International Valuation Standards Council  
London  
By e-mail to: CommentLetters@ivsc.org

Re: Response to Questions in IVSC Discussion Paper, Valuations in the Extractive Industries

The following are my personal responses to the questions posed in the Discussion Paper. As background, I have worked in the minerals (mining) industry for 40 years and also have experience in many aspects of the petroleum (oil and gas) industry. For almost 20 years, I have specialized in conducting mineral property valuations in accordance with appropriate valuation standards, primarily the USA’s USPAP and the IVSs. My mineral property valuation work is divided between properties in and outside the USA. Many of my clients are international, generally with international uses for the valuation reports. Most of my valuation work has been for legal purposes, primarily as expert reports in litigations.

Question 1.1:  
Should IVSC produce combined standards and guidance for Extractive Industries or produce separate pronouncements for mining and for oil and gas? If you believe the latter please indicate the reasons why you consider separate guidance is appropriate.

The most significant differences between the two sectors are: (1) the method of determination of the level of confidence for estimates of categories of resources and reserves in the most respected classification systems; (2) mines and quarries typically attain reasonably constant or increasing annual production rates, whereas annual production from individual oil and gas wells typically declines on an exponential decay curve; and (3) petroleum and its refined products are generally transported to market or port by pipeline, whereas mined product is normally transported to market by truck or rail.

These differences are due to extraction of solids versus fluids. They are inadequate to justify separation of the two sectors for valuation guidance. The extent of difference is similar to that between the crop growing sector and the livestock raising sector of the agricultural industry.

Despite these conspicuous basic differences between the two sectors, the following similarities for valuation inputs outweigh the differences: types of geological and geographical settings; property interests, leasing, and royalty factors; access and water rights; risk factors; social and economic issues; regulatory and political issues; financing and taxation structures; multi-year to more than decade long time-lines from exploration through project development; and a vast range in scale of project capital investment required.
However, from my experience with these standards matters, I expect that the petroleum sector will be slower to adopt a valuation standard developed for the extractive industries in general than one developed specifically for its sector.

**Question 1.2:**

a) Should the project focus just on the valuation of reserves and resources or should it extend to other assets employed in the industry and to entire businesses in the sector? Please provide reasons for your answer.

The project should focus on the valuation of interests held in mineral and petroleum exploration properties, and resource and reserve properties, as they relate to land and the interests held in the minerals and surface estates of land. Realistic market valuation of exploration properties can be important, yet quite challenging, and must not be ignored.

The valuation of plant and equipment, intangible assets, and businesses within the extractive industries should also be addressed. However, since the influences on these valuations are essentially a subset of the influences on the valuation of minerals estate interests, they can be addressed secondarily.

b) How often do you assess or use (if it is readily ascertainable) the value of an extractive business as a starting point for the valuation of reserves and resources?

Owners and operators of mineral properties often carry their interests in a particular mineral property in a holding company devoted to that property, together with associated assets such as permits and water rights. Therefore, for the sales comparison approach (market approach) the starting point of transaction analysis is frequently a transaction of a corporate entity holding company. Since the subject property is often similarly held, little or no adjustment to the holding company value may be needed.

I sometimes use stock market valuations of corporations that are a single mineral property asset company or dominantly one property. The mineral property asset of interest may be the subject of the valuation or a comparison property for use in sales comparison transaction analysis. Accounting for liabilities and assets of the corporation that are not part of the subject or comparison property allows extraction of the entity value of the mineral property assets from the stock market capitalization of the corporation.

I avoid using stock market value extraction method as my primary method for market valuation of mineral property assets as I find that there can be a significant disconnect between stock market valuations and direct acquisitions of mineral property assets.

**Question 1.3:**

Do you agree with the Board's preliminary view as to the type of pronouncements that IVSC should be making in relation to valuations in the Extractive Industries? If not please explain what alternative or additional material you believe would be useful.
I agree with the preliminary view expressed in para 1.3.5: 

*It is the preliminary view of the Board that a standard might be needed to confirm how the principles in the other IVSs should be applied in order to prevent misapplication of those principles and maximise the protection to those who rely on valuations in the sector. However, it considers that the major part of its output will be in the form of a TIP providing non-mandatory guidance.*

However, I consider that a standard **is** needed for the extractive industries. It should state that the principles in the other IVSs should be applied and how they should. My observation is that globally, most mining industry professionals who develop valuation reports have little knowledge of the generally accepted valuation principles.

