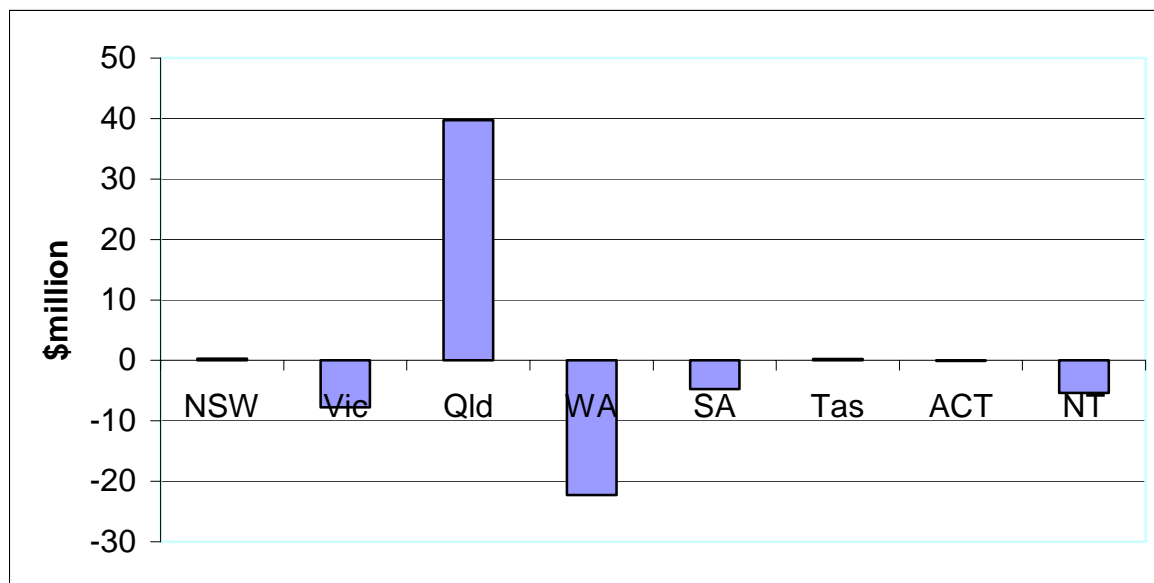
78. This recent evidence, together with the view that the decision making processes of States seem to take some account of economic rent (or approximations of it), suggests there is a case for reducing the factor used for the elasticity adjustment if the current adjusted value added based assessment is retained. However, a reduction of the elasticity adjustment to, say, -1 would have a significant impact on the distribution of State grants, as shown in Figure 5<sup>10</sup>. As can be seen, the change in the adjustment from -3 to -1 would have resulted in a significant redistribution of grants towards Queensland and away from Western Australia and, to a lesser extent, Victoria, South Australia and the Northern Territory.

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<sup>9</sup> That figure was based on data supplied by Western Australia, which indicated that supply elasticities could vary between -1.1 and -5.5, depending on the mineral.

<sup>10</sup> The effects on the redistribution of changing the elasticity factor would be smaller in future years because of other effects associated with the decision to discontinue the adjustment for quasi-royalties in Queensland.

**Figure 5** CHANGES IN STATE GRANTS (REDUCED ELASTICITY ADJUSTMENT)



79. There is also a conceptual argument for including an elasticity adjustment in the calculations if royalty rate adjusted value of production were to be used as the measure of the revenue base. It is also possible that the size of any adjustment could be larger than that for adjusted value added. However, there is little publicly available information on the sensitivity of value of production to changes in royalty rates or the price of the mineral.

80. The Commission is still considering the issue of the appropriate size of any elasticity adjustment under the adjusted value added and royalty adjusted value of production approaches to measuring the revenue base. Further information from States would assist that consideration.

## CONCLUSIONS

81. Ultimately, the choice of the measure of the revenue base for the Mining assessment will reflect a trade-off between two criteria:

- (i) the extent to which the measure captures what States do (or try to do); and
- (ii) the extent to which the data required to implement the measures are available or can be estimated with an acceptable level of confidence.

