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**SEEA Revision
Issue 15b
Outcome Paper**

Outcome Paper for Global Consultation

Issue #15b: Recording the ownership of mineral related assets¹

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¹ This outcome paper has been prepared by the SEEA Editor. It is based on papers presented to the London Group of Experts on Environmental Accounting and discussions among those experts. Investigation and research for this outcome paper was led by Peter Comisari of the Australian Bureau of Statistics.

A. Introduction

1. The issue of the recording of ownership of mineral related assets is one of the more difficult in the System of Environmental and Economic Accounts (SEEA) revision process. There is simply no neat accounting for the general situation of ownership of mineral and energy resources that exists in most countries. This is due to both the unusual nature of the ownership and extraction operation compared to other activities and also due to the underlying conventions of the SNA that place some limitations on the way in which the relevant flows can be presented. Consequently, the proposed choice of accounting treatment is an on balance decision.

2. Chapter 10 of SEEA-2003: “Making environmental adjustments to the flow accounts” contains five sets of treatment options in its section on depletion. The SEEA revision outcome papers for Issue #13: Recording of Depletion for Non-renewable Resources and Issue #14: Recording of Depletion for Renewable Resources make recommendations in relation to the first three topics. This outcome paper covers topics iv and v in the following list of topics.

- i. Identifying the income and depletion elements of resource rent.
- ii. Recording mineral exploration and mineral deposits.
- iii. Recording the additions to and subtractions from the stock of environmental assets.
- iv. Recording ownership of mineral-related assets.
- v. Recording depletion—asset recorded in the legal owner's balance sheet.

3. The December 2007 meeting of the London Group in Rome took a unanimous position on the attribution of ownership of mineral-related assets. Mineral related assets in this context comprise the assets mineral exploration and mineral and energy resources. The London Group unanimously rejected the notion that the mineral exploration asset be combined with the mineral and energy resources to form a “developed natural resource”. Instead, in all cases, the mineral exploration asset is recorded in the balance sheet of its legal owner. This view is explained further in the outcome paper for Issue #13.

4. For the mineral and energy resource itself, attributing ownership is less straightforward. The London Group nevertheless unanimously agreed that under conditions typically governing the use of a mineral and energy resource, it is appropriate to effect a partitioning of ownership of the natural resource between the extractor undertaking the resource extraction and the legal owner of the natural resource. However, the London Group sought further elaboration of accounting for income under its preferred outcome.

5. In the period since London Group’s decision on this issue the position of the 2008 System of National Accounts (SNA) has become clear. In short, the 2008 SNA now clearly advocates attribution of ownership of the mineral resource asset to its legal owner, and not a partitioning of the resource. Nevertheless, there are entirely valid reasons why the SEEA and the SNA can and should adopt different treatments. In particular, the SEEA should record a depletion charge against output and income and therefore we need to consider the important questions of who owns the mineral resource and how various related flows (e.g. depletion, rents/royalties) are to be accounted for. The SEEA requires a complete and cohesive accounting of all these elements.

B. Resource rent, the valuation of natural resources and depletion

6. To understand the proposed approaches to determining ownership of mineral and energy resources a broad understanding of resource rent, the valuation of natural resources and depletion is required. Resource rent is income that accrues to the owner of a natural resource through its use in production. It is derived residually by deducting from output amounts for intermediate consumption, compensation of employees and the costs of produced assets (both depreciation and a return to produced assets). By deducting all of the costs of production the

resulting income stream – the resource rent - can be attributed to the single asset, the natural resource.

7. Using this income stream it is possible to estimate the value of the natural resource by looking at the stream of resource rent that the owner of the asset will earn over the asset's life. A common technique used for this estimation is the net present value (NPV) method that discounts the income to be earned in future years to give a value for the resource in the current period. The NPV formula can be represented by equation 1.

$$V_t = \sum_{s=1}^N \frac{RR_{t+s}}{(1+r_t)^s} \quad (\text{Equation 1})$$

where: V = net present value, RR = resource rent, r = discount rate, N = asset life. Note that the time period "t" refers to the accounting period in respect of RR and r but for V it refers to the balance sheet date at the end of the accounting period – i.e. this formulation gives an estimate of the value at the end of period t.

