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**International
Accounting Standards
Board**

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These notes are based on the staff papers prepared for the IASB. Paragraph numbers correspond to paragraph numbers used in the IASB papers. However, because these notes are less detailed, some paragraph numbers are not used.

INFORMATION FOR OBSERVERS

Board Meeting: 16 October 2006, London

Project: Extractive Activities research project

Subject: Applying the fair value hierarchy to reserves and resources
(Agenda Paper 4C)

Purpose

1. The purpose of this paper is to apply FAS 157 *Fair Value Measurements* (issued September 2006) to determine:
 - (a) if it is possible to measure a reserves and resources asset at fair value in accordance with the FAS 157 fair value hierarchy, and, if so, where the fair value estimate would be expected to fall in the hierarchy; and
 - (b) the extent to which inputs for the fair value estimate are expected to be based on the reporting entity's own assumptions rather than market participant assumptions, and the implications of this.

Context

2. FAS 157 defines fair value and establishes a framework for measuring fair value for financial reporting purposes. It introduces a three-level fair value hierarchy that prioritises the inputs to be used in a fair value measurement, and it gives highest priority to unadjusted quoted prices in active markets for identical assets and liabilities (Level 1) and lowest priority to unobservable inputs (Level 3). In

applying the fair value hierarchy, some might argue that fair values that fall into Level 1 of the hierarchy are in some way “better” than those that fall into Level 3. Nevertheless, a measurement that falls into any of the levels of the hierarchy can qualify as a fair value measurement. Conversely, a measurement that does not fall into any level of the hierarchy is not a fair value measurement. For this reason, the research project team is considering how the FAS 157 hierarchy would apply to an estimate of the fair value of reserves and resources.

Relationship of this paper within the agenda paper package

3. The purpose of FAS 157 is to address the question of *how* to determine fair value; it does not address the questions of *if* or *when* to measure an asset or liability at fair value.
4. 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. This question is addressed in Agenda Paper 4C. 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 was addressed in Agenda Paper 4A, which concluded that the technique that is usually used to estimate the value of reserves and resources is the income approach;
 - (b) identify the unit of account for the fair value measurement of reserves and resources – this was addressed in Agenda Paper 4B, which concluded that the most appropriate unit of account for reserves and resources is the cash-generating unit (CGU), as determined in accordance with IAS 36 *Impairment of Assets* principles; and
 - (c) consider how the FAS 157 fair value hierarchy would apply to an estimate of the fair value of reserves and resources – this is addressed in this paper.
5. 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.

Outline of paper

- 6. This paper is structured as follows:
 - (a) paragraphs 7-32 identify the inputs to a fair value estimate for reserves and resources and assess where those inputs would be expected to fall in the fair value hierarchy;
 - (b) paragraphs 33-40 discuss the extent to which adjustments may be required if the reporting entity's own assumptions are used in the estimate of fair value; and
 - (c) paragraphs 41-43 present the research project team's views regarding the application of the fair value hierarchy to minerals and oil & gas reserves and resources.

Identification of inputs for reserves and resources

- 7. 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).

- 8. If fair value is to be the measurement or disclosure objective for reserves and resources, it must first be determined whether it is possible to obtain a fair value for reserves and resources. The remainder of this paper therefore considers the application of the FAS 157 fair value hierarchy to what is considered to be a 'typical' reserve and resource property – that is, a property where:
 - (a) the income approach is used to estimate value;¹ and

¹ In some cases, it may be possible to estimate value of the property by supplementing the fair value estimate worked out in accordance with the income approach with market transaction data to provide, at a minimum, a sanity check for the fair value estimate. However, the valuation technique common to a typical reserve and resource property will be the income approach, and so for that reason applying the income approach to a reserve and resource property is the focus of the remainder of this paper.