82. In terms of what States do (or try to do), it seems that the ranking of potential measures of the base (in descending order) would be the existing adjusted value added measure, the royalty rate adjusted value added measure and the royalty rate adjusted value of production (see Table 3). While a high proportion of royalty rates are expressed in terms

of value of production, there is considerable evidence to indicate that States set those rates at different levels for different minerals and, in some cases different projects, after considering issues such as industry structure and costs of production.

83. In relation to data availability, the descending order of ranking of potential revenue base measures would be royalty rate adjusted value of production, royalty rate adjusted value added and the current adjusted value added approach.

84. Overall, the trade-off between the two criteria appears to favour the royalty rate adjusted value of production approach.

- (i) While States may try to use something closer to the current base in assessing royalties, royalty rate adjusted value added and, to a lesser extent, royalty rate adjusted value of production are also reasonable approximations for what States actually do (or try to do).
- (ii) Expected future data availability strongly favours the royalty rate adjusted value of production approach — data will be available to support it (much of the data for the current approach will not be available) and data will be available for the last year of the assessment period.

**Table 3** RANKING OF OPTIONS

<b>Option</b>	<b>What States do (or try to do)</b>	<b>Reliability</b>	<b>Overall</b>
Royalty rate adjusted value of production	3	1	1
Royalty rate adjusted value added	2	2	2
Adjusted value added	1	3	3

85. Against this background, and subject to any comments States make in the October and November 2002 conferences, the Commission is inclined to replace the current assessment with an adjusted value of production based assessment.

86. On the question of an elasticity adjustment, it seems that a factor could be required if either the royalty rate adjusted value of production approach or the existing adjusted value added approach were to be adopted, but the size of it would depend on further empirical evidence.

87. The Commission is also inclined to change the presentation of the assessment for revenue from Commonwealth revenue sharing payments relating to off-shore oil and gas. It is inclined to show those revenues as Mining Revenue (rather than as SPPs) but to continue the existing actual per capita assessment.

## ATTACHMENT A

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### BACKGROUND AND HISTORY OF THE MINING ASSESSMENT

1. *Pre-1981.* In the Queensland claimancy inquiries, the Commission split the mining assessment into two categories: Black Coal; and all other minerals combined. The Black Coal revenue base was assessed using profitability, as measured by value added adjusted for wages and salaries, payroll tax, workers' compensation and capital expenditure (averaged over a five-year period)<sup>1</sup>. For Other Minerals, the Commission adopted value of output at the mine site as the revenue base because value added data were not available. Profitability was preferred as the measure of revenue capacity because the Commission considered that a State's capacity depended on the profitability of its mineral production and not on quantities produced or the value of mineral output, even though mineral royalties were usually levied on these bases.

2. *The 1981 Review.* In the 1981 Review, the Commission split the mining assessment into three categories. The new category, Off-shore Petroleum and Natural Gas comprised revenues arising from a revenue sharing agreement between the Commonwealth and Victoria, with the Commonwealth setting the royalty rate. Because the State had little control over the amount of revenue raised, the Commission treated these revenues as though they were grants from the Commonwealth and applied an actual per capita assessment to them.

3. The Commission adopted adjusted value added as the revenue base measure for the other two categories. Again, profitability, as measured by adjusted value added, was preferred as the revenue base measure because the Commission believed it gave the best indication of comparative revenue raising capacity. It noted that, although profitability was not used as the basis upon which royalties were levied for all minerals in all States, it was taken into account implicitly where royalties varied in accordance with changes in world prices and where royalty rates were reduced when mining operations encountered financial difficulties. Profitability also reflected differences in costs as well as differences in the grade of ore and the selling price. The Commission accepted that, for minerals where the royalty was based on value of output, short-term fluctuation in adjusted value added might not be closely correlated with fluctuations in value of output; but it considered that, when comparing State with State over a period of years, relative profitability gave a better indication of relative capacity to obtain royalty revenue.

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<sup>1</sup> This measure of profitability is referred to as adjusted value added.

4. The States' respective revenue needs arising from black coal and from all other minerals were assessed by taking the adjusted value added for each State as its revenue base. Adjusted value added was adopted as an approximation to profitability and it was calculated by deducting from value added for each State (as published by the Australian Bureau of Statistics), the relevant wages and salaries, payroll tax, workers' compensation insurance and average annual capital outlay on mine development.