8. Depletion is defined as the decline in value of a natural resource during an accounting period due to its physical removal or extraction. The decline in value is the difference between the value of the asset at the beginning of the year and the end of the year. Usefully the concept of depletion can be analysed within the NPV framework. Thus reworking equation 1 to show the value of V_{t-1} less V_t leads to the following equation

$$d_t = V_{t-1} - V_t = RR_t - rV_{t-1} \quad (\text{Equation 2})$$

where: d = depletion

Equivalently,

$$RR_t = d_t + rV_{t-1} \quad (\text{Equation 3})$$

9. Thus within an NPV framework, the resource rent is equal to depletion plus a return on the value of the natural resource. This partitioning of resource rent into a change in value (depletion) component and a return or income component is a fundamental one. In fact, the partitioning applies equally to all types of assets including produced assets such as machines and buildings and financial assets such as loans. The components are usually referred to differently however. For produced assets the change in value is known as depreciation or consumption of fixed capital and the return is the return on produced assets or equivalently the opportunity cost of capital. For a financial loan the change in value will equal the repayment of principal and the return component for a loan will equal the interest payable by the borrower.

C. Royalties and rent

10. In the case of mineral and energy resources there are usually payments made by an extracting firm to the government as the legal owner of the mineral and energy resource. These are commonly referred to as royalties. These payments are defined in the SNA as rent and are classified as a form of property income along with flows such as interest and dividends. While a distinction is usually made between royalties/rent in an SNA sense and resource rent in fact there are strong linkages between the two that need to be understood.

11. First, both royalties and resource rent are generated from the extraction of a natural resource. Depending on the arrangements in place in a given country for a particular mineral and energy resource, the government may seek relatively small or large proportions of the resource rent which can be paid to the government by the extractor in the form of royalties. The important connection here is that it is assumed that the royalties have some link to the amount of extraction that occurs in a particular period – thus as extraction rises and falls so does the amount of royalties. At the very least it is assumed that if there is no extraction there

is no royalty payment and that royalties should not exceed the resource rent earned by the extractor in a period.

12. On the basis of this assumption one can see that if royalties are less than the total resource rent earned, then both the extractor and the government effectively share the resource rent. This being the case it is possible to use equation 1 and determine the value of the mineral deposit effectively owned by each party – i.e. the resource can be partitioned based on the value of the future income streams that each party will receive.

13. Further, following equation 3 we can see that the resource rent earned by each owner can be partitioned into a depletion and a return/income component. If depletion were to be zero then for both the extractor and the government all of the resource rent would be income. If depletion is not equal to zero then both the royalty payment (accruing to government) and the remaining resource rent (accruing to the extractor) need to be partitioned to show a depletion component.

14. With this background in resource rent, depletion and royalties, description of the possible accounting treatments for the ownership of mineral and energy resources can be undertaken.

D. Scenarios for using natural resources

15. It is useful to examine the use of mineral and energy resources in the broader context of natural resources. The 2008 SNA (paragraph 17.314) identifies three sets of conditions that may apply to the use of natural resources:

1. The owner may permit the resource to be used to extinction;
2. The owner may allow the resource to be used for an extended period of time in such a way that in effect the user controls the use of the resource during the time with little if any intervention from the legal owner; or
3. The owner may extend or withhold permission to continue use of the asset from one year to the next.

16. Looking at the various possible arrangements to use mineral and energy resources, the first option, whereby the resource is permitted to be used to extinction, clearly represents the sale of an asset. The 2008 SNA states that when a unit owning a mineral and energy resource cedes all rights over it to another unit, this constitutes the sale of the mineral and energy resource. This is not considered to be a typical arrangement for ownership and usage of mineral and energy resources.

