Option valuation and accounting for contingent consideration in mineral sector acquisitions

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OPTION VALUATION AND ACCOUNTING FOR CONTINGENT CONSIDERATION IN MINERAL SECTOR ACQUISITIONS

Atul Chandra* and Pietro Guj**

Vendor consideration on acquisition of mineral sector companies/projects may include shares and/or options contingent on achievement of uncertain milestones either financial (specified levels of future profit, share price etc) or physical (delineation of specific levels of mineral resources). Accounting standards on business combination, fair value and financial instruments have recently undergone major changes, with potentially significant impact on the valuation and accounting of the consideration transferred. The valuation approaches to assess the “fair value” of contingent consideration in the form of financial instruments include expected present value techniques and option-pricing models. These are discussed and applied to an actual acquisition of an iron ore exploration project/company in West Africa. Valuation of contingent consideration provides valuable insights and benefits while negotiating and accounting for business acquisitions.

Keywords: option valuation, contingent consideration, mineral sector, acquisitions

I. INTRODUCTION

The International Accounting Standards Board (IASB) and the Financial Accounting Standards Board (FASB) of the US have recognised the urgent need to revise the accounting standards relating to business combination, fair value and financial instruments. The objective was to provide a more realistic, uniform and fair presentation of business acquisitions in financial accounting statements and reports. Australia has incorporated in its accounting standards, the suite of International Financial Reporting Standards (IFRS) issued by IASB, with some exceptions. One of the key outcomes of these reviews is the global establishment and acceptance of the fundamental principle of “fair value”. In particular, the application of the new “Fair Value Measurement” accounting standard, IFRS 13 is now mandatory across all the jurisdictions, which are part of IFRS or FASB. It is expected that this standard will provide the necessary transparency in converting the economic reality of business transactions to be represented more accurately in financial statements and reports.

In another major initiative, the IASB and FASB have joined forces to bring IFRS and the Generally Accepted Accounting Principles (GAAP) of the US to progressively

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converge. This movement, which commenced in 2002 with the signing of the historic “Norwalk Agreement” between IASB and FASB, has already resulted in the convergence of many accounting standards, with more revisions expected to continue in the future.

This paper reviews the impact of the current changes in accounting standards and illustrates the use of contemporary valuation techniques and their accounting implications in the context of the acquisition of an actual iron ore exploration project/company in West Africa. In particular, it highlights the complex issues of valuing and accounting for vendor consideration in the form of performance shares and options, contingent on achievement of milestones. Complexity arises because the revised accounting standards require that all components of vendor consideration be assessed at “fair value”, irrespective of the probability distribution of occurrence of the relevant financial or physical milestones. In the West African exploration example the performance milestones are physical and are represented by successive levels of possible delineation of iron ore resources. Expected present value techniques and option-pricing valuation models were in this case study the main methods used to value contingent consideration.

The following three recently revised or newly introduced IFRS standards are critical to the valuation and accounting for vendor consideration in respect of corporate business acquisitions:

- Business Combination – IFRS 3
- Fair Value Measurement – IFRS 13
- Financial Instruments – IFRS 9

Business Combination

In January 2008, IASB issued a revised version of International Financial Reporting Standards (IFRS) 3 which was made effective for business acquisitions taking place on or after the beginning of the first annual reporting period after 1 July 2009. This was a result of IASB and the US Financial Accounting Standards Board (FASB) to jointly arrive at uniform standards for business acquisitions (Mackenzie et al., 2012, p.282). Both IFRS 3 and US Financial Accounting Standards 141 (FAS141) for Business Combinations have been revised individually and the gap between them has been closed, with some sections becoming identical. For example, both IFRS 3.39 (IFRS, 2012, p.A143) and ASC 805-30-25-5 require contingent consideration to be recognised and measured at “fair value” at the acquisition date (PricewaterhouseCoopers, 2010b, p.2-40). The Australian Accounting Standard, AASB 3 on Business Combinations (Locke, 2012, p.127) has also followed and replicated the IFRS 3, as set by IASB.

Fair Value Measurement

As a result of the convergence project between the two boards, IASB has formulated IFRS 13 in line with SFAS157 Topic 820 of the FASB (Baltazar et al., 2012, p.994). This has led to a consistent definition, with some differences, of fair value and guidance in respect of how to measure it. IFRS 13 will come into effect from the first annual reporting period after 1 January 2013.
There are two key distinctions between the ways existing IFRSs consider valuation methodologies as compared to the new IFRS 13. The first one is that guidance in relation to valuation approaches, techniques and models in IFRS 13 requires strict adoption of fair value measurements. The second is that IFRS 13 does not rank the use of one valuation methodology over another, unlike some IFRS’s which in the past required use of specific methodologies. Instead, IFRS 13.61 (IFRS, 2012, p.A482) prioritises a three-tier hierarchy of inputs, which should be used in the various valuation methodologies. These rank between observable market prices to unobservable estimations, with emphasis on maximising use of the former and minimising the latter as required by IFRS 13.74 (IFRS, 2012, p.A485).

IFRS 13 (Fair Value Measurement) defines “fair value” by providing principles-based guidance on how to measure it, and requires information about relevant measurements to be disclosed as per IFRS 13.1 (IFRS, 2012, p.A472). The standard does not decrease the degree of judgement required in estimating fair value, but provides guidance towards a consistent framework that has the objective of reducing inconsistency and increasing comparability of fair value measurements used in financial reporting.

Financial Instruments

IAS 32.11 (IFRS, 2012, p.A879) defines a financial instrument as any contract that gives rise to a financial asset of one entity and a corresponding financial liability or equity instrument of another entity.

Currently, IFRS 9 (Financial Instruments) is undergoing replacement of International Accounting Standard 39 (IAS 39) in three stages: (1) Classification and Measurement; (2) Impairment of Financial Assets; and (3) Hedge Accounting. The first stage has already been completed and will be effective from 1 January 2013. It is expected that the other two stages will be effective from 1 January 2015. Although IFRS 9 and US GAAP Topic 320 have similarities, they have many differences too, especially regarding “Hedging” (Mackenzie et al., 2012, p.735). As a consequence of the study conducted by the Financial Crisis Advisory Group (FCAG) after the 2008 financial crisis, guidance in respect of financial instruments for both IFRS and US GAAP has undergone major changes under the joint project between IASB and FASB.

II. BACKGROUND

The status before and after June 2009 of the three major changes in the accounting standards relating to business acquisitions are considered in this paper, with focus on:

- The “fair value” transferred to the acquiree as consideration instead of the earlier consideration based on the amount “spent” in the acquisition;
- Increased use of fair value methodologies uniformly for business combination and other accounting standards, requiring more rigorous financial expertise and judgement in making the relevant estimations; and
- Fair value estimation of contingent consideration transferrable in business acquisitions on the acquisition date, irrespective of its probability of realisation.
Consideration transfer

In the past, IFRS allowed two methods of accounting for business combinations.