5. Although the Commission considered that comparisons of adjusted value added on a mineral-by-mineral basis would have been more appropriate, it was unable to obtain the necessary figures from the Australian Bureau of Statistics because of confidentiality restrictions.

6. Another important issue affecting the assessment of mining revenue needs concerned the treatment of rail profits earned by Queensland on the haulage of minerals on its special mineral lines. Queensland claimed these to be a substitute for mining royalties and resulted from greater revenue effort on the State's part rather than from greater revenue-raising capacity. In general, the other States took the view that the whole of the profits on mineral lines should be included in the railway comparisons for the purpose of assessing needs, on the ground that they represented above-standard revenue-raising capacity and not above-standard effort on the part of Queensland.

7. After considering all available evidence, including a consultant's report, it was decided that 25 per cent of Queensland's profit from the haulage of export coal and all of Western Australia's profit from the haulage of domestic coal should be excluded from the standard budget. Those two States thereby retained a benefit from their above standard revenue raising efforts. The remaining 75 per cent of Queensland's profits from export coal and all the profits from the haulage of minerals other than export coal were treated as railway revenue. They were thus interpreted as a reflection of Queensland's relative advantage in the costs of providing rail services or in the ability to raise railway freight revenues. As the railway assessments were then made by the per capita difference method, this treatment of the profits reduced Queensland's railway deficits and commensurately reduced the assessment of that State's financial assistance requirement.

8. ***The 1982 Review.*** In the 1982 Review, the Commission decided needs for black coal and off-shore petroleum and natural gas should continue to be assessed by the procedures adopted for the 1981 Review.

9. While it considered that the 1981 method for the Other Minerals category was unsatisfactory in a number of respects, it concluded that, within the constraints of the available time and data, the only practicable method of comparison was to continue to measure the revenue base using adjusted value added.

10. The Commission examined the submissions from Western Australia and Queensland in relation to the impact of social and economic infrastructure contributions by mining companies on the relative capacities of the States to raise revenue from mining royalties. It was inclined to accept that, in principle, infrastructure contributions by mining companies would reduce their capacity to pay mining royalties.

11. In the absence of suitable details, the Commission used its broad judgment to make conservative estimates of the cost to the companies of servicing such capital outlays in each of the years of the review period for Queensland and Western Australia and their adjusted value added figures for each year of review were thereby reduced.

12. These adjustments reflected the Commission's belief that infrastructure contributions by mining companies reduced their capacity to pay mining royalties and, like extraction costs, were influences which affected the ability of States to raise revenues from royalties.

13. ***The 1985 Review.*** In the 1985 Review, the Commission split the mining assessment into four categories. The new category comprised revenues from uranium in the Northern Territory. Like those for off-shore petroleum and natural gas, uranium royalties were treated as though they were a grant from the Commonwealth.

14. The revenue bases for Black Coal and Other Minerals continued to be measured using profitability<sup>3</sup>. Profitability continued to be preferred as the measure of the revenue base because it reflected all the factors which influence the acceptability of the data on value of production.

15. Adjustments continued to be made in the Other Minerals category. In addition to those made in the 1982 Review, the Northern Territory's revenue base was reduced because of constraints placed on its ability to raise revenues from mining by the long term agreements entered into by the Commonwealth prior to self-government.

16. These adjustments reflected the Commission's continued belief that infrastructure contributions by mining companies, extraction costs, and constraints on a State's freedom to levy royalties were influences which affected the ability of States to raise revenues from royalties.

17. ***The 1988 Review.*** In the 1988 Review, Mining Revenue were assessed in five categories:

- (i) Black Coal;
- (ii) Gold;
- (iii) Uranium
- (iv) Off-shore Petroleum and Natural Gas; and
- (v) Other Mining.