**Question 2:**

a) **Are you familiar with the former GN14?**

I am quite familiar with GN 14.

b) **Is GN 14 used in the valuations that you provide or receive?**

I have applied GN 14, together with the other 2005 and 2007 IVSs, to some substantial and complex mineral property valuation assignments for international clients with international intended users and uses of the valuation reports, with the mineral properties sometimes also being in foreign locations. It has been particularly useful for developing well respected regulatory filings, given that “all statements in the Standards, Applications and Guidance Notes have equal authority” (IVS 2007, page xi).

I am aware of only one mineral valuation report that I have received that has abided by GN 14.

c) **What elements of GN 14 do you find useful in either reporting or interpreting valuations?**

I find the following particularly useful:

The references in GN 14 to other standards in the IVSs provide useful direction for integration of the specific extractive industries guidance with guidance in other IVS standards;

The definitions are helpful and useful for quoting;

The explanation of how to apply aspects of the valuation framework, such as Highest and Best use, within the extractive industries.
Question 3

a) Which classification code or codes are most commonly used in your industry/sector?

Classification standards or codes related to the CRIRSCO-based classification system (CRIRSCO Template), especially JORC, CIM, SME, and SAIMM, are mainly used in the minerals industry of the western world, or where the mineral property is controlled by a western world company. They are applied primarily to mineral properties held by companies reporting to the western world stock exchanges, or where there is an expectation or hope for a transaction involving a listed public company. As a result, mineral deposits with significant economic interest for the major metals and precious metals, coal, and uranium, are usually classified in accordance with the CRIRSCO Template. However, for industrial mineral and aggregate quarry properties, which in the great majority of cases are not held by publically listed companies, even in the western world, the owners and operators often have little or no knowledge or interest in any resource classification system.

The United Nations Framework Classification (UNFC) is a numerical classification system, independent of language, that is designed for use in both the minerals and petroleum sectors. It provides a much wider ranging classification system, encompassing mineral deposits from producing reserves to those that fall well outside the five resource and reserve boxes of the CRIRSCO Template. It provides classifications designed to work in capitalist and socialist economies.

The UNFC has gained some penetration worldwide for use by academics and government agencies for classifying mineral deposits in national resource inventories. Its use is most prevalent in parts of eastern Europe and in China.

b) Which code do you normally use or rely on?

For my work within the USA, I generally use or apply either the SME or CIM classifications. However, many advanced stage and operating industrial mineral and construction stone properties are unclassified. Outside the USA, I often work with properties to which the JORC classification has been applied. Most of the mineral property transaction data I receive from outside the USA is in the JORC or CIM classifications. Transaction data from China, central Asia, and the ex-Soviet countries has often been in the Russian classifications, and now more frequently, the UNFC.

c) Are you aware of differences across your/industry sector on the classification codes used? If so please indicate whether these differences cause problems in undertaking or understanding valuations.

Within the USA, I sometimes must deal with transaction data constrained by the US SEC’s restrictive Industry Guide 7 classification. I find the differences between the CRIRSCO-based classifications to be insignificant for valuation undertakings.

However, impositions of regulations by stock exchange regulators, for reporting within the classification systems, can result in significant differences, which cause biases in transaction data and valuations. An example is the Canadian NI 43-101 regulatory definition of historic data and the prohibition of the use of historic data for higher than an Inferred Resource classification.
Question 4:
a) Please identify the valuation methods that you most commonly use or encounter for valuing:

• Producing reserves


Encounter: NPV/DCF Method. Direct sales comparison methods.

• Reserves undergoing development

As above.