- (b) the highest and best use of the property is in-use. FAS 157.13 explains that the highest and best use of an asset is in-use “if the asset would provide maximum value to market participants principally through its use in combination with other assets as a group (as installed or otherwise configured for use)”. Minerals or oil & gas properties that have a highest and best use other than as a mining or oil & gas operation are expected to be rare. Most properties are located in remote areas that are not expected to have an alternative use that would generate future cash flows that exceed the value of the deposit.²
9. Inputs that would be used to estimate the fair value of a reserves and resources asset in accordance with the income approach include:
- (a) the estimate of volumes of minerals or oil & gas contained in the deposit – this requires:
 - (i) interpretation of the geology of the deposit, including volumes (e.g. tonnage and grade for minerals);
 - (ii) making assumptions regarding the technical recovery of the deposit, which may include:
 - (A) for oil & gas, assumptions about the reservoir pressure and flow rates; and
 - (B) for minerals, assumptions about metallurgical recovery and mine design;
 - (b) the schedule for producing the volumes;
 - (c) future prices, costs³ and exchange rates; and
 - (d) discount rates.

² Exceptions may include aggregate properties (i.e. sand, gravel, crushed stone) and marginal petroleum properties (especially in the USA) where these properties in or near expanding towns and cities.

³ The research project team understands that an entity’s investment decision making generally involves calculating net present value / internal rates of return on the basis of after-tax cash flows. However for the purposes of this paper, the affect, if any, that taxation may have on the fair value estimate is not being considered. This is because there is only limited commentary on the treatment of tax in estimating fair value in FAS 157, and furthermore, any taxation implications are not considered to materially alter the conclusion regarding where a fair value estimate for a reserves and resources asset would fall in relation to the fair value hierarchy.

10. These inputs are relevant to the fair value measurement of a developed property that is in production, a property that is being developed (and may or may not have commenced production), or an undeveloped property. There would be uncertainties associated with each of these inputs regardless of the development status of the property, although it is expected that the uncertainties would be greater for properties that are in development or are undeveloped. The following analysis of inputs is intended to deal with the valuation of properties generally (i.e. without reference to their development status). Although the development status of a property could become a determinant of initial recognition of the reserve and resource asset – therefore indicating when the asset is initially measured at fair value if fair value is to be the measurement objective – the question of initial recognition is not being considered in this package of papers. Initial recognition will be considered further in subsequent research.

Fair value hierarchy guidance

11. A fair value estimate is to include all of the assumptions that market participants would use in pricing the asset, and the valuation techniques used to estimate fair value must maximise the use of observable market inputs and minimise the use of unobservable market inputs. (Refer FAS 157, paragraphs 7 and 21)
12. FAS 157 sets out a fair value hierarchy to prioritise inputs to be used when estimating fair value. In broad terms, the hierarchy is as follows:
 - (a) Level 1 inputs (most preferred) – these inputs are observable inputs that reflect quoted prices (unadjusted) for identical assets in active markets that the reporting entity has the ability to access at the measurement date;
 - (b) Level 2 inputs – these inputs include:
 - (i) quoted prices for similar assets in active markets;
 - (ii) quoted prices for identical or similar assets in markets that are not active;
 - (iii) inputs other than quoted prices that are observable for the asset (e.g. interest rates, yield curves, volatilities that are observable at the commonly quoted intervals, and default rates);

- (iv) inputs that are derived principally from or corroborated by observable market data through correlation or by other means (market-corroborated inputs); and
- (c) Level 3 inputs (least preferred) – these inputs are unobservable inputs and shall be used only to the extent that observable inputs are not available. This allows for situations where there is little, if any, market activity in respect of the asset at measurement date.