18. Royalties from uranium and off-shore petroleum and natural gas continued to be treated as though they were a grant from the Commonwealth. In the remaining categories, mining revenues were assessed using a capacity to pay criterion, despite the practice of most States of imposing royalties on the value of production. The Commission considered that in the long run the ability of the States to raise revenues from the mining

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<sup>3</sup> The measure of profitability was adjusted value added, calculated using the methods adopted in the 1982 Review, except that capital expenditures were averaged over ten years rather than five.

industry was constrained by the industry's profitability. The available information on the actions of States over the years as mining profits fluctuated supported that view. The revenue base in each mining revenue category was therefore measured as:

- value added of the relevant sectors of the mining industry;
- *less* wages and salaries (including allowances for payroll tax and workers' compensation insurance);
- *less* an estimate of depreciation expenses.

19. Also, for the Northern Territory, the revenue raising capacity implied by this measure was adjusted downwards because long term agreements made by the Commonwealth before self-government prevented the Territory from applying the standard revenue effort to some major mines.

20. One significant change in procedures for the mining revenue comparisons concerned the quantification of the mining revenue for Queensland in the black coal comparisons. As part of its decision to assess zero needs in the Non-Metropolitan Transport — Freight Services category, the Commission decided to treat part of the revenue derived from the haulage of black coal in that State as mining revenue to ensure that the differences between Queensland and other States in the way in which revenue was collected from the mining industry did not influence the relativities. Queensland had long argued that an element of its profit on the carriage of minerals was a substitute for mineral royalties.

21. ***The 1993 Review.*** The option of amalgamating the categories of Black Coal, Gold and Other Minerals was suggested in the Commission's *1991 Technical Issues Report*. The States which supported it argued that, provided the revenue base was measured in a consistent way, there was no reason for special treatment of any mineral. Moreover, a combined assessment would reduce the potential for grant design inefficiency which arose from the concentration of most of the revenue base for any particular mineral in a small number of States. States which opposed amalgamation argued that categories should not be amalgamated where there were substantial differences between States in their revenue raising policies. They argued that the differences in standard effective tax rates for black coal, gold and other minerals indicated that States applied different policies.

22. Although the Commission considered that there was merit in both sides of this argument, it concluded that Mining Revenues should be assessed in a single category called Mining Revenue. The main reasons were:

- (i) while there are differences in the severity of the royalties applied to some minerals (notably gold) in some States, it is not clear that the underlying ability of States to collect revenue differs appreciably between minerals;
- (ii) disaggregated assessments are more prone to grant design inefficiencies;

- (iii) data necessary for the disaggregated comparisons are not readily available and, while estimates could be made (and in the past were), the Commission thought they would be unreliable; and
- (iv) an aggregated assessment is much simpler.

23. Some States asked the Commission to reconsider the 'capacity to pay' approach. States which opposed the capacity to pay approach suggested that the mining revenue assessments should be based on measures such as value of production which more closely reflect the actual practices of the States. Those which supported the capacity to pay approach suggested that the use of value of production would not account for interstate differences in costs of production. Western Australia suggested moving further with the capacity to pay approach by using the economic profit of the mining sector as the revenue base.

24. Although the Commission adopted a legal incidence approach for most revenue assessments, it considered that the capacity to pay approach was more relevant for mining revenue since the mining sector is more reliant on exports than most other sectors, and therefore less able to shift tax liability forward. This implies that, at least in the long run, States would have to take account of the industry's capacity to absorb taxes when setting their revenue policies.

25. For the 1993 review, the Commission decided to measure the revenue base using methods similar to those adopted in the 1988 Review, except that it included:

- a deduction for exploration costs; and
- an adjustment for the price elasticity effects on production levels that could be expected to apply if each State's actual revenue effort were replaced by the standard effort.

It also considered it appropriate to retain the adjustment to the Northern Territory's capacity that allows for the constraints imposed by the remaining long term agreements inherited from the Commonwealth.

26. In the 1993 Review and subsequent updates, the revenue base was thus defined as the adjusted value added for mining (including construction materials and mining nec). States' value added was adjusted by:

- (i) deducting value added for off-shore petroleum and, for the Northern Territory, uranium;
- (ii) including an estimated amount of quasi-royalties for Queensland;
- (iii) deducting wages and salaries net of amounts relating to off-shore petroleum and, for the Northern Territory, uranium; but including related on-costs (payroll tax and workers' compensation insurance);

- (iv) deducting a five year average of exploration expenses, net of amounts relating to off-shore petroleum and, for the Northern Territory, uranium;
- (v) deducting a ten year average of capital expenditure, net of amounts relating to off-shore petroleum and, for the Northern Territory, uranium; and
- (vi) including an adjustment for price elasticity effects.