17. The second set of conditions effectively represents a shift in economic ownership (i.e. the risks and rewards of ownership) from the owner to the user. The great majority of arrangements for the extraction of mineral and energy resources are expected to be governed by these types of conditions. One consideration may be who is responsible for the costs of mine decommissioning. If decommissioning costs are wholly or mainly met by the government, then a potentially substantial portion of the risks of owning the mineral and energy resource also reside with the government.

18. Finally, the third set of conditions suggests that the legal owner maintains economic ownership by assuming most of the risks and rewards of ownership. In particular, the users' absence of long term control and access to the resource points to a simple operating lease type of arrangement. In practice, given the often very significant start-up and operating costs associated with mineral extraction, it is unlikely that a lessee would commit to this type of lease arrangement.

19. Until an arrangement has been made with an extractor, economic ownership of the mineral and energy resource resides with the legal owner. By extension, it may be concluded that economic ownership of the mineral and energy resource reverts to the legal owner at the conclusion of the extractive licence.

20. In all of these scenarios one factor that should be kept in mind is the extent to which the legal owner, usually the government, is entitled to share in the resource rent earned by the user of the natural resource. Thus even under conditions 1 and 2 where the legal owner plays little part in the extraction process and decision making, it may be reasonable to assume that the legal owner retains significant economic ownership if the benefits that are earned through extraction predominantly end up with the government. Further, the notion that economic ownership may in fact be shared needs also to be considered.

21. In practice, the second set of conditions is the most likely to apply to mineral and energy resources and it also represents the more challenging and contentious of the sets of conditions from an environmental-economic accounting perspective. Particularly so since it crosses into the area of leases, licences and permits which was one of the more contentious areas of economic accounting during the most recent SNA revision process.

22. Under the second set of conditions, there are three distinct options for allocation of economic ownership of the mineral resource:

- i. record on the balance sheet of the legal owner;
- ii. record on the balance sheet of the extractor; or
- iii. partition economic ownership between the extractor and the legal owner.

23. The following sections provide a brief description of how the various options for the treatment of balance sheet values and income flows would work in practice. Two possible treatment options are suggested for partitioning economic ownership of the mineral resource. For each option a full exposition of the accounting entries is provided in the appendix.

E. Option 1: Recording economic ownership on the balance sheet of the legal owner: 2008 SNA

24. One option is to record the value of the mineral and energy resource on the balance sheet of the legal owner. It represents the recommendation in the 2008 SNA and is current practice within a number of statistical agencies. The accounting for option 1 is presented in Table 1 in the appendix.

25. The logic for the SNA treatment is explained in paragraph 13.50

“...Because there is no wholly satisfactory way in which to show the value of the asset split between the legal owner and the extractor, the whole of the resource is shown on the balance sheet of the legal owner...” (2008 SNA paragraph 13.50)

26. Under this approach, the flow accounts record the income from sales of the extracted resource in the accounts of the extractor and the royalties paid to the legal owner by the extractor in the allocation of primary income account. As discussed above the royalties are regarded as a form of property income. Further, there is no charge for depletion that is made in the production accounts and the change in the value of the mineral and energy resource is recorded in the other change in the volume of assets account. Often however, in the presentation of national mineral and energy resource accounts, rather than in SNA accounts, depletion is allocated against the income of the extractor to give estimates such as depletion adjusted operating surplus and value added.

27. An important underlying assumption in the SNA is that the royalty flow is all property income. That is, it contains no element of depletion. This assumption is present since the underlying basis for the royalty is assumed to be a resource lease that by definition involves the use of a resource with an infinite life (2008 SNA paragraph 17.310). Following the earlier discussion on this issue, if a resource did have an infinite life then the assumption of no depletion would be appropriate and consequently all of the royalty would be correctly treated as property income. However, since for mineral and energy resources this assumption is known not to hold, the SNA treatment of royalties is inappropriate.