Guidance relating to unobservable inputs

13. FAS 157.30 requires that unobservable inputs used in a fair value measurement must reflect the reporting entity's own assumptions about the assumptions that the market participants would use in pricing the asset (including assumptions about risk).
14. In considering what a market participant's assumptions might be, FAS 157.10 indicates that market participants are "knowledgeable, having a reasonable understanding about the asset ... and the transaction based on all available information, including information that might be obtained through due diligence efforts that are usual and customary". Therefore the reporting entity should assume that market participants would have access to all relevant and available information relating to the reserves and resources, and not just the publicly disclosed reserve and resource information.
15. FAS 157 acknowledges that the reporting entity need not undertake all possible efforts to obtain information about market participant assumptions. Instead, unobservable inputs are to be based on the best information available in the circumstances, noting that this might include the reporting entity's own data. In developing unobservable inputs, the reporting entity's own data must be adjusted if information is reasonably available without undue cost and effort that indicates that market participants would use different assumptions. In other words, the reporting entity cannot ignore information about market participant assumptions that is available within reasonable cost-benefit constraints (refer paragraph C86 of the Basis for Conclusions to FAS 157).

Application of the hierarchy to the inputs

Volume estimates

16. The minerals and oil & gas industry has developed reserve and resource definitions to communicate information about the volumes of minerals or oil & gas that are expected to be contained in a deposit. Broadly speaking, a reserves estimate identifies the volumes that are expected to be both technically and economically recoverable.⁴ To make an assessment of economic recoverability, estimating reserve and resource volumes – like estimating a fair value – requires assumptions to be made regarding the schedule for producing the volumes as well as assumptions about future prices, future costs, future exchange rates, and discount rates.

Geological interpretation and assumptions about technical recovery

17. Geological interpretation and assumptions about technical recovery of minerals and oil & gas are two inputs to the reserve and resource estimate that are unique to each deposit. The interpretations and assumptions are made by geologists and engineers after considering the data obtained from exploration and evaluation activities (e.g. from analysing drilling logs or core samples). These inputs (particularly the interpretations and assumptions) are not observable inputs; that is, they are not “inputs developed based on market data obtained from sources independent of the reporting entity” (refer FAS 157.21). Therefore they are not Level 1 or 2 inputs. Instead, they are ‘unobservable inputs’ (Level 3), provided they are “inputs that reflect the reporting entity’s own assumptions about the assumptions market participants would use in pricing the asset, developed based on the best information available in the circumstances” (refer FAS 157.21).
18. The uncertainty inherent in interpreting geological data (e.g. obtained from drilling logs, core samples etc) means that an estimate by one person (or one company) is likely to be different from estimates by others.⁵ Therefore, the

⁴ A reserves estimate is classified into subcategories to reflect different levels of confidence in the recovery of the minerals or oil & gas (e.g. proved reserves, probable reserves). Estimates of resources are generally related to less mature projects, but they too may be expected to be economically recoverable.

⁵ The subjective nature of geological interpretation means that two equally competent geologists using the same framework for geological interpretation will probably reach different views on

entity should expect that its interpretation on the size of the deposit will be different from interpretations that other geologists, or market participants more generally, might make. However, the uniqueness of each property would make it difficult, if not impossible, for an entity to quantify the market's interpretation of the data so that adjustments could be made to the entity's inputs. For instance, market participants may interpret the geology differently or have access to different technology that would impact recovery rates.⁶ Therefore, the reporting entity's own assumptions relating to geological interpretation and technical recovery may represent the best information available in the circumstances. The difficulty in obtaining information about market participant's assumptions is discussed later in the paper under the heading 'Adjustments to the reporting entity's own assumptions'.

19. Some may question why, given these difficulties with geological interpretation etc, disclosing reserve volumes is appropriate. The question of whether a representationally faithful estimate of reserves and resources can be obtained is discussed in Agenda Paper 4D (which assesses a fair value estimate of reserves and resources according to the Framework's qualitative characteristics of decision-useful information).

Other inputs for a reserve and resource estimate

20. As explained above, assumptions regarding the schedule for producing the volumes, future prices, costs and exchange rates, and discount rates need to be made for both reserve and resource volumes estimates and for fair value estimates. For simplicity, these inputs will be considered in the context of developing a fair value measurement, although the same conclusions would apply if a volume estimate were to be developed.