27. ***The 1999 Review.*** The major issues for the 1999 Review were whether or not to:

- use as the revenue base value of production, adjusted value added or economic rent;
- deduct off-lease exploration expenditure from the revenue base;
- have a separate adjustment for on-lease exploration expenditure;
- assess a rate of return on capital expenditure; and
- assess an elasticity adjustment.

28. New South Wales, Western Australia, Tasmania and the Northern Territory supported, in principle, the Commission's 1995 Research Report proposal to use a measure based on value added as the revenue base.

29. Victoria and Queensland supported value of production as the revenue base because they believed it reflects how most States raised royalties. Queensland argued for adjusted value added as the second best option but firmly opposed an economic rent measure. It said that economic rent bears little relationship to the way States levy royalties and does not correlate well with revenues. Queensland was also concerned with the potential problems associated with deciding a rate of return if an economic rent measure were adopted.

30. Western Australia and the Northern Territory said that the best measure of capacity was the economic rent or long run profitability of the mining industry, and supported an economic rent model because they believed it reflects the true underlying capacity that States tax. They said that even States that do not directly tax profit have regard to it when setting royalty rates. Western Australia noted that both the Industry Commission and the Bradley Report considered economic rent to be the maximum return a community could expect from a mining venture<sup>4</sup>.

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4 Industry Commission, Report on Mining and Minerals Processing in Australia, 1991. The Bradley Report is the Report of the Mineral Revenues Inquiry in Regard to the Study into Mineral (including Petroleum) Revenues in Western Australia, 1986.

31. The Commission decided to retain the 1993 approach of adjusting value added, but reviewed the costs for which adjustments were made.

## ATTACHMENT B

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### DATA AVAILABILITY

1. The problem of missing data is a major one for the Mining assessment. This Appendix outlines those parts of the assessment where data are unavailable and have to be estimated.

#### *Value added*

2. It is necessary to adjust published value added for the mining industry to:

- (i) include an amount for quasi royalties from the rail haulage of black coal in Queensland for the years prior to 2000-01;
- (ii) include an amount in all States for construction materials and mining nec; and
- (iii) exclude an amount for off-shore petroleum in Victoria, Western Australia and the Northern Territory, and uranium for the Northern Territory.

3. *Quasi-royalties.* The amount for quasi-royalties from the rail haulage of black coal to be added back into published data is not based on published data but is an estimate based on a comparison of Queensland Rail (QR) profits with those of other State rail systems. The estimated average excess return earned by QR is applied to the value of fixed plant and equipment used by QR. As a result of changes in coal freight contracts in Queensland, quasi-royalties are assumed to be zero for 2000-01 and subsequent years.

4. *Value added — construction materials and mining nec.* Value added data relating to construction materials and mining nec production are not published for all years. Data at the State level on construction materials are only available for all States for 1992-93. Confidentiality restrictions on the ABS mean that construction materials data for the ACT are included in the figures for New South Wales.

5. *Value added — calculation of off-shore petroleum — Victoria.* Data for value added for off-shore petroleum production in Victoria are not available. However, data on the value added of oil and gas production in Victoria are available from *Mining Operations Australia*, ABS 8415.0, up to 1996-97. It is assumed that the whole amount relates to off-shore production. As gas production (including, possibly, Coal Bed Methane

gas) from the Otway basin comes on stream, this assumption will become more and more unrealistic. Value added as a share of total value added for the earlier years will then be used to estimate data for more recent years.

6. ***Value added— calculation of off-shore petroleum — Western Australia.*** Value added data relating to off-shore petroleum production are not published.

7. ***Value added — calculation of off-shore petroleum and uranium — Northern Territory.*** Value added data for off-shore petroleum in the Northern Territory are not published. As well, data for uranium value added are not available for all years.

### ***Wages and Salaries***

8. It was necessary to adjust published wages and salaries for the mining industry:

- (i) to include an amount for construction materials and mining nec for years for which data were not published; and
- (ii) to exclude an amount for off-shore petroleum and uranium.