The first, called the “purchase method”, recognised the acquisition cost to include any excess over the identifiable fair value of the assets transferred to be an intangible asset called “goodwill”. In mineral sector acquisitions, this excess consideration spent was called “mining rights”, to distinguish it from the standard concept of goodwill (Morar, 2007, p.4).

The second was known as the “pooling of interests” or “merger” method which added the book values of the combining entities, without adjusting the fair values of their respective assets and liabilities with the difference between the amount spent and the book values being classified as goodwill. Thus, prior to 2009, IFRS 3 adopted a historic cost-based approach, by recognising the acquisition cost of the assets and liabilities acquired, including estimated contingent liabilities, and allocating them in a discretionary manner.

Costs such as professional fees directly related to the business acquisition were part of vendor consideration under the two methods.

Use of fair value methodology

There were many different asset valuation methodologies across the various accounting standards, each having its own specific requirements. For example, standard IAS 39.AG75 (IFRS, 2010, p.A928) states that the valuation of financial instruments should estimate fair value making maximum use of market inputs and relying as little as possible on entity-specific inputs. Furthermore, IAS 39.AG82 (IFRS, 2010, p.A930) identifies a number of factors that may influence the fair value of a financial instrument such as the volatility of its price, the time value of money and the credit risk.

IAS 39 will be discontinued in stages, commencing with the introduction of IFRS 9 and IFRS 13 on fair valuation on 1 January 2013 as the first stage. It is intended to bring uniformity in accounting standards by applying the “fair value” principle across all business sectors.

Contingent consideration on acquisition

Prior to the amendment of IFRS 3 in 2009, recognition of the fair value of contingent consideration had to meet both the tests of whether the event leading to realisation was “probable” and whether its probability and value could be measured reliably on the acquisition date (Barden et al., 2010, p.2233). If either of these two tests failed to meet their respective criteria on the acquisition date, then the related contingent consideration would only be recognised in the future, if and when both the criteria were subsequently met, with any goodwill later recognised by means of additional adjustments to vendor consideration. In practice, contingent consideration as a component of total vendor consideration was only recognised on the acquisition date, if the probability of the economic benefit being transferred was reliably estimated to be greater than 50%. As a consequence, the final amount of goodwill could only be determined post acquisition, with additional consideration being progressively recognised as events unfolded.
Business Combination – Post June 2009

Consideration transfer

A business combination is now defined by IASB in IFRS 3 Appendix A (IFRS, 2012, p.A152) as a transaction or other event in which an acquirer obtains ownership and/or control of one or more businesses. In accordance with the revised IFRS 3 all assets acquired and liabilities assumed are recorded on the acquirer’s books at their respective fair values using the “acquisition” accounting method as distinguished from the earlier prescribed method of “purchase” accounting. The “acquisition method” adopts a market-price-recognition view. In short, IFRS 3 has moved from the purchase cost allocation to the fair value acquisition approach. The acquiring company now has to measure the identifiable assets and liabilities at fair values on the acquisition date as per IFRS 3.18 (IFRS, 2012, p.A139) and AASB 3.18 (Locke, 2012, p.137) to arrive at the vendor consideration. The emphasis is now on increasing “recognition, particularly of intangible assets at their fair values, instead of later adjustments to the value of existing assets and liabilities. The earlier pooling of interest or merger accounting and discretionary allocation method of purchase consideration are no longer allowed” (Cheng, 2008, p.36).

Unlike the “purchase method”, acquired assets contingent on the occurrence of a specified event, need to be valued in all cases and recognised regardless of the degree of probability of occurrence of the events to which they are contingent and related realisation of the economic benefits stemming from them. For this reason, recognition will need to be on the basis of probabilistic or expected values. This approach includes valuation of vendor consideration transferred in the form of performance shares and performance options, which must now also be measured at fair value. Recognition of their fair value may have potential taxation implications for the vendor at the time of acquisition. In addition, subsequent gains or losses due to post-acquisition re-measurement of assets and liabilities, forming part of contingent vendor consideration, may need to be recognised as adjustments in the profit and loss account in IFRS 3.58 (IFRS, 2012, p.A148) and AASB 3.58 (Locke, 2012, p.144).

Where the acquirer issues financial instruments (i.e. financial equities) not contingent on any future event as vendor consideration, IAS 39 requires determination of their fair value, while IFRS 3.37 (IFRS, 2012, p.A143) states that their fair values should be determined on the acquisition date or on the basis of their market prices very close to that date.

An intangible asset is defined in IFRS 3.B31-B34 (IFRS, 2012, p.A160) and IAS 38.8 (IFRS, 2012, p.A1036), as an identifiable non-monetary asset without physical substance and which can be in the form of contractual or other legal rights such as licences and operation rights. In this paper, the claim on mineral resources or mining rights resulting from the acquisition of tenements or of a corporate entity holding such rights, is an intangible asset. The fair value of these intangible assets can be calculated using a similar methodology as for the fair value on an “earn out” where successive milestones are achieved. This is discussed by Weber (2010, p.5) and Weber and Raichart (2012, p.2) for IFRS reporting and by Weber (2009, p.62) for US GAAP reporting.

The value of the mineral resources implicit in mining rights is no longer a balancing figure between the price paid for a project and book values, but instead has to be
valued individually using fair valuation approaches, such as, discounted cash flow and/or real options models. Goodwill arises if the consideration paid exceeds the fair value of the assets acquired, both tangible and intangible (including mining rights), (Alfredson et al., 2009, p.422). Under the “acquisition method”, the “mining rights” are independently valued as compared to the earlier “purchase method” where they were recorded as the difference between the price paid and the cost of the tangible assets acquired (Morar, 2007, p.5).

Costs such as professional fees related to business acquisition will no longer be capitalised as part of vendor consideration, but expensed in the period when they are incurred, except for the cost of issuing debt or equity instruments – refer to IFRS 3.53 (IFRS, 2012, p.A147) and AASB 3.53 (Locke, 2012, p.143).

In summary, the new accounting standards on business acquisitions require the acquiring company to recognise and measure at the acquisition date, the fair value of all identifiable assets and liabilities comprised in the vendor consideration, irrespective of whether they are certain or contingent in nature.

Use of fair value methodology

IFRS 3.37 (IFRS, 2012, p.A143) requires that at the acquisition date, the consideration transferred in a business combination needs to be measured as the sum of the fair values of:

- The non-financial instruments/assets transferred by the acquirer;
- The liabilities incurred by the acquirer to the acquiree; and
- The financial instruments, such as financial equities issued by the acquirer.

Potential forms of consideration, as mentioned in IFRS 3.37 (IFRS, 2012, p.A143), include cash, other assets, ordinary or preference equity instruments, options, warrants and other contingent consideration.

