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International Accounting Standards Board

INFORMATION FOR OBSERVERS

Board Meeting: **16 October 2006, London**

Project: **Extractive Activities research project**

Subject: **Valuation techniques used to estimate fair value of reserves and resources (Agenda Paper 4A)**

Purpose

1. The purpose of this paper is to apply contemporary fair value measurement thinking, as presented in FAS 157 *Fair Value Measurements* (issued September 2006), to determine which valuation techniques would be expected to be used to estimate the fair value of a minerals or oil & gas reserves and resources asset.

Relationship of this paper within the agenda paper package

2. The primary purpose of this agenda paper package is to consider *if* minerals and oil & gas reserves and resources should be measured at fair value for either balance sheet measurement or note disclosure purposes. This question is addressed in Agenda Paper 4D. In making this assessment of fair value as a measurement or disclosure objective for reserves and resources, it is also necessary to:

   (a) identify which valuation techniques would be used to estimate the fair value of reserves and resources – this is addressed in this paper;

(b) identify the unit of account for the fair value measurement of reserves and resources – this is addressed in Agenda Paper 4B; and

(c) consider how the FAS 157 fair value hierarchy would apply to an estimate of the fair value of reserves and resources (noting that the IASB has a project that is proposing to introduce FAS 157 fair value measurement thinking into IFRSs).

3. Agenda Papers 4E and 4F follow on from this assessment of the suitability of fair value measurement of reserves and resources by briefly looking at:

(a) the previous conclusions reached by standard-setters in relation to the fair value measurement of oil & gas reserves and other non-financial assets – refer Agenda Paper 4E; and

(b) possible alternatives to the fair value measurement of reserves and resources that could be explored further by the research project – refer Agenda Paper 4F.

FAS 157 guidance on valuation techniques

4. FAS 157.5 defines fair value as:

> …the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date.

In other words, FAS 157 defines fair value as an exit price that would be received or paid in a hypothetical transaction at measurement date from the perspective of a market participant (seller).

5. FAS 157 explains that the valuation techniques used to measure fair value are to be consistent with the market approach, income approach and/or cost approach. Using a single valuation technique will be appropriate in some cases and using multiple valuation techniques will be appropriate in other cases. FAS 157.18 defines the valuation techniques as follows:

> The **market approach** uses prices and other relevant information generated by market transactions involving identical or comparable assets or liabilities (including a business).
>
> The **income approach** uses valuation techniques to convert future amounts (for example, cash flows or earnings) to a single present amount (discounted). The measurement is based on the value indicated by current market expectations about those future amounts. Those valuation techniques include present value techniques; option-pricing models, such as the Black-Scholes-Merton formula (a closed-form model) and a binomial model (a lattice model), which incorporate present value techniques; and the multi-period excess earnings method, which is used to measure the fair value of certain intangible assets.

> The **cost approach** is based on the amount that currently would be required to replace the service capacity of an asset (often referred to as current replacement cost). From the perspective of a market participant (seller), the price that would be received for the asset is determined based on the cost to a market participant (buyer) to acquire or construct a substitute asset of comparable utility, adjusted for obsolescence. Obsolescence encompasses physical deterioration, functional (technological) obsolescence, and economic (external) obsolescence and is broader than depreciation for financial reporting purposes (an allocation of historical cost) or tax purposes (based on specified service lives).

Application of FAS 157 guidance to reserves and resources

6. Each mineral or oil & gas reserve and resource is unique. This uniqueness includes not only the geological structure of the property but also the degree of knowledge about this geological structure, as well as differences in geography, infrastructure, economic and political factors that can affect the cost of extracting the minerals or oil & gas.

7. The uniqueness of each mineral or oil & gas reserve and resource means that estimating the fair value of an asset containing reserves and resources[1] only by reference to market transactions involving identical and comparable assets is rarely possible as it would require a recent market transaction relating to the same mine or oil & gas field.[2] International Valuation Standards Committee (IVSC) Guidance Note 14 *Valuation of Properties in the Extractive Industries*, at paragraph 5.3.1, makes the following comments about the use of the market approach (which it refers to as the sales comparison approach):

> Each Mineral deposit, Petroleum accumulation and Exploration Property is unique. Therefore, direct comparison of Mineral or Petroleum natural resource property transactions is often difficult or inappropriate. However, sales analysis is an important valuation tool. Sales adjustments or ratio analysis can frequently be applied for indirect sales comparison purposes. Sales analysis and other market analysis can often yield market factors such as a market discount rate, a risk factor or uncertainty factor that may be used in the Income Approach.

8. [Paragraph omitted from observer note]

9. A cost approach, such as current replacement cost, is not expected to be able to be applied to estimate the fair value of the reserve and resource asset because of the substantial uncertainty about the amount and type of activities required to

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1 The unit of account for reserves and resources is discussed in Agenda Paper 4B.

2 Fair value might be able to be estimated using only the market approach in the rare case when the fair value of a joint venturer's interest in a reserve and resource can be estimated by reference to a recent market transaction for the sale of another joint venturer's interest in the same reserve and resource. However, if there is an absence of other market transactions for the sale of joint venture interests in subsequent reporting periods, use of the market approach in isolation of other fair value measurement techniques may not be suitable for subsequent fair value measurements of the asset.

replace the service capacity of the reserve and resource asset. Also, since the amount of activity cannot be reasonably estimated, the historical activity (and related costs) of finding the reserve or resource do not provide a basis that can be updated to estimate a current replacement cost. Therefore the costs incurred in exploration, evaluation and development of a deposit may have little correlation to the amount that would be received if the asset were sold to a market participant.[3]

10. The research project team understands that the value of reserves and resources is normally estimated according to the income approach, whereby value is estimated by discounting future cash flows. This is consistent with IVSC Guidance Note 14, which suggests that net present value analysis/discounted cash flow analysis is the "method most commonly used by businesses for investment decision-making within the Extractive Industries" (paragraph 5.3.3). Existing financial reporting practice in valuing reserves and resources is discussed further in Agenda Paper 4B.

Conclusion

11. The income approach appears to be the valuation technique that is generally applied to value minerals and oil & gas reserves and resources. There will be circumstances when a fair value estimate might be developed by using the income approach in conjunction with another valuation technique, such as the market approach, however this requires that relevant transaction data exists and is accessible. This will not always be the case. For this reason, the agenda paper package assumes that the valuation technique used to estimate the fair value of minerals and oil & gas reserves and resources is the income approach.

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[3] The research project team has been advised that some other cost approach methods have been used to value exploration or mineral properties. For instance, the Rural Cost Appraisal method can be adapted to value mineral properties. Other methods including the Multiple of Exploration Expenditure method can be applied to exploration properties and resource properties that are considered to be of marginal development potential. The research project team understands that these cost approach methods are considered to be emerging methods for valuation of exploration or minerals or oil & gas properties.