Details of the availability of wages and salaries are shown below.

9. ***Wages and salaries — construction materials and mining nec.*** Similar data problems to those outlined for value added data were found with wages and salaries data relating to construction materials and mining nec production as.

10. ***Wages and salaries — calculation of off-shore petroleum — Victoria.*** Data on wages and salaries relating to off-shore oil and gas production are unavailable.

11. ***Wages and salaries — calculation of off-shore petroleum — Western Australia.*** Wages and salaries data relating to off-shore petroleum production are not published.

12. ***Wages and salaries — calculation of off-shore petroleum and uranium — Northern Territory.*** Wages and salaries data relating to off-shore petroleum, and uranium production, are not published.

### ***Capital Expenditure***

13. Capital expenditure data for the mining industry are not available at all for 1985-86 and 1986-87. State level data are unavailable for most years.

14. It was also necessary to adjust published capital expenditure for the mining industry:

- (i) to include an amount for construction materials and mining nec and brown coal for years in which data were not published; and

(ii) to exclude an amount for off-shore petroleum and uranium.

15. **Capital expenditure — construction materials and mining nec.** As with value added data, capital expenditure data relating to construction materials and mining nec production have not been published for all years. Prior to 1988-89, data relating to construction materials and mining nec production were included in published totals. Since 1983-84, New South Wales' data has included an amount for operations within the ACT.

16. **Capital expenditure — Victorian brown coal.** Prior to 1993-94, brown coal data were not included in the published total of capital expenditure for Victoria.

17. **Capital expenditure — calculation of off-shore petroleum — Victoria.** Capital expenditure data for off-shore production are not published for all years.

18. **Capital expenditure — calculation of off-shore petroleum — Western Australia.** Capital expenditure data for off-shore petroleum were not published.

19. **Capital expenditure — calculation of off-shore petroleum and uranium — Northern Territory.** Capital expenditure data for off-shore petroleum and for uranium production are not published.

20. From the 2000-01 Mining Collection, data on capital expenditure will not be available at the State level.

### ***On-Lease Exploration Expenditure***

21. The Australian Bureau of Statistics does not publish data on on-lease exploration expenditure by State. Only a national total is available.

22. Calendar year on-shore petroleum exploration expenditure data are available from Geoscience Australia. The calendar year data were converted to financial years by averaging consecutive years. However, data are not available for 1998 and data for 1997 were used as a proxy.

## ATTACHMENT C

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### HISTORICAL DEVELOPMENT OF ELASTICITY ADJUSTMENT IN THE MINING ASSESSMENT

1. As noted in Volume II of the *1996 Reports on Research in Progress*, revenue bases are intended to measure the capacity of States to raise revenue, assuming they make the average revenue effort. This average effort encompasses the standard rate of tax.

2. The choice of tax rate is within State control and differences in revenue arising from different tax rate choices by the States are not considered to be disabilities. Policy neutrality also requires that rate differences should not affect the assessment of a State's revenue capacity. As a result, revenue measures that assess States' capacities by reference to the level of activity (or adjusted value added in the case of Mining) may need to be adjusted (the elasticity adjustment) to ensure that they capture the level of activity which would have been observed had the States all imposed the standard tax rate.

3. In the 1993 Review, the Commission decided to include an adjustment in the Mining assessment 'for the price elasticity effects on production levels that could be expected to apply if each State's actual revenue effort were replaced by the standard effort.' In support of this decision, the Commission argued that:

since the mining industry is generally dependent on world prices, its level of activity would be sensitive to changes in royalty rates. This view was supported by a consultant's report submitted by Western Australia which provided estimated elasticity coefficients for a number of minerals. These implied that a one per cent increase in royalties could result in decreases in production of between 1.1 and 5.5 per cent, depending on the mineral concerned. The elasticity adjustment we have incorporated in the revenue base assumes that on average a one per cent increase in royalties would result in a three per cent decrease in the base.<sup>1</sup>

4. In the 1999 Review, the Commission reaffirmed the 1993 decision because it felt:

- (i) there was sufficient information to form a reasonable judgement about the size of the elasticity coefficients; and

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<sup>1</sup> Commonwealth Grants Commission, Report on General revenue Grant Relativities, 1993, Volume II, Methods, Assessments and Analysis, p 135.