Schedule for producing the volumes

21. The production schedule relating to a minerals or oil & gas deposit is also expected to be an 'unobservable input' (i.e. a Level 3 input). A production schedule is developed by considering geological, technical and commercial factors. Production rates will be influenced by the unique characteristics of

the size of a deposit. The interpretations should not be vastly different, but they will nevertheless be different.

⁶ For example, the entity may have access to proprietary technology that could improve recovery rates, but this technology is not available to market participants.

each deposit, although these characteristics may be subject to interpretation by the entity. This may include, for oil & gas, reservoir pressure and flow rates, and for minerals, the deposit shape and grade variability. Entity-specific factors that can influence technical recovery include the extraction method and mine design. Commercial factors that can influence the production schedule may be either entity-specific factors or general factors that would be expected to affect any market participant. Entity-specific commercial factors would include the availability of specific resources (mining expertise, technology, financing etc) and whether the entity has any alternative development opportunities available to it. General commercial factors would include market demand for the commodity and legal or environmental restrictions associated with the development and production of the deposit.

22. A production schedule is therefore an amalgam of all these factors. It is possible that market participants would adopt a different production schedule from the entity's own production schedule as a result of having a different view on one or more factors that influence the schedule. Examples of factors that are specific to the entity and that market participants may exclude in making their own fair value assessment include:
 - (a) the quantum and/or rate of production of technically recoverable reserves and resources (as discussed above in relation to estimating volumes); and
 - (b) the timetable for developing and producing a deposit if, say, the market would commence development immediately but the entity has deferred the project in favour of progressing other projects.
23. It is expected that, at best, an entity may only be able to forecast a market view on the production schedule for some factors that might influence the schedule. For example, an entity's ability to isolate its own views on the quantum and/or rate of production of technically recoverable reserves and resources may be limited to excluding the effect of the entity's access to proprietary technology that might improve recovery rates. However to do so in practice may require the entity to develop a new reserve and resource volume estimate. Similarly, an entity may also be able to adjust its production schedule to exclude the effect that entity-specific commercial factors may have on its schedule, but in practice this too may require the entity to develop a new reserve and resource volume

estimate. As per the conclusion reached for volume estimates, the research project team considers that assumptions relating to a production schedule are expected to be Level 3 inputs, and the reporting entity's own assumptions are expected to form the basis of the input.

Future prices, costs and exchange rates

Commodity price assumptions

24. Commodity price assumptions need to take account of the following variables:
 - (a) the price expected to be realised when the commodity has been produced and is ready for sale (which for some mine or oil & gas fields may extend well beyond 20 years into the future);
 - (b) the expected quality of the produced commodity (unless it is homogenous); and
 - (c) the location of the commodity.
25. Spot and future prices are quoted in active markets for some commodities. These would represent Level 1 inputs. Valuing in-place volumes can be based on Level 1 price inputs if the quoted prices incorporate the above variables. If the quoted prices do not incorporate the above variables, valuing in-place volumes are expected to be based on Level 2 (observable inputs) or Level 3 (unobservable inputs / entity-specific inputs). The research project team expects that for some homogenous commodities, long-term views on commodity prices might be capable of being either directly observable or extrapolated and corroborated by other observable market transactions. Also some economic consultants produce long-range price forecasts for certain commodities that are publicly available and these may be considered to be proxies for the market views on prices. In those cases, the price assumptions to be used may be a Level 2 input. In certain cases, the quality or location of the commodity may have a material influence on the commodity price, which may necessitate adjusting any market-based long-term view on commodity prices that is capable of being observed or extrapolated. The impact that quality or location has on the price of the commodity may be estimated using observable or unobservable inputs (most likely entity-specific inputs), which if the adjustment is significant

to the fair value measurement may affect whether the fair value measurement will be a Level 2 or Level 3 measurement (refer FAS 157.28).⁷