The earlier standards IAS39.AG14-AG83 (IFRS, 2010, p.A908) relating to classification and measurement have been deleted from IAS39.AG14-AG83 (IFRS, 2012, p.A1085), but they have reappeared modified in IFRS 9 and IFRS 13. For example, guidance is provided by IFRS 9.BCZ5.3 (IFRS, 2012, p.B709) that a quoted price is the appropriate measure of fair value for an instrument quoted in an active market because:

- It is defined in terms of a price agreed by a knowledgeable, willing buyer and knowledgeable willing seller and is the best evidence of fair value;
- It results in consistent measurement across entities; and
- Does not depend on entity-specific sectors.

IFRS 13 Appendix (IFRS, 2012, p. A492) provides three levels of inputs, including assumptions which acquirer and acquiree should use to measure fair value to price assets or liabilities, as follows:

- Level 1 Inputs are directly observable from active markets, such as quoted prices for identical assets or liabilities;
- Level 2 Inputs are indirectly observable from active markets, such as quoted prices for similar assets or liabilities; and
• Level 3 Inputs are unobservable and the acquirer must make assumptions about the position which would be taken by market participants.

In addition, IFRS 9.BCZ5.9 (IFRS, 2012, p.B711) states that in the absence of an active market, alternative valuation techniques can be used. For instance, market prices can be treated to be equivalent to the expected net present value of the future cash flows from equity. IFRS 13 requires an entity to use valuation techniques that are matched to the situation and for which sufficient data are available to measure fair value. As a result, the use of multiple valuation techniques, methodologies and models will be required more often than it is currently the case.

Three widely used valuation techniques mentioned in IFRS 13.61-62 (IFRS, 2012, p.A482): the market approach, cost approach, and income approach are discussed below:

• **Market approach:** IFRS 13.B5 (IFRS, 2012, p.A497). The market approach uses prices, generally referred to as “quoted” or “spot” market prices that market participants would pay or receive in transactions involving identical or comparable or similar assets or liabilities or group of assets and liabilities of a business. The market price may be adjusted to reflect the characteristics of the item being measured, such as its current condition and location, and could result in a range of possible fair values.

• **Cost approach:** IFRS 13.B8 (IFRS, 2012, p.A497). The cost approach reflects the amount that would be required currently to substitute the service capacity of an asset. This approach is often referred to as current replacement cost.

• **Income approach:** IFRS 13.B10 (IFRS, 2012, p.A498). The income approach discounts future expected cash flows or income and expenses generated by the asset to convert them into a single present value. A fair value measurement using the income approach will reflect current market expectations about future cash flows or payoffs.

IFRS 13.B24 (IFRS 2012, p.A501) recognises that in making an investment decision, risk-averse market participants would take into account the risk that the actual payoffs may differ from the expected payoffs, and adjust their discount rates accordingly.

IFRS 13.B11 (IFRS, 2012, p.A498) includes in the income approach valuation techniques such as:

• Present value techniques – IFRS 13.B11(a) (IFRS, 2012, p.A498) including two broad techniques:
  o Discount rate adjustment technique – IFRS 13.B12-B30 (IFRS, 2012, p.A498) which uses a single set of payoffs selected from the range of possible estimated amounts. Payoffs may be contractual, promised or the most likely. In any case, they are conditional upon specified events to occur and discounted at an observed or estimated market rate of return as per IFRS 13.B18 (IFRS, 2012, p.A500).
  o The expected present value technique starts with a set of payoffs that represents the expected or probability-weighted mean of all possible future payoffs. As all possible payoffs are probability weighted, the resulting expected payoff is not conditional upon the occurrence of any specified event,
unlike the payoffs used in the above discount rate adjustment technique. There are two methods which can be used, as follows:

- **Method 1 – IFRS 13.B25 (IFRS, 2012, p.A501):** The expected payoffs are adjusted for the systematic or market risk by subtracting a cash risk premium. This results in risk adjusted expected payoffs that represent certainty equivalent payoffs. These certainty equivalent payoffs are then discounted at a risk-free interest rate to compensate for their timing.

- **Method 2 – IFRS 13.B26 (IFRS, 2012, p.A502):** Systematic or market risk is compensated for by adding a risk premium to the risk-free interest rate resulting in a risk and time adjusted discount rate, which is used to discount the expected payoffs.

The main difference between Method 1 and 2 is the manner in which the market risk premium is calculated, but both methods arrive at the same fair value. However, the discount rate used in the discount rate adjustment technique is likely to be higher than the discount rate used in Method 2, which is an expected rate of return relating to expected or probability weighted payoffs as per IFRS 13.B26 (IFRS, 2012, p.A502).

- **Multi-period excess earnings method (MPEM) is used to measure the fair value of some intangible assets IFRS 13.B11(c) (IFRS, 2012, p.A498).** This method is a modification of the discounted cash flow analysis. Although the expected present value techniques measure fair values by discounting future payoffs for an entire business acquisition, MPEM measures the fair value of individual intangible assets by discounting their specific expected future payoffs.

- **Option pricing models – IFRS 13.B11(b) (IFRS, 2012, p.A498) include the Black-Scholes-Merton (BSM) formula or a binomial lattice model which incorporate present value techniques and reflect both the time value and the intrinsic value of an option.**

The selected valuation approach should use the exit market principle, so that the most advantageous market for the asset or liability given their nature should be used based on professional judgement.

**Contingent consideration on acquisitions**

In many business acquisitions, vendor consideration may not be determinable with certainty on the acquisition date, but may be dependent on the outcome of future events. This may be because consideration may include components contingent upon the achievement of specified outcomes linked to future financial or physical performance milestones. Milestones can be achieved by exceeding specified profit or earnings levels, specified share price or delineating an agreed level of resources (as used in the example provided later in this paper), over contractual period of time. Milestones are included in the contractual agreements dealing with contingent consideration obligations, and are often referred to as “earn-outs”.

In such situations, acquirer and acquiree share the risk of the uncertainty of future events by contracting to transfer or receive additional vendor consideration in the future, only if the agreed milestones are achieved. Additional consideration to be transferred after the acquisition date can be in the form of cash or financial equities, such as shares and options or other assets.
Contractual conditions may also include a possible return of previously transferred consideration as per IFRS 3 Appendix A (IFRS, 2012, p.A152).

IFRS 3.BC348 (IFRS, 2012, p.B302) acknowledges that when the acquirer and acquiree negotiate the acquisition contract, contingent consideration becomes the mechanism to reconcile and share the economic risk about future outcomes. The information so collected and analysed during these negotiations assist in estimating the fair value of contingent consideration.