28. Overall, the primary difficulty of this approach from a SEEA perspective is that there is no recognition of the depletion flow in the transaction accounts and hence no accounting aggregates such as depletion adjusted operating surplus or value added can be part of the sequence of accounts. Further, even if a depletion flow was recognised as a transaction it is unclear which choice should be made as to where to record the depletion. Should it be deducted from the operating surplus of the extractor or should it be shown in the accounts of the legal owner to reflect the decline in the value of the resource that they own?

29. Since one of the key aims of the SEEA is to explicitly make the connection between the run-down in wealth due to the extraction of resources and the economic production accounts, the SNA treatment is deficient from a SEEA perspective and alternative accounting treatments must be found. The remaining options attempt to deal with this choice that is not made within the 2008 SNA.

F. Option 2: Recording ownership on the balance sheet of the extractor – SEEA-2003 option D2

Option [D2] shows ... the ... deposit as being in the de facto ownership of the extractor. In addition the extractor has a financial liability towards the owner corresponding to his share of the resource rent. This amount is also shown as a financial claim in the balance sheet of the owner.

30. SEEA-2003 Option D2 attributes the entire ownership of the mineral and energy resource to the extractor. This option also requires that the extractor record a financial liability on their balance sheet based on the share of the resource rent they will be required to pay to the legal owner. The legal owner records a corresponding financial asset. Deriving the share might be difficult as often the royalty paid to the legal owner is dependent on the amount of extraction and this is likely to vary from year to year.

31. One suggested approach in SEEA-2003 is to look at the share of resource rent earned by the two parties during the accounting period – i.e. for a balance sheet at the end of the period one would use the flow information from that period. This might be done by comparing the total resource rent earned to the royalty payment from extractor to legal owner.

32. An alternative approach is to forecast future royalty payments to the legal owner based on intended extraction schedules and use an NPV approach to discount that stream of income. This would derive a direct estimate of the liability of the extractor to the legal owner. It is noted as well that this second method should ensure that the net worth of the economic and the legal owners aligns with the future income accruing to the owners. The relevant accounting entries are shown in Table 2 in the appendix.

33. SEEA-2003 paragraph 10.98 notes however that

“One unsatisfactory aspect of this option is that the changes to the value of the deposit resulting from changes in relative prices, from new discoveries and from changes in the extraction rate all affect the level of the financial claim and liability as well as the value of the mineral deposit itself. This is a most unusual situation for financial assets which are usually clearly specified at the time they are acquired and not subject to such fluctuations. These fluctuations also have implications for the partitioning of payments into a capital and income element.” (SEEA-2003, paragraph 10.98)

34. Regarding the income flows under this approach the SEEA-2003 indicates that the part of the flow between extractor and legal owner that represents the depletion of the natural resource should be treated as a financial transaction reducing the value of the financial liability of the extractor. (Much the same as in the case of a financial loan where there is a repayment of principal.) The remainder should be treated as property income paid by the extractor as a form of interest payment on the liability. Thus, unlike the SNA approach, the royalty payment would be partitioned.

35. While the SEEA paragraph quoted above notes some of the measurement difficulties there are also some important presentational considerations. The balance sheet outcomes show the correct net worth positions of both owners reflecting future income streams. Further, because the entire value of the mineral resource remains on the balance sheet of the extractor all of the relevant depletion of the resource will be shown against the production accounts of the extractor thus providing a clear measure of depletion adjusted operating surplus and value added in the accounts.

36. However, a major change relates to the treatment of the royalty flow. Since this is now treated as a financial asset/liability, the associated transactions and changes in this asset/liability need to be accounted for. This is done by showing a financial transaction between the extractor and the legal owner equal to the depletion component of the royalty due to the legal owner. In addition there is a repayment of interest shown in the primary income accounts of both parties. In effect the extractor is shown as paying off the debt of the future royalty flow through the extraction and depletion of the minerals. While this leaves the accounts in good balance it may be of concern that the royalty flow traditionally regarded as an income flow has been partitioned.

G. Option 3: Partitioning the mineral resource – SEEA option D1

Option [D1] shows ... the value of the deposit in the balance sheet of the legal owner. If the agreement between the owner and the extractor allows for the extractor to retain some of the resource rent coming from the asset, the ownership of the asset should be partitioned accordingly.