Exchange rate assumptions

26. Exchange rate assumptions must be made where commodity prices and capital, operating and refining costs involve more than one currency. Similar to commodity prices, some spot and future exchange rates will be quoted in active markets (i.e. a Level 1 input). Other exchange rates may be quoted in markets that are not active (i.e. a Level 2 input). However because the foreign currency prices and/or costs generated by the mine or oil & gas field may extend well beyond the period that quoted or observable exchange rates are available, the exchange rate used may be largely based on extrapolating the market's view on long-term exchange rates. Whether this provides a Level 2 input will depend on whether the derived exchange rate can be corroborated by other observable market data. This might be possible for widely traded currencies. It might not be possible for thinly traded currencies, in which case the exchange rate assumptions may be rendered a Level 3 input.

Capital and operating cost assumptions

27. Estimates of future cash outflows relating to capital and operating costs are expected to be influenced by the characteristics of the property (e.g. the type, quality and location of the mineral, oil or gas) and the entity operating the property. The future cash flow estimates will be based on the development and production plan for the property, which as discussed earlier would be expected to be a Level 3 input. Some may argue that estimates of some types of costs (e.g. employee costs) that are applied to a specific development and production plan may be able to be based on Level 2 inputs if there are observable industry (or benchmark) rates associated with those costs. Others may argue that costs such as employee costs should be based on the rates paid by the entity because the employment of the employees is a market transaction and the pay rates equate to what is necessary to attract and retain the workforce for the property in question. These costs would nevertheless be unobservable inputs, and so would be Level 3 inputs.

⁷

This assumes that the commodity price before quality and location adjustments would be a Level 1 or Level 2 input.

28. Overall, the cost assumptions are expected to be Level 3 inputs because the unique characteristics of each property and the corresponding development and production plan will influence the cost estimates. It is possible that market participants may be subject to different cost drivers from the reporting entity and so some adjustments may be able to be made to the reporting entity's own assumptions; for instance if the entity's policy is to rehabilitate mine sites to a standard that exceeds that which is legally required or if the entity's workplace insurance premiums are higher or lower than market rates because the entity has a poor or excellent workplace safety record.

Discount rates

29. The selected discount rate applied to estimate both the fair value of the reserves and resources asset and the economic quantity of reserves and resources is expected to comprise:
- (a) the risk-free time value of money – this will reflect market interest rates for periods corresponding to the timetable for development and production of a deposit; and
 - (b) adjustments for the risks specific to the reserves and resources – this may include risks such as project execution risk, economic risks, environmental risk, and political risks – to the extent that those risks have not been incorporated into the cash flow estimates.
30. The risk-free time value of money component is expected to be a Level 1 or Level 2 input, depending on whether quoted interest rates are available for the duration of the mining or oil & gas project.
31. Risk adjustments to the discount rate would be either Level 2 or Level 3 inputs depending on whether risk rate can be extrapolated from other market transactions. For instance, the price adjustments for:
- (a) political risk may be observed from transactions relating to that region;
 - (b) economic risk may be observed from transactions relating to that mineral or oil & gas; and
 - (c) project execution risk may be observed from a stock market's reaction to the reporting entity committing to develop new projects.

32. The minerals property valuer explained that he determines discount rates on the following basis:

In accordance with Guidance Note (GN) 9 of the [International Valuation Standards], market discount rates are best extracted from internal rate of return calculations done on transactions of properties of similar characteristics to the subject property, where the cashflow calculations are set up on the same basis as for the subject to maintain compatibility. Adjustments need to be made for the relative risk profiles (country, geological, metallurgical, product market, etc.), and the relative blue sky potential (or lack thereof) that may have been paid for in the transactions analysed. Market derived discount rates from other sources should also be reviewed, but with considerable caution regarding their basis of derivation and relevance.