As per IFRS 3.39 (IFRS, 2012, p.A143), the value of contingent consideration at the acquisition date will need to be measured at fair value, irrespective of the probability of realisation or measurement reliability. This will enable vendor consideration to be determined and recorded by fairly capturing potential liabilities, which would have been ignored in the pre June 2009 regime. As discussed before, this represents a significant change from the previous version of IFRS 3 where contingent consideration obligations were recognised only when the contingency was probable (in practice better than 50%) and could be measured reliably (Barden et al., 2010, p.2233). In cases where the full value of contingent consideration was recognised there was an erroneous presumption that the uncertain milestones would definitely be achieved. On the other hand by completely ignoring the value of consideration, contingent on improbable milestones, the total value of consideration transferred would be incorrectly understated by IFRS 3.BC349 (IFRS, 2012, p.B303). This position has changed in the revised IFRS 3, as it is opined now that by delaying recognition of or otherwise ignoring assets or liabilities that are difficult to measure, will cause financial reporting to be incomplete and thereby reduce its usefulness in taking economic decisions.

Therefore, IFRS 3.BC347 (IFRS, 2012, p.B302) requires that the initial measurement of the fair value of contingent consideration needs to be based on assessing the facts and circumstances that exist at the acquisition date even though it may be difficult to measure.

Under IFRS 3.58 (IFRS, 2012, p.A148), after determining the initial recognition of contingent consideration at fair value for financial equities using IFRS 9, any contingent consideration which was not recognised or occurred on the day of acquisition, is to be recorded as per other appropriate standards, such as IAS 37 (Provisions, Contingent Liabilities and Contingent Assets).

**Classification as Equity or Liability**

In order to classify contingent consideration as equity, various conditions need to be complied with, such as:

- Performance milestones need to be based on acquiree’s internal business operations and not external indicators of the markets.
- There should be fixed contingent consideration transfer terms so that there is no variation in the number or amount of financial equities which are issued on reaching the milestone.
- Criteria for classifying the financial equities need to be complied with, such as availability of authorised share capital, when contingent consideration may need to be transferred (PricewaterhouseCoopers, 2010b, p.3).
The acquisition contractual terms which determine the initial classification of contingent consideration can have significant impact on the acquirer’s post-acquisition balance sheet and profit and loss account. For contingent consideration classified as a liability, changes in fair value subsequent to the acquisition date must be re-measured each financial year until the acquisition contract is completed. By contrast, the fair value of equity classified as contingent consideration is not re-measured each year but remains the same as on the acquisition date.

As a consequence it is important that when contingent consideration takes the form of financial equities, it should be clearly classified as either a “liability” or “equity” by the acquirer. IFRS 3.40 (IFRS, 2012, p.A144) requires an equity classification should be based on the definitions of IAS32 (Financial Instruments: Presentation). Similarly, US GAAP ASC 805-30-25-6 requires this classification to be based on ASC 480, (Distinguishing Liabilities from Equity) or other applicable GAAP (PricewaterhouseCoopers, 2010a, p.2-40).

When a fixed number of financial equities, such as shares and options are issued on reaching the milestone, then contingent consideration must be classified as “equity”. Otherwise, if there is a variable number of financial equities, then the contingent consideration will be classified as a “financial liability”.

In cases, where contingent consideration can be triggered by multiple events, each identified by a discrete milestone, then the equity or liability classification would depend on whether the occurrence of these events are independent of each other, i.e. mutually exclusive. If these events are mutually exclusive and each milestone is assessed separately, resulting in a fixed number of financial equities to be issued, then they will be classified as “equity”. On the other hand, if contingent consideration is based on the overall assessment of interdependent events and variable number of financial equities to be issued, then they would be classified as a “financial liability”.

Similarly, an acquirer’s contingent right to refund of consideration transferred, which is contingently returnable consideration, is recognised as an asset and measured at fair value by both IFRS 3.40 (IFRS, 2012, p.A144) and US GAAP ASC 805-30-25-5 and ASC 805-30-25-7 (PricewaterhouseCoopers, 2010a, p.20-40).

**Income Approach**

IFRS 13.BC141 (IFRS, 2012, p.B931) allows use of the market, cost and/or income approach while estimating the fair value of assets and liabilities.

With valuation of contingent consideration, there may not be any similar traded asset, which makes application of the market approach impossible. Furthermore, since the value of a contingency is driven by payoffs dependent on specified future events actually occurring, the cost approach based on historic cost or replacement cost, is also inappropriate. Thus, the unique aspects of contingent consideration, limits the choice of methodology to the income approach.

**Risks associated with the underlying asset**

It is important to distinguish between different types of contingent considerations as they could be based on risks which may be very different in nature, i.e. systematic or unsystematic.
The contingent consideration obligation of the acquirer may be exposed to unsystematic, private or project risks, when the milestones are project related with linkages to business objectives. In our mineral exploration project/company example, the physical milestones on which the possible future issues of performance shares and options depend, are delineation of increasing tonnages of iron ore resources of acceptable grade/quality representing clearly unsystematic project risk. The project risks so determined can in turn be used as the mechanism to value the acquirer’s financial equities transferred as contingent consideration. Event-based contingent consideration can be valued by first computing the project payoffs corresponding to each possible event and then, after estimating the probability of achieving each milestone, calculating the expected or mean present value.

The distinction between project and market risk and its handling in real options valuation in the context of the mineral sector business are explained in Guj and Chandra (2012a, p.182).

**Payoff structure**

In a typical business acquisition, the expected value of vendor consideration and its corresponding effect on the value of the acquirer’s financial equities issued are determined by future cash flows or payoffs projections and by the expected rate of return generated by the acquired project/company. When there is a linear relationship between consideration payoffs and the values of a project, company and/or financial equity, then the relevant discount rates can be determined by pricing debt and equity returns (PricewaterhouseCoopers, 2011, p.3).

However, the linear relationship between consideration and value breaks down to become non-linear, when any component of vendor consideration is of a contingent nature. In our example, payment of contingent consideration occurs only if the actual quantity of iron ore delineated exceeds certain tonnages. The value of non-linear consideration payoffs cannot be established on the basis of a single certain event. In order to capture the unsystematic or project risk, the valuation needs to be based on a set of mutually exclusive and collectively exhaustive events that cover the whole spectrum of their possible payoffs.

In our example, consideration payoffs as a result of reaching a resource delineation milestone have a non-linear structure, like a call option value on a financial equity. The difference is that for a financial option, the underlying asset is actively traded in the market. The consideration payoff becomes positive, if its spot price becomes greater than the exercise price. Although in the example of this paper, the underlying asset is the acquirer’s share which is traded in an active market, an alternative deal could have been struck where the underlying asset could have been the mining rights to the actual iron ore project. Therefore, in the case of single-project, mining companies, the value of which is largely determined by the value of the resources they hold, the dividing line between “financial” and “real options” can be nebulous and the distinction becomes a matter of semantics. In our example, option value is created in the first instance by the uncertainty of the resource tonnages, which is the main determinant of the volatility of the share price. An alternative could have been to build a discounted cash flow model of possible iron mine designs of different sizes and estimate the volatility of their cash flows using Monte Carlo simulation (Guj and Chandra, 2012b, in review) as an input into a real option model, as discussed below. “Real Option” can be defined as the right but not the
obligation, for investors to acquire or not at their discretion the net after-tax, present value of all operating cash flows generated by an infrequently traded project (a proxy for the spot price) at an implementation cost equivalent to the present value of all initial and sustaining capital investments (a proxy for the exercise price) at or before some specified date in the future. An estimate of the volatility of the project cash flows and of the risk-free rate of interest is also needed to calculate the real option value (ROV).