37. Option D1 suggests recording the mineral and energy resource on the balance sheet of the legal owner. However, it further states that where the extractor is permitted to retain some of the resource rent, ownership of the mineral and energy resource should be partitioned. Given that, in most cases, the extractor could be expected to retain some of the resource rent, option D1 will generally result in a partitioning of ownership.

38. Where this is the case, it is considered appropriate to perform a simple partitioning of the mineral and energy resource based on the relative shares of expected resource rents and expected rent (royalty) payments. If the mineral resource is already being valued using the NPV of expected resource rents, it is a relatively straightforward method to apply in practice.

39. The share of the mineral resource ‘owned’ by the legal owner commands the payment of rent (royalty) from the extractor. SEEA-2003 provides a few different ways of treating the royalty flow all of which recognise that where there is depletion, the royalty flow must be partitioned in some way.

40. The first method (option E2 in SEEA-2003) records the depletion element of the royalty payment as a capital transfer paid by the extractor to the legal owner. This then reduces the value of the mineral and energy resource on the balance sheet of the legal owner and reduces the net lending position of the extractor.

41. The second method (option E3 in SEEA-2003) shows the entire royalty payment from the extractor as a gross royalty flow and then records depletion as a deduction in the primary income account of the legal owner. Depletion reappears as a flow in the capital account thus accounting for the change in the value of the resource. It is noted that where the ownership is partitioned both the extractor and the legal owner will record amounts of depletion.

42. Accounting entries for both methods of treating the flows under this option are shown in Tables 3A and 3B in the appendix.

H. Option 4: Partitioning the mineral resource – imputed financial lease option

43. This option also results in a partitioning of the ownership of the mineral and energy resource between the legal owner and the extractor under conditions typically governing the use of a mineral resource. While this option has similarities to both options D1 and D2 it considers a different form of partitioning based on the time at which the asset is under effective economic ownership. In this regard it is more a variant on option D2.

44. The starting point for the development of this option is to consider that while a mineral and energy resource will have a particular resource life, this life is likely to be longer than the period of the extractive licence held by the extractor. In this circumstance the economic ownership of the extractor should be considered to extend only until the end of the licence and hence the value of the resource to the extractor is the discounted flow of earnings over the period of the licence. Any potential earnings beyond the period of the licence should be shown as accruing to the legal owner to whom economic ownership reverts at the end of the licence.

45. One consideration in this option is whether there are in fact any potential earnings that should be accounted for beyond the period of the extractive licence. It might be argued that without an extractor there can be no earnings that accrue to the legal owner. Consequently, it may be reasonable to assume that extraction will continue beyond the period of a current extractive licence and that this extraction would be undertaken by an extractor under similar arrangements as exist during the licence.

46. It is noted that under options 2 and 3 there is no consideration of the period of the licence and hence the values reflected in the balance assume that attribution of economic ownership remains the same over the entire resource life.

47. It is important to recognise that while the value of the mineral and energy resource is partitioned, the earnings in any particular period are either earned by the extractor or by the legal owner but not split. Thus the full depletion of the resource should be shown against the extractor during the period of the licence but shown against the legal owner in the period after the licence.

48. At the same time, during the period of the extractive licence it is also the case that extractor makes royalty payments to the legal owner. How should these be treated? Under this option it is proposed to establish an imputed financial lease equal in value to the expected value of the future stream of royalty payments. The flows associated with the imputed financial lease are recorded as interest in the primary income account and as repayment of principal in the financial account.

49. The accounting entries suggested by option 4 are presented in Table 4 in the appendix.

50. A difficulty with this option is the ability to account precisely for the changing value of the mineral resource in the accounts of the legal owner and the extractor. When applying the NPV method in the first period – as is done in the appendix, Table 4 – it can be seen that the change in value of the mineral and energy resources from the perspective of the extractor is greater than the total depletion measured in other examples because the value of the mineral and energy resource is being depleted over the (shorter) life of the licence. At the same time the value of the mineral and energy resource to the legal owner actually increases during the first period since their income stream is one period closer to realisation.