(ii) the resultant elasticity adjustment was likely to substantially affect the assessment.

5. A factor of 3 was used for the elasticity adjustment for percentage point differences in royalty rates among States.

## SECTION 2: ROYALTY RATES &amp; INTERSTATE COMPARISON



## 2. INTERSTATE ROYALTY RATES &amp; COMPARISON

*Mineral Royalty Rates (Not including State Agreement Acts)*

Commodity	WA	NSW	VIC	QLD	SA	TAS	NT
Aggregate	30c/t		84c/t		20c/t	\$1/t	18% NV
Bauxite	7.5%	35c/t	2.75% SV	10% FOB	2.5% AV*	ad v+prof	18% NV*
Chromite	5% RV	4% EMV	2.75% SV	50c/t	2.5% AV	ad v+prof	18% NV
Clays	30c/t	25-30c/t	2.75% SV	25c-\$1/t	20c/t	\$1.2/t	18% NV
Coal	\$2.25c/t	\$1.7-\$2.2t*	2.75% SV	4%-7% FOR	2.5% AV	ad v+prof	18% NV
Cobalt	2.5% RV	4% EMV	2.75% SV	2% GP	2.5% AV	ad v+prof	18% NV
Copper	5% RV*	4% EMV	2.75% SV	1.5%-4.5% MV	2.5% AV*	ad v+prof*	18% NV
Dimension Stone	5% RV	35c/t	\$3.12/t	50c/t	20c/t	\$5/m <sup>2</sup>	18% NV
Diamonds	7.5% RV*	4% EMV	2.75% SV	2.7% over 30k	2.5% AV	ad v+prof	18% NV
Dolomite	30c/t	50c/t	84c/t	25c/t	25c/t	60c-\$1.2t	18% NV
Felspar	5% RV	50c/t	2.75% SV	50c/t	50c/t	ad v+prof	18% NV
Gallium	5% RV	4% EMV	2.75% SV	2% GP	2.5% AV	ad v+prof	18% NV
Gamet	2.5-5% RV	4% EMV	2.75% SV	2.7% over 30k	2.5% AV	ad v+prof	18% NV
Gems and Precious Stone	7.5% RV	4% EMV	2.75% SV	2.7% over 30k	2.5% AV	ad v+prof	18% NV
Gold	1.25% RV*	4% EMV	Nil	1.5%-4.5% MV	\$0.30/g unit royalty*	ad v+prof	18% NV
Gravel	30c/t		84c/t	50c/t	20c/t	60c/t	18% NV
Gypsum	30c/t	35c/t	24c-84c/t	25c/t	20c/t	ad v+prof	18% NV
Heavy Mineral Sands	50c/t	4% FOB	2.75% SV	5% MCV	2.5% AV	ad v+prof	18% NV
Iron Ore Lump Ore	7.5% RV*	35c/t	2.75% SV	35c/t	2.5% AV*	ad v+prof	18% NV
Fine Ore	5.625% RV*						
Beneficiated Ore	5% RV*						
Lead	5% RV*	4% EMV	2.75% SV	1.5%-4.5% MV	2.5% AV*	ad v+prof*	18% NV
Limestone	50c/t	0.35c/t	84c/t	30c/t	20c/t	60c-\$1.2t	18% NV
Manganese	7.5% RV	4% EMV	2.75% SV	2% GP	2.5% AV	ad v+prof	18% NV
Minor Minerals	Various	Various	2.75% SV	2% GP	2.5% AV	ad v+prof	18% NV
Nickel	2.5% RV*	4% EMV	2.75% SV	2% GP	2.5% AV	ad v+prof	18% NV
Palladium	5% RV	4% EMV	2.75% SV	2% GP	2.5% AV	ad v+prof	18% NV
Platinum	2.5% RV	4% EMV	2.75% SV	2% GP	2.5% AV	ad v+prof	18% NV
Rare Earth Minerals	5% RV	4% EMV	2.75% SV	2% GP	2.5% AV	ad v+prof	18% NV
Red Oxide	5% RV	70c/t	2.75% SV	35c/t	2.5% AV	ad v+prof	18% NV
Rock	30c/t	0.35c/t	84c/t	50c/t	20c/t	60c/t	18% NV
Salt	30c/t	4% EMV	2.75% SV	5% MCV or 50c/t	20c/t	ad v+prof	18% NV
Silver	2.5% RV	4% EMV	2.75% SV	1.5%-4.5% MV	2.5% AV*	ad v+prof	18% NV
Spodumens	5% RV	4% EMV	2.75% SV	2% GP	2.5% AV	ad v+prof	18% NV
Spongoite	5% RV		2.75% SV	2% GP	2.5% AV	ad v+prof	18% NV
Talc	50c/t	85c/t	2.75% SV	50c/t	50c/t	ad v+prof	18% NV
Tantalite	2.5% RV	4% EMV	2.75% SV	2% GP	2.5% AV	ad v+prof	18% NV
Tin	2.5% RV	4% EMV	2.75% SV	2% GP	2.5% AV	ad v+prof	18% NV
Tungsten	5% RV	4% EMV	2.75% SV	2% GP	2.5% AV	ad v+prof	18% NV
Uranium	5% RV*				2.5% AV*	ad v+prof	NA*
Vanadium	5% RV*	4% EMV	2.75% SV	2% GP	2.5% AV	ad v+prof	18% NV
Zinc	5% RV*	4% EMV	2.75% SV	1.5%-4.5% MV	2.5% AV*	ad v+prof*	18% NV
Other Minerals	5% RV	4% EMV	2.75% SV	2% GP	2.5% AV	ad v+prof	18% NV