Use of the reporting entity's own assumptions in fair value measurements

33. As indicated above, many of the inputs to a fair value measurement of reserves and resources are not expected to be Level 1 or Level 2 inputs. Instead, they are more likely to be Level 3 inputs (i.e. unobservable inputs) that are based on the reporting entity's own data and assumptions. Incorporating the reporting entity's own assumptions (without considering market participant assumptions) in an asset valuation will produce an entity-specific measurement. This is inconsistent with the intent of fair value measurement, which is to estimate the exit price from the perspective of the market participant that holds the asset.

Availability of market participant assumptions without undue cost and effort

34. With a reporting entity's own data and assumptions expected to form the basis of a fair value measurement of reserves and resources, the question is therefore to what extent are market participant assumptions expected to be available without undue cost and effort. If the entity is unable to quantify any market participant assumptions without incurring undue cost and effort, then the reporting entity's own data and assumptions can be used as unobservable inputs to the fair value measurement, as this would represent the best information available in the circumstances (as per FAS 157.30).
35. The unique characteristics of each minerals and oil & gas deposit means market data is not expected to be available for many of the inputs relating to the reserves and resources unless market participants were themselves to collect and analyse data related to the deposit. Using independent consultants to prepare or review a reserve and resource estimate may result in the estimate being indicative of the assumptions that a market participant would use in developing

a fair value estimate for the reserve and resource asset.⁸ However, this will depend on the facts and circumstances pertaining to the engagement of the consultant. For instance, if the consultant has to prepare the reserve and resource estimate using certain inputs specified by the entity (e.g. economic assumptions), this may limit the extent to which the consultant's estimate can be considered to be indicative of a market participant's view. In any case, using independent consultants to prepare or evaluate reserve and resource estimates across the entity's portfolio of properties is not commonplace. With the exception of Canada's National Instrument 51-101, *Standards of Disclosure for Oil and Gas Activities*, there is no general requirement for the annual disclosure of reserve and resource volume estimates to be prepared or evaluated by independent consultants.⁹

36. Market participant assumptions might be available without undue cost and effort for inputs relating to some economic factors (e.g. the prices, costs, discount rates used in reserve and resource volume estimation). Whether market participant assumptions are available will depend on the facts and circumstances pertaining to the reserve and resource. Some Advisory Panel members have suggested that it might be difficult to identify market participant assumptions that extend to cover the life of a minerals or oil & gas property.
37. If market participant assumptions can be identified for economic factors, the research project team notes that the use of these assumptions has implications for the reserve and resource volumes estimate. Economic inputs are a core component of the reserve and resource volume estimate. For example, in the case of mineral reserves and resources, they influence assessment of cut-off grades for resource estimation, mine design, the production schedule and therefore what quantities are economically recoverable. Consequently, the use

⁸ The research project team is not using this topic to suggest whether or not independent consultants should be used in estimating either reserve and resource volume estimates or a fair value of reserves and resources. This will be considered in subsequent research that the project team will undertake.

⁹ As a general rule, section 2.1 of NI 51-101 requires 'independent qualified reserves evaluators or auditors' to evaluate or audit the majority of an entity's reserve information. However NI 51-101 allows for 'senior producing issuers' to potentially be exempted from this requirement. Section 8.2 states that factors that will be considered for allowing an exemption "would likely include the background and experience of the reporting issuer's non-independent qualified reserves evaluators, the quality of its past oil and gas disclosure, and its internal disclosure, compliance, quality control and approval procedures. Demonstrated adherence to "best practice" standards of the COGE Handbook and of the relevant professional body would be expected".

of market participant's assumptions in reserve and resource fair value estimates might require completely new reserve and resource volume estimates to be developed, as existing practice in reserve and resource volumes estimation is to use either entity-specific assumptions or a mix of entity-specific and standardised assumptions. Arguably, re-estimating reserve and resource volumes using market participant assumptions could be interpreted as involving undue cost and effort. Agenda Paper 4D, under the heading 'Timeliness', explains that some reserve and resource volume estimates can take several months to complete.