51. In the example in the appendix the changing value for the legal owner has been accounted for in the other changes in volume of asset account to ensure reconciliation of the balance sheet positions.

52. While this accounting issue is of concern, this option does allow for depletion to be allocated against the extractor and permits the partitioning of ownership that takes into account the effect of the extractive licence.

I. Conclusion

53. None of the options are completely satisfactory. It is simply not possible in a case of split ownership of a natural resource to show the appropriate balance sheet positions, the attribution of depletion against production, and a traditional recording of royalties as property income, in a simple and complete manner given the broadly accepted structures and conventions of national accounting.

54. A choice of accounting approach must therefore be based on the relative merits of the various options. Four questions are central in determining an agreed treatment.

1. In cases where there is some sharing of resource rent must there be an effective partitioning of the value of the mineral and energy resource between the legal owner and the extractor? Alternatively, ownership might be simply allocated to one or the other regardless of whether the resource rent is shared. This alternative might be particularly appropriate where the legal owner or the extractor is entitled to the large majority of the resource rent.

2. Should the economic ownership of a mineral and energy resource revert to the legal owner at the end of an extractive licence? Alternatively the economic ownership might be assumed to continue with an extractor following the end of the licence.

3. Should the entire amount of depletion to be recorded in the accounts of the extractor? Alternatively, depletion might be recorded against both the extractor and the legal owner or solely against the legal owner if the value of the mineral and energy resource was allocated solely to the legal owner.

4. Should the royalties payable by the extractor be partitioned in cases where there is depletion of the mineral and energy resource? Alternatively, the entire value of the royalty payment would need to be recorded as property income.

55. On balance the London Group concluded that the imputed financial lease option (option 4) was the most suitable. Thus the Group accepted that there should be partitioning of the value of the mineral and energy resource, that the economic ownership should revert to the legal owner following the end of the extractive licence, that it is preferable that the entire amount of depletion be recorded in the accounts of the extractor. The Group made no clear recommendation with regard to the treatment of royalties.

56. While the London Group's recommended treatment seems to provide a solution to a number of the requirements, there is a difficult accounting entry to reconcile and it will not be straightforward to implement. In this regard, the support of national accountants will be important during any implementation of this approach.

Appendix 1: Accounting options for recording shared ownership of a mineral deposit.

The following tables present the various options discussed in this paper. Opening and closing balance sheet positions are defined and all relevant flow account entries are included.

The underlying example has one legal owner and one extractor. The extractor earns output from sales of extracted mineral deposits, has costs of intermediate consumption, compensation of employees and consumption of fixed capital.

Total resource rent (net operating surplus less return on fixed capital) is equal to 100 per annum. The extractor pays 56 per year in royalties to the legal owner. Based on the changing value of the resource the depletion can be estimated. In most cases this is 61 leaving a return to natural resources out of the resource rent of 39.

To determine asset values the stream of resource rent is assumed to flow for 10 years at the same rate. The same is assumed for the flow of royalties. The NPV approach is used to discount the stream of income using a 5% discount rate. For option 4, the extractive licence is assumed to last for 5 years and the total asset life is 10 years.

The following table provide relevant NPV results based on these assumptions

Table A

	Income (RR) flow #1	Income (RR) flow #2	Income (RR) flow #3	Royalty flow #1	Royalty flow #2	Net RR flow
NPV - beg. Year 1	772	433	339	432	242	340
NPV - end Year 1	711	355	356	398	199	313
Flow - Y1	100	100	0	56	56	44
Y2	100	100	0	56	56	44
Y3	100	100	0	56	56	44
Y4	100	100	0	56	56	44
Y5	100	100	0	56	56	44
Y6	100	0	100	56	0	44
Y7	100	0	100	56	0	44
Y8	100	0	100	56	0	44
Y9	100	0	100	56	0	44
Y10	100	0	100	56	0	44

Note that in all examples and options that follow the total net worth of the economy at the beginning and end of the period is the same. Net worth at the start of the period is equal to the value of the mineral deposit (772) and at the end of the period it is equal to the depleted value of the mineral deposit (711) plus the cash generated through selling the extracted minerals (150) – a total of 861.