There are a number of methods to value options, which include close-form equations, such as the Black-Scholes-Merton (BSM) formula, binomial lattices and trees and decision trees. In our example we made use of the BSM formula to estimate the value of various possible performance options given different resources delineation milestones with the possible option values becoming the inputs in a decision tree designed to obtain their expected present value.

The advantage of these methodologies is that they utilise models that more consistently and accurately reflect real world decision-making, such as, the value of contingent claims. Options valuations techniques will therefore become more prominent in fair valuing for financial reporting in the future (Zyla, 2010, p.219), and will be applicable to contingent vendor consideration valuation of performance shares and options.

III. DESCRIPTION AND DATA OF CASE STUDY

In this case study, the acquiree owns exploration tenements for iron ore in a hilly and densely wooded terrain a few hundred kilometres from the coast in a West African country. Geological reconnaissance and aeromagnetic survey have confirmed the presence of iron ore. Based on initial rock sampling and limited shallow drilling, geologists concur that these tenements may contain iron ore in potentially significant quantity and of acceptable quality and grade. The contractual terms for an outright acquisition of the project are given in Table 1 below.

<table>
<thead>
<tr>
<th>TABLE 1: COMPONENTS OF VENDOR CONSIDERATION</th>
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<tbody>
<tr>
<td><strong>Net assets of acquiring company:</strong> $255,000,000</td>
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<tr>
<td><strong>Number of shares of the acquiring company on issue:</strong> 120,000,000</td>
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<tr>
<td><strong>Vendor consideration components</strong></td>
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<tr>
<td>Consideration</td>
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<tr>
<td><strong>Performance milestones</strong></td>
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<tr>
<td>On 0.6 B tonnes of ore</td>
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<td>On 1.2 B tonnes of ore</td>
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<td>On 1.8 B tonnes of ore</td>
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<td>On 2.4 B tonnes of ore</td>
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The components of the vendor consideration to be transferred include:

- Cash;
- *Consideration shares* in the acquiring company;
- *Consideration options* over the acquiring company shares;
- Four tranches of *Performance shares* contingent on the achievement of increasing levels of iron ore tonnages being delineated by a forthcoming drilling program; and
- Four tranches of *Performance options* exercisable at different prices contingent on the achievement of increasing levels of iron ore tonnages being delineated by the above drilling program.

It is expected that the drilling program will be carried out soon after the acquisition is transacted and that it will be completed over a relatively short interval of time.

Aside from *consideration shares and options* which are issued at the acquisition date, as each successive resource milestone is achieved, a new tranche of *performance shares and options* is issued, thereby creating five mutually exclusive and collectively exhaustive possible events as shown in Table 2.

<table>
<thead>
<tr>
<th>Exploration events</th>
<th>Resource milestones</th>
<th>Tranches</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>&lt; 0.6 B tonnes of ore</td>
<td>No new issues</td>
</tr>
<tr>
<td>2</td>
<td>On 0.6 B tonnes of ore</td>
<td>Tranche 1</td>
</tr>
<tr>
<td>3</td>
<td>On 1.2 B tonnes of ore</td>
<td>Tranche 1 and 2</td>
</tr>
<tr>
<td>4</td>
<td>On 1.8 B tonnes of ore</td>
<td>Tranche 1, 2 and 3</td>
</tr>
<tr>
<td>5</td>
<td>On 2.4 B tonnes of ore</td>
<td>Tranche 1, 2, 3 and 4</td>
</tr>
</tbody>
</table>

As discussed below, the probability of the first event is relatively high, while those of the following events decrease from relatively low to very low.

There were 120 million shares of the acquiring company on issue at the time of the announcement of the acquisition of the project, which were trading at $1.50. The net asset backing of the acquiring company was $255 million.

IV. METHODOLOGY

**Acquisition method for vendor consideration**

IFRS 3.4 (2012, p.A137) requires that all business combinations be accounted for by applying the “acquisition method”. The acquisition method can be summarised in nine steps after considering the various requirements of IFRS 3, including IFRS 3.5 (2012, p.A137) and others as shown in the flowcharts of Figures 1 to 3.

Figure 1 shows the first six steps necessary to identify and quantify the various components of vendor consideration and relates them to the relevant accounting standards.
Figure 2 relates to acceptable valuation methodologies for the non-contingent and contingent components of vendor consideration. The figure also highlights how this valuation framework was applied to our West African example in determining the total vendor consideration value transferred.

Figure 3 focuses on the determination of goodwill and bargain purchase and their accounting treatment.

The case study in this paper is mainly focused on Step 7 (in Figure 2) regarding the determination and accounting for consideration transferred, with particular emphasis on contingent consideration often used in mineral sector acquisitions.

**FIGURE 1: FLOWCHART #1**

**ACQUISITION METHOD**
IFRS 3.4 (IFRS, 2012)

**STEP 1**
Business combination identification
IFRS 3.3; IFRS 3.B5-12; IFRS 3 Appendix A (IFRS, 2012)

**STEP 2**
Acquirer identification
IFRS 3.6-3.7; IFRS 3 Appendix A; IFRS 3.B13-B18 (IFRS, 2012)

**STEP 3**
Acquisition date determination
IFRS 3.8-3.9; IFRS 3 Appendix A (IFRS, 2012)

**STEP 4**
Identifiable assets acquired and liabilities assumed: recognition and measurement
IFRS 3.10-3.14; IFRS 3 Appendix A (IFRS, 2012)

**STEP 5**
Identifiable assets acquired and liabilities assumed: classification and designation
IFR 3.15 to 3.17; IFRS 3 Appendix A (IFRS, 2012)

**STEP 6**
Possible non-controlling interest in the acquire: recognition and measurement

**TO FLOWCHART #2**
FIGURE 2: FLOWCHART #2

From Flowchart #1

STEP 7
Consideration Transfer Measurement

Valuation Methods - IFRS 13

Consideration (Not contingent on milestones)

Cash Amount
Shares No
Options No
Market Approach
Income Approach
Cost Approach

Linear Payoff
Non-linear Payoff

Option Pricing Model
Multi-period earnings method
Present Value Techniques

Discounted Rate Adjustment
Expected Present Value

Option Price

Quoted spot price
Exercise Price
Volatility
Risk-free Interest
Time

Options Value
Financial Options approach
Real Options approach

Classify as Equity
Classify as Equity


Contingent Consideration (Dependent on milestones)