\* State Agreement Act applies or alternative calculation.



### Abbreviations used in mineral royalty table

Abbreviation	Description
AV	Assessed Value = normal market value assuming normal processing & transportation cost to port
GP	Gross Proceeds = quantity x price (or gross revenue) above \$30,000
EMV	Ex-mine Value = mineral value once mined and brought to the surface less treatment costs,
FOB/FOR	Free on Board/Rail
NV	Net Value of the saleable mineral commodity sold or removed without sale from a production unit in a royalty year.
MCV	Mine Concentrate Value
MV	Metal Value = value of the recoverable metal within the extracted ore.
NR	Net Realisation = operating profit after production costs, certain capital and exploration costs with a \$50,000 NV general exemption threshold. Its equivalent to an ad valorem rate of approx. 3% - 4% of sales value.
RV	Realised Value - except gold, which is based on the average market price for the last quarter.
SV	Sales Value – value as sold less any costs directly incurred with the sale.
<i>Ad v + Prof.</i>	ad valorem and profit-based combination according to $RS = \frac{0.016N^2 + 0.35P^2}{N}$ where R\$ is the royalty payable, P is annual profit and N is annual net sales

### Petroleum Royalty

Table of Petroleum Royalty Rates

WA	NSW	VIC	QLD	SA	TAS	NT
10% - 12½% of well-head value or resource rent royalty (RRR) (State Agreement)	10% of well head value	10% of well head value (onshore only)	10% of well head value less field lease rentals	10% of well head value less field lease rentals (State Ratification)	12% of gross well head value	10% of gross value at the well head

#### Petroleum Well-head Royalty

The well-head value is derived by taking the gross value of petroleum recovered and deducting all costs incurred between the well head and the point of sale. Deductible costs are normally confined to the processing, storage and transport of the petroleum recovered by the producer to the point of sale.

#### Petroleum Royalty Rates

Royalty rates between 10% and 12.5% of well-head value generally apply in Western Australia. Production from primary production licences attracts a rate of 10% while production from secondary licences attracts a rate of 12.5%. Primary licences are those initially issued to producers, while secondary licences are those subsequently issued to cover the width of the producing field.

#### Resource Rent Royalty

The Barrow Island Royalty Variation Agreement Act 1982 invoked a resource rent royalty on Barrow Island petroleum production which replaced the well-head royalty and excise system that had previously applied. A royalty rate of 40% equivalent net value (gross revenue minus eligible deductions).

#### Petroleum Resource Rent tax