**Option 1: Recording ownership on the balance sheet of the legal owner: 2008
SNA**

Table 1

Transaction	Legal owner		Extractor	
	Resources/ assets	Uses/ Liabil.	Resources/ assets	Uses/ Liabil.
<i>Opening balance sheet</i>				
Mineral deposit	772			
Net worth	772			
<i>Production account</i>				
Output – sales from extraction			1000	
Intermediate consumption				500
Gross Value Added			500	
Consumption of fixed capital			-150	
Net Value Added			350	
<i>Generation of income account</i>				
Compensation of employees				200
Gross operating surplus			300	
<i>Allocation of primary income account</i>				
Consumption of fixed capital			-150	
Net operating surplus			150	
Royalties	56			56
Net saving		56		94
<i>Capital account</i>				
Net lending		56		94
<i>Financial account</i>				
Increase in cash	56		94	
<i>Other changes in the volume of assets a/c</i>				
Depletion	-61			
<i>Closing balance sheet</i>				
Mineral deposit	711			
Cash	56		94	
Net worth	767		94	

Option 2: Recording ownership on the balance sheet of extractor : SEEA-2003 option D2

Assume that the financial asset/liability is based on NPV of royalty payments. The partitioning of the royalty flow between interest and repayment of principal has been derived by estimating the repayment of principal based on the change in NPV of the royalty flow (Table A: Royalty flow #1) and then deducting this from the total royalty flow.

Table 2

Transaction	Legal owner		Extractor	
	Resources/ assets	Uses/ Liabil.	Resources/ assets	Uses/ Liabil.
<i>Opening balance sheet</i>				
Mineral deposit			772	
Imputed loan	432			432
Cash	0		0	
Net worth	432		340	
<i>Production account</i>				
Output – sales from extraction			1000	
Intermediate consumption				500
Gross Value Added			500	
Consumption of fixed capital			-150	
Net Value Added			350	
Depletion			-61	
Depletion adjusted Net Value Added			289	
<i>Generation of income account</i>				
Compensation of employees				200
Gross operating surplus			300	
Consumption of fixed capital			-150	
Net operating surplus			150	
Depletion			-61	
Depletion adjusted operating surplus			89	
<i>Allocation of primary income account</i>				
Interest on imputed loan	22			22
Depletion adjusted saving		22		67
<i>Capital account</i>				
Depletion adjusted saving	22		67	
Depletion			-61	
Net lending		22		128
<i>Financial account</i>				
Repayment of loan principal	-34			-34
Increase in cash	56		94	
Net lending	22		128	
<i>Closing balance sheet</i>				
Mineral deposit			711	
Imputed loan	398			398
Cash	56		94	
Net worth	454		407	

Option 3A: Partitioning ownership of mineral deposit : SEEA-2003 option D1

Partitioning based on resource rent and royalty streams. Resource rent equals 100 with depletion of 61 and income flow of 39. Return on produced assets equals 50. Depletion recorded as capital transfer.

Partitioning of the royalty flow between interest and repayment of principal: Repayment of principal is equal to the change in NPV of the royalty flow (Table A: Royalty flow #1). Interest is equal to the total royalty payment less repayment of principal.