Financial Milestone
Physical Milestone
Other Milestone

Milestone probability distribution

Trigger Financial Instruments as consideration - IFRS 9
Trigger Non-Financial Instruments as consideration

Non-Linear Payoff
Non-Linear Payoff or Present Value

Performance Options Number
Performance Shares Number

Classification by IAS 32

Fixed number of equities
Variable number of equities

Classify as Equity
Classify as Financial Instrument Liability

Total Vendor Consideration Value Transferred

To Flowchart #3
FIGURE 3: FLOWCHART #3

FROM FLOWCHART #2

STEP 8
Goodwill or bargain purchase gained: recognition and measurement

IFRS 3.32-3.36 (IFRS, 2012)

Consideration transferred greater than consideration paid
Difference is goodwill

Consideration transferred less than consideration paid
Difference is bargain purchase

STEP 9
Subsequent measurement and accounting


Equity

Goodwill

Bargain purchase

Financial instrument (FI) liability

Non-financial instrument (NFI) liability

No re-measurement required

Re-measurement required

Adjustment of variance as profit or loss

Application of methodology to an iron ore project acquisition in West Africa

Valuing consideration shares and options

Let us now consider how to value the various vendor consideration components already provided in Table 1.

Cash, consideration shares and options are paid and issued on the acquisition date and their value can be determined from market information. As per IFRS 9.BCZ 5.3, when there is an active market for the shares, the fair value of the shares and options can be determined by using Level 1 inputs directly or as inputs to option pricing models in line with IFRS 13.B11(b) (2012, p.A498). In this case, as the current spot market price
of the acquirer’s shares of $1.50 per share was used, the 100 million vendor consideration shares were valued at $150 million.

Using the BSM models, the value of the 50 million vendor consideration call options exercisable at a price of $1.75 per share over the next three years, worked out to $0.64 per option or a total of $32 million. This was under assumptions of an annualised volatility of 65% for the acquirer’s share price and a risk-free rate of interest of 5.4%.

Valuing contingent performance shares


The set of discrete, collectively exhaustive and mutually exclusive, resource tonnage milestones as specified in the contract is provided in Table 2. Four tranches of 50 million performance shares will be progressively issued dependent on whether the iron ore tonnages delineated by drilling exceed each successive specified milestone. Accordingly, for each milestone there are two potential outcomes: either the milestone is exceeded with a contingent payoff of an additional 50 million performance shares issued, or the incremental payoff is zero.

As discussed earlier, contingent consideration does not lend itself to valuation using the market or cost approach. Instead, income approach can be used by considering two aspects:

- The full range of outcomes for the exploration events and the probabilities of these outcomes; and
- The discount rate to be applied after considering the risks associated with the resulting contingent payoffs.

The value of vendor performance shares at the acquisition date is uncertain because it is contingent on the probability of achieving various possible specified milestones and on the estimated value of the contingent payoffs related to each of them. In view of these two inputs, the most appropriate method which gives a consistent and reliable result is the probability-weighted-mean or expected present value approach.

The method is based on calculating the expected present value of various tranches of performance shares, weighted by the probability that each corresponding specified level of resources will be delineated.

Two methods have been used in this study to calculate the probabilities of achieving each of the resource milestones listed Table 2:

- Traditional geologists’ subjective probability estimates; and
- Rank-statistics (i.e. the Zipf curve).

The Zipf power law generates the size distribution of all possible deposits in the relevant geological setting from the size of the rank 1 deposit, in our case the Simandou Range deposit in Guinea (Guje et al., 2012, p.120). This is a conservative and objective approach which provides a valuable reality check on the subjective judgement of the geologists, which invariably tends to be optimistic. For a more in-
depth coverage of the Zipf distribution, the reader is referred to Guj et al. (2012, p.120) and Mamuse and Guj (2011, p.1).

The following methodologies and inputs were used for our case study:

- **Geologists’ estimate of the probability of delineating any level of iron-ore.** The first step was to estimate the probability that a forthcoming program of systematic drilling will actually define a resource independently of its ultimate size, based on the current geological knowledge of the project, then that of achieving individual resource milestones given that a resource is delineated. The opinion of three different geologists familiar with the project was sought and their subjective probability estimates of delineating a resource irrespective of size ranged between 60% and 90%, with a mean of 75%.

- **Geologists’ and Zipf estimates of the conditional probability that if any iron-ore is delineated, it will fall within any of the five tonnage intervals defined by the specified resource milestones.** As the four resources milestones are 0.6 Bt, 1.2 Bt, 1.8 Bt and 2.4 Bt of iron ore, they define five ranges within which the size of a possible resource may fall, i.e. 0 to 0.599 Bt, 0.6 to 0.999 Bt etc as shown in Table 3.

**TABLE 3: GEOLOGISTS’ AND THEORETICAL RANK-STATISTIC (ZIPF) ESTIMATES OF CONDITIONAL PROBABILITIES**

<table>
<thead>
<tr>
<th>Theoretical Zipf estimate</th>
<th>Geologists’ estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>P(&lt; 0.6 Bt) =</td>
<td>84.0% versus 76%</td>
</tr>
<tr>
<td>P(0.6 to 1.199 Bt) =</td>
<td>8.7% versus 12%</td>
</tr>
<tr>
<td>P(1.2 to 1.799 Bt) =</td>
<td>2.8% versus 6%</td>
</tr>
<tr>
<td>P(1.8 to 2.399 Bt) =</td>
<td>1.4% versus 4%</td>
</tr>
<tr>
<td>P(&gt; 2.4 Bt) =</td>
<td>0.7% versus 2%</td>
</tr>
</tbody>
</table>

The interval defined by a resource greater than 2.4 Bt, was interpreted to be between 2.4 Bt and an upper bound of 3.0 Bt considered highly improbable on a rank-statistic basis. As the size of the resource can take any value between 0 and 3 Bt of ore, it is essentially a continuous distribution function. For the purpose of simplifying calculations, the probability estimate of the resource size falling within any of the above intervals was attributed to the size corresponding to the mid-point in each range, i.e. 0.3 Bt, 0.9 Bt, 1.5 Bt, 2.1 Bt and 2.7 Bt of ore.

Various geologists concur that these tenements may contain iron ore, which is of significant quantity and quality, with average iron grades of 52.5% in the range of 50% to 55%. Given this average grade, each resource milestone can in turn be expressed in terms of its contained iron metal. Thus 0.6 Bt of ore contains 0.6 Bt times 52.5% or 0.315 Bt of iron metal. Hence, the milestones expressed in terms of their metallic iron content are: 0.315 Bt, 0.63 Bt, 0.945 Bt and 1.26 Bt iron metal and the corresponding mid-points of the ranges are 0.158 Bt, 0.473 Bt, 0.788 Bt, 1.103 Bt and 1.418 Bt respectively.