38. That said, as those same economic factors will be used to estimate the fair value of the reserves and resources asset, the project team believes there is, at least in principle, a strong case for the use of consistent assumptions for both reserve and resource volume estimation and for fair value measurement. If market participant assumptions are therefore used for both the fair value measurement of reserves and resources and the reserve and resource volume estimate underlying the fair value measurement, the research project team notes this would duplicate effort in preparing reserve and resource volumes estimates for other purposes. This is because:

- (i) companies manage their projects in accordance with their own views on the inputs to expected reserve and resource volumes (although this is not dissimilar to companies using different accounting practices for special purpose financial reporting and for general purpose financial reporting); and/or
- (ii) existing disclosure requirements imposed by regulators and stock exchanges continue to require the use of either entity-specific assumptions or a mix of entity-specific and standardised assumptions (although it is hoped that the Board and relevant market regulators would reach a mutually acceptable view on reserve and resource disclosure requirements that would not result in a duplication of effort in disclosure requirements).

Inclusion of risk premiums

39. The fair value measurement of a reserves and resources asset must include all the assumptions that a market participant would use in pricing the asset,

including assumptions about risk. FAS 157 anticipates that this would include market participant's assumptions about the risk inherent in a particular valuation technique used to measure fair value and/or the risk inherent in the inputs used in measuring fair value (unobservable inputs). FAS 157.B5 further explains that:

A fair value measurement should include a risk premium reflecting the amount market participants would demand because of the risk (uncertainty) in the cash flows. Otherwise, the measurement would not faithfully represent fair value. In some cases, determining the appropriate risk premium might be difficult. However, the degree of difficulty alone is not a sufficient basis on which to exclude a risk adjustment.

40. Market participants would be expected to assume some level of risk when estimating the fair value of a reserves and resources asset, especially given that the fair value estimate would be heavily reliant on unobservable inputs based on the reporting entity's own assumptions. However, the research project team acknowledges that obtaining market participant's assumptions of risk would be difficult given both the uniqueness of the asset and the entity's assumptions relating to that asset. Consequently, the risk premium would also be expected to be a Level 3 input based on the reporting entity's own assumptions of the risk adjustment that market participants would demand. This would appear to add further – and potentially considerable – subjectivity to the fair value estimate of reserves and resources, which may have an adverse affect on the resultant representational faithfulness of the fair value estimate.

Conclusion

41. The research project team considers that it is possible to measure a reserves and resources asset at fair value in accordance with the FAS 157 fair value hierarchy. Although, as noted above, many of the inputs to the fair value estimate are expected to be unobservable inputs that are based on the reporting entity's own data and assumptions, the estimate will be a fair value estimate if:
 - (a) the unobservable inputs are adjusted to reflect the assumptions a market participant would use in pricing the asset (if different from the reporting entity's own assumptions), unless information regarding market assumptions cannot be obtained without undue cost and effort; and
 - (b) a risk premium is included to reflect a market participant's assumptions about the risk inherent in the valuation technique used to measure fair value and the risk inherent in the inputs used in measuring fair value.

42. A fair value estimate for reserves and resources would generally be described as a Level 3 estimate of fair value. FAS 157.22 states that “the level in the fair value hierarchy within which the fair value measurement in its entirety falls shall be determined based on the lowest level input that is significant to the fair value measurement in its entirety”. The research project team considers that the lowest level inputs that are significant to the fair value measurement of a reserves and resources asset are expected to be the inputs relating to the volume estimates and the production rates, which are expected to be Level 3 inputs. Accordingly, the fair value measurement for a reserves and resources asset would not typically fall within Level 1 or Level 2.
43. Although a fair value measurement of a reserves and resources asset can be determined in accordance with FAS 157, the research project team considers that with the heavy reliance on unobservable, and sometimes very subjective, assumptions, consideration needs to be given to how verifiable and neutral, and therefore representationally faithful, such a fair value measurement would be. This is discussed in detail in Agenda Paper 4D.