Table 3A

Transaction	Legal owner		Extractor	
	Resources/ assets	Uses/ Liabil.	Resources/ assets	Uses/ Liabil.
<i>Opening balance sheet</i>				
Mineral deposit	432		340	
Cash	0		0	
Net worth	432		340	
<i>Production account</i>				
Output – sales from extraction			1000	
Intermediate consumption				500
Gross Value Added			500	
Consumption of fixed capital			-150	
Net Value Added			350	
<i>Generation of income account</i>				
Compensation of employees				200
Gross operating surplus			300	
Consumption of fixed capital			-150	
Net operating surplus			150	
<i>Allocation of primary income account</i>				
Royalty	22			22
Net saving		22		128
<i>Capital account</i>				
Net saving	22		128	
Capital transfer (Depletion)	34			34
Net Lending		56		94
<i>Financial account</i>				
Increase in cash	56		94	
<i>Other changes in the volume of assets a/c</i>				
Depletion	-34		-27	
<i>Closing balance sheet</i>				
Mineral deposit	398		313	
Cash	56		94	
Net worth	454		407	

Option 3B: Partitioning ownership of mineral deposit : SEEA-2003 option D1

Partitioning based on resource rent and royalty streams. Resource rent equals 100 with depletion of 61 and income flow of 39. Return on produced assets equals 50. Gross royalty flow and depletion recorded in income accounts.

Table 3B

Transaction	Legal owner		Extractor	
	Resources/ assets	Uses/ Liabil.	Resources/ assets	Uses/ Liabil.
<i>Opening balance sheet</i>				
Mineral deposit	432		340	
Cash	0		0	
Net worth	432		340	
<i>Production account</i>				
Output – sales from extraction			1000	
Intermediate consumption				500
Gross Value Added			500	
Consumption of fixed capital			-150	
Net Value Added			350	
Depletion			-27	
Depletion adjusted Net Value Added			323	
<i>Generation of income account</i>				
Compensation of employees				200
Gross operating surplus			300	
Consumption of fixed capital			-150	
Net operating surplus			150	
Depletion		34		27
Depletion adjusted operating surplus	-34		123	
<i>Allocation of primary income account</i>				
Royalties (including depletion)	56			56
Depletion adjusted saving		22		67
<i>Capital account</i>				
Depletion adjusted saving	22		67	
Depletion	-34		-27	
Net Lending		56		94
<i>Financial account</i>				
Increase in cash	56		94	
<i>Other changes in the volume of assets a/c</i>				
<i>Closing balance sheet</i>				
Mineral deposit	398		313	
Cash	56		94	
Net worth	454		407	

Option 4: Partitioning the mineral resource – imputed financial lease option

Assume that the financial asset/liability is based on NPV of royalty payments

Assume value of mineral deposit partitioned based on extractors income stream during

extractive licence and legal owners income stream after extractive licence

Partitioning of the royalty flow between interest and repayment of principal: Repayment of

principal is equal to the change in NPV of the royalty flow (Table A: Royalty flow #1).

Interest is equal to the total royalty payment less repayment of principal.

Table 4

Transaction	Legal owner		Extractor	
	Resources/ assets	Uses/ Liabil.	Resources/ Assets	Uses/ Liabil.
<i>Opening balance sheet</i>				
Mineral deposit	339		433	
Imputed loan	242			242
Cash	0		0	
Net worth	581		191	
<i>Production account</i>				
Output – sales from extraction			1000	
Intermediate consumption				500
Gross Value Added			500	
Consumption of fixed capital			-150	
Net Value Added			350	
Depletion			-78	
Depletion adjusted Net Value Added			278	
<i>Generation of income account</i>				
Compensation of employees				200
Gross operating surplus			300	
Consumption of fixed capital			-150	
Net operating surplus			150	
Depletion			-78	
Depletion adjusted operating surplus			72	
<i>Allocation of primary income account</i>				
Interest on imputed loan	13			13
Depletion adjusted saving		13		59
<i>Capital account</i>				
Depletion adjusted saving	13		59	
Depletion			-78	
Net lending		13		137
<i>Financial account</i>				
Repayment of loan principal (depletion)	-43			-43
Increase in cash	56		94	
Net lending	13		137	
<i>Other changes in the volume of assets a/c</i>				
Adjustment to balance value of the mineral deposit for legal owner	17			

<i>Closing balance sheet</i>				
Mineral deposit	356		355	
Imputed loan	199			199
Cash	56		94	
Net worth	611		250	