- **Value of iron metal in the ground.** Using tonnes of iron metal instead of ore, facilitates comparison of the size of deposits with different iron grades. Use of this Level 2 input also allows valuation of the individual milestone outcomes which is obtained by multiplying the tonnes of contained iron metal by the price of one
tonne of iron in the ground. Our study made use of data extracted for African iron ore transactions from the global database maintained by Alexander Research based in Perth, Western Australia. The database shows nine transactions involving iron ore projects at the advanced exploration stages in various African countries. These projects feature a variety of generally large tonnages of iron ore ranging from low (29% Fe) to high (55% to 70% Fe) grade. Consequently, the corresponding prices per tonne of iron metal in the ground ranged widely with a weighted average of $0.954. This mean price has been used in the analysis to determine the incremental value added by the possible achievement of each of the resource milestone, as shown in Guj et al. (2012, Table 2, p.119).

The values of iron corresponding to various milestones so obtained were then used to estimate their possible impact on the acquirer’s share price. The resultant increase in share price was, of course, moderated by the dilution effects due to the issuing of the various tranches of shares. The possible share prices were then multiplied by the corresponding probability of each related resource milestone being achieved and summed up to get the expected value of the performance shares in the hands of the vendor. In our example, based on geologists’ probability, this was estimated to be $74.5 million. It is to be noted that even though delineation of resources within the 0 to 0.6 Bt range would add potentially high value to the enterprise, it has no value in the hands of the vendor, as no performance shares or options are issued in this range.

If resource delineation takes place over an extended period of time, then the probability-weighted average contingent payoff should be discounted to its present value based on a market rate of return. In our case, discounting has been ignored because there was no fixed date for the delineation of iron ore resources and the drilling program was expected to take place over a relatively short period of time.

As it has been assumed that resource delineation will take place over a limited period of time, this valuation also ignores the possible effect of general fluctuations in the market price for iron ore.

Valuing contingent performance options

In the example, the expected present value of the four possible tranches of 25 million performance options exercisable at various prices over four years is also subject to the achievement of specified resource milestones.

The process of estimating the expected present value of the performance options is similar to that used for the performance shares, except that instead of using the possible share prices corresponding to different levels of iron ore resources milestones, the methodology uses the values of the various tranches of performance options. The latter are calculated using in the first instance the related possible share prices at various milestones as inputs, generating the option values as if they were not contingent on the achievement of various milestones.

In effect, the valuation methodology for performance options has two stages. Firstly, the price of the option for each of the exploration event ranges is valued by using the option pricing technique as per IFRS 13.B11(b) (IFRS, 2012, p.A498), then these option values are weighted by their respective probability of occurrence to generate the relevant expected present value.
To the extent that the volatility of the acquirer’s share price (i.e. 65%) was used in the BSM option pricing calculations, the value of performance options is dependent upon both “market” and “project or private” risk, which determines whether the acquirer’s share price on the exercise date will be high enough for the performance options to “get in the money” and consequently being exercised.

It is also important that the BSM formula, besides neutralising risk, also incorporates discounting to present value, at the risk-free rate of interest, to compensate for the timing between the acquisition date and the exercise date. This means that the second step of computing the probability-weighted expected value of all possible performance option values does not require discounting.

Figure 4, reproduced from Guj et al. (2012a, p.124), shows how these option prices become Level 3 inputs to the decision tree used to calculate their expected present value.

For example, given a share volatility ($\sigma$) of 65% and a risk-free rate of interest (Rf) of 5.4%, the value of an option exercisable in four years at a price (X) of $2.00 against a corresponding spot price (S) of $3.17 (i.e. first tranche), if not contingent on the achievement of resources between 0.6 and 1.2 Bt of ore being delineated, would be $2.06. The intrinsic values of the performance options corresponding to the other resource milestones can be similarly determined.

**FIGURE 4: EXPECTED VALUE OF PERFORMANCE OPTIONS**

![Figure 4: Expected Value of Performance Options](image-url)
Intrinsic value of options (as if not conditional on milestones)

Using Black and Scholes formula with $S = 65\%$, $T = 4$, $R_f = 5.4\%$

<table>
<thead>
<tr>
<th>Tranche</th>
<th>S</th>
<th>X</th>
<th>Call value</th>
<th>Tranche</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;0.6 Bt</td>
<td>N/A</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>0.6 to 1.2 Bt</td>
<td>$3.17$</td>
<td>$2.00$</td>
<td>$2.06$</td>
<td>1</td>
</tr>
<tr>
<td>1.2 to 1.8 Bt</td>
<td>$5.02$</td>
<td>$3.00$</td>
<td>$3.33$</td>
<td>2</td>
</tr>
<tr>
<td>1.8 to 2.4 Bt</td>
<td>$7.19$</td>
<td>$4.00$</td>
<td>$4.88$</td>
<td>3</td>
</tr>
<tr>
<td>2.4 to 3.0 Bt</td>
<td>$9.55$</td>
<td>$5.00$</td>
<td>$6.61$</td>
<td>4</td>
</tr>
</tbody>
</table>

Five mutually exclusive and collectively exhaustive possible events

<table>
<thead>
<tr>
<th>Exploration events</th>
<th>Geologist</th>
<th>Options tranches</th>
<th>Cumulative value of tranche</th>
<th>Probability weighted payoff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resources delineated</td>
<td>75%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resource milestones</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;0.6 Bt</td>
<td>76%</td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>0.6 to 1.2 Bt</td>
<td>12%</td>
<td>1</td>
<td>$51,500,000</td>
<td>$4,635,000</td>
</tr>
<tr>
<td>1.2 to 1.8 Bt</td>
<td>6%</td>
<td>1+2</td>
<td>$134,750,000</td>
<td>$6,063,750</td>
</tr>
<tr>
<td>1.8 to 2.4 Bt</td>
<td>4%</td>
<td>1+2+3</td>
<td>$256,750,000</td>
<td>$7,702,500</td>
</tr>
<tr>
<td>2.4 to 3.0 Bt</td>
<td>2%</td>
<td>1+2+3+4</td>
<td>$422,055,737</td>
<td>$6,330,836</td>
</tr>
<tr>
<td>100%</td>
<td>EV of performance options =&gt;</td>
<td>$24,732,086</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As the uncertain events triggering the issuing of the performance options are the same as those for the performance shares, the option values are probability-weighted by the same probabilities of milestone occurrences, as adopted in the calculation of performance shares. For example, the probability-adjusted value of the performance options in the event of a resource between 0.6 and 1.199 Bt occurring (second branch from the top in the tree of Figure 3) is $0.75 \times 0.12 \times $2.06 = $0.1854$.

An expected or mean present value of $27.4 million is then obtained by summing up all possible, probability adjusted, performance call option values for each of the 4 possible tranches of options corresponding to each branch of the decision tree, calculated in accordance with IFRS 13.B11(b) (IFRS, 2012, A498) using the Level 3 inputs. However, as 50 million performance shares are issued in each tranche, their dilution effect on the share price may be such that the corresponding performance options in the tranche may in some cases not “get in the money” and therefore never be exercised. As a consequence, $24.7 million represents a maximum expected value for the performance options, if the options of all the four tranches are exercised.

Contingent consideration implications

There has been radical change in the methodology which can be used for valuing contingent vendor consideration. Earlier, the mineral resources/mining rights purchased were valued and treated as intangible assets, only if two conditions were met, i.e. if there was a relatively high probability more than 50% that the expected future economic benefits attributable to them would flow to the acquiree company; and that their value could be measured reliably. Otherwise no consideration was
brought to account at the acquisition date and additional vendor consideration component was later added to the original vendor consideration, if and when it subsequently became more probable and reliably measurable.

The amended fair value accounting standard allows the use of probability-based valuation methodologies such as expected present values and option pricing, so that components of vendor consideration in the form of financial equities contingent on the achievement of specified milestones can now be valued for any probability of realisation of the related economic benefit no matter how low.

The value of mineral resources in the ground may be based on actual comparable transactions for similar resources in the region, on the basis of either the price-per-tonne-of-ore or of the equivalent value per-tonne-of-contained-metal.

As subjective geologists’ probability estimates are generally optimistic, it is worth comparing them to more objective but generally conservative probability distributions of possible mineral deposit sizes generated using rank statistics (e.g. Zipf’s law), which represents a good reality check and a basis for a “floor” value. The level of realism of the subjective estimation of the probability of achievement of various deposit-size milestones, provided by the project geologists, is the other critical parameter to arrive at an acceptable estimation of the corresponding possible contingent payoffs, which are the main Level 3 inputs for the calculation of the “expected fair value” of vendor performance shares and options.

In determining the prices that shares would reach if various resource milestones were achieved, the analysis must consider both the value added to the entity by the additional resources as well as the possible dilution effect resulting from the issuing of various tranches of performance shares and options, net of the possible cash flows from exercise of the options.

If a significant time interval elapses from the date of acquisition to the issuing of performance shares, then the related payoffs need to be discounted to their present value by an appropriate risk and time adjusted rate of discount. In our case study, no discount was used for performance shares because it was assumed that delineation drilling would have taken place over a relatively short period of time. Possible fluctuations in the price of iron ore were also ignored for the same reasons. In the case of performance options the BSM formula or binomial lattice neutralise risk and contain a discount factor at the risk-free rate of interest.

V. RESULTS

The case study clearly demonstrates that very complex estimations have to be made to determine the fair values of performance shares and performance options. These include significant complex estimates of the increment in the value of the entity due to the increasing levels of resources inventory and the dilution effects due to successive share and option issues on the estimated share prices corresponding to various milestones under uncertainty.
All the individual components of the vendor consideration, both certain and contingent, can now be summed up to determine the “fair value” of the total vendor consideration transferred, which, based on geologists’ subjective probability estimates, is:

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash component</td>
<td>$100.0 million</td>
</tr>
<tr>
<td>Market value of 100 million shares @ $1.50 per share</td>
<td>$150.0 million</td>
</tr>
<tr>
<td>Value of call options @ $0.64 per share exercisable over three years</td>
<td>$32.0 million</td>
</tr>
<tr>
<td>Expected value of four tranches of performance shares over next four years</td>
<td>$74.5 million</td>
</tr>
<tr>
<td>Expected value of four tranches of performance options exercisable over the next four years</td>
<td>$24.7 million</td>
</tr>
<tr>
<td><strong>Total fair value of vendor consideration transferred</strong></td>
<td><strong>$381.2 million</strong></td>
</tr>
</tbody>
</table>

The project value of $381.2 million will appear as an asset in the balance sheet of the acquiring company together with $131.2 million in liabilities relating to the tranches of consideration options and performance shares and options, as well as a reduction of $100 million in cash, resulting in a net asset value of $150.0 million.

If the same calculation is carried out based on the conservative theoretical Zipf curve probability estimates, then the value is:

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash component</td>
<td>$100.0 million</td>
</tr>
<tr>
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</tr>
<tr>
<td>Value of call options @ $0.64 per share over next three years</td>
<td>$32.0 million</td>
</tr>
<tr>
<td>Expected value of four tranches of performance shares over next four years</td>
<td>$33.6 million</td>
</tr>
<tr>
<td>Expected value of four tranches of performance options exercisable over the next four years</td>
<td>$11.1 million</td>
</tr>
<tr>
<td><strong>Total fair value vendor consideration transferred</strong></td>
<td><strong>$326.7 million</strong></td>
</tr>
</tbody>
</table>

This is a “bottom fair value” estimate of the total vendor consideration. The $54.5 million difference between $381.2 million and $326.7 million is a measure of the geologists’ optimism.

VI. CONCLUSIONS

International and Australian Accounting standards are undergoing major changes, including those related to acquisition of corporate businesses, i.e. IFRS 3 (Business Combinations), IFRS 13 (Fair Value) and IFRS 9 (Financial Instruments). The revised and new accounting standards will use “fair value” as the consistent basis of all relevant valuations. This landmark change will enable financial accounts and reports to better reflect the economic realities of business acquisitions. The “fair value” approach has also been adopted by the US accounting standards in a joint project with the IASB, resulting in convergence between the IFRS and US GAAP leading to greater global uniformity of accounting standards. The change to “fair value” and related accounting standards for business combinations will deeply impact the
valuation methodologies to be used for valuing vendor consideration. The current “acquisition method” is driven by market values as compared to the earlier “purchase method” based on allocating costs of acquisitions. The earlier pooling-of-interest or merger accounting for business combination has now been discontinued.

Contingent consideration obligations are generally based on financial performance milestones, such as specific future levels of profit, sales or share prices, called “earn-outs”. The relevant valuation approach will need to be based on a combination of estimation of possible future shares and/or option prices and expected present value techniques. This methodology can also be applied if vendor consideration for the acquisition of mineral exploration/mining projects includes performance shares and options contingent on the achievement of milestones of a physical nature such as delineation of specified levels of mineral resources by future drilling. Valuing vendor consideration during negotiations including contingent consideration by adopting the valuation approaches and techniques which are becoming integral to international accounting standards, enables both the acquirer and acquiree to make sound commercial decisions based on more realistic economic values. The new valuation approach will also be reflected in more consistent and accurate financial accounts and statements.

REFERENCES


Option valuation and accounting for contingent consideration in mineral sector acquisitions


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