• Reserves or resources subject to exploration


Encounter: For all property stages, the NPV/DCF Method is employed. For early resource and exploration properties, I have encountered various Cost Approach methods, including Multiples of Exploration Expenditures, the Appraised Value Method, and versions of the Geoscience Matrix Method.

If you are a valuation provider, please indicate why you prefer these methods. If you are a valuation user, please indicate if you are confident in the result obtained by these methods.

As a valuation provider, I prefer the Market Transaction Valuation Method at all property stages, because I find its market measurement techniques provide the most accurate and reliable results. I like the NPV/DCF method for advanced stage and operating properties because it is quick and easy, it looks impressive, and most professionals associated with the mining industry feel they understand it. However, for Mineral Resource and earlier stage properties, I find the NPV/DCF method to be inaccurate and often misused and abused by valuers.

¹ By “indirect sales comparison method” I mean a method in which the transacted properties are adjusted to the subject property on a per unit basis of contained mineral commodity, such as Troy ounces of gold, or tonnes of magnetite. An array of adjustments may be applied to each property, some substantial, due to lack of direct comparability to the subject property of the transacted property’s geological parameters, the geographic and socio-political setting, or property interest involved. The compounded total of the adjustments can be quite large. By “direct sales comparison method” I mean a method in which the transacted properties are adjusted to the subject property, possibly also on a per unit basis of contained mineral commodity, with only a few adjustments, these generally being modest, thus providing an implication of direct comparability of the transacted properties to the subject property. (Ellis, Trevor R., 2011, “Sales Comparison Valuation of Development and Operating Stage Mineral Properties”, Mining Engineering, Vol. 63, No. 4, April 2011, pages 89-104, a peer reviewed technical paper.)
Question 5:
b) If you have experience of using the market approach to value assets, please indicate the sectors and asset types where this is used.

I apply the Market Transaction Valuation Method (an indirect sales comparison method) across all mineral commodity sectors for all mineral property exploration, development, and operating stages. A couple of other mineral valuers are also applying this method.

I have encountered mineral property valuation reports with direct sales comparison applied to properties at all exploration, development, and operating stages. In all cases, that comparison process has lacked adequate adjustments to transform the transacted properties to represent the subject. As a consequence, the results from the sales comparison process are inappropriate.

c) Please identify the three most important factors for which you frequently need to adjust price data when applying this approach.

Changes and differences in net commodity prices and in capital and operating costs, generally represented by adjustment for operating margin change.

Resource quantity

Resource location

Question 6.1:
a) Production forecast – do you use internal production forecasts developed by the entity's own geological and engineering specialists, external forecasts, or a combination of both?

For an Investment Valuation, I will rely moderately on the entity’s internal production forecast.

For a Market Valuation, I will rely mainly on external market information that I compile and analyze. Whether the mineral property market is a buyer’s or seller’s market will help determine the weighting I give to an internal production forecast.

b) Do you adjust the production forecasts for risk by reserve category?

I do not differentiate between Proven and Probable Mineral Reserve categories.

I do differentiate between Mineral Reserve categories and the various Mineral Resource categories.

c) Do you make an explicit cash flow forecast through the term of expected production, even though it might be a very long period of time, or do you use a "remainder period" for long lived reserves? If you use a remainder period, typically over what period is your explicit forecast?

Though I often use a remainder period, I have no fixed policy on the period of my explicit forecast. I do whichever makes the most sense based on the configuration of the deposit being mined, the
tenement terms, the social and regulatory environment, and the commodity market. However, it would be quite unusual for me to model more than 40 years of production, or less than 20 years, for a long life reserve.

d) Do you use an internal management estimate for future pricing, eg the NYMEX, investment bank analysts' estimates, industry sources, or a combination thereof to estimate future prices? If using the NYMEX strip pricing, what are the typical assumptions you make for prices beyond the NYMEX strip (e.g., flat, inflationary growth, etc.) Do you consider the impact of any hedging of future prices that might be in place in estimating the future revenue stream?

For an Investment Valuation, I will typically use my client’s internal management estimate for future pricing, at least as a base case, provided it can be reasonably justified.

For a Market Valuation, I will probably use a combination of future pricing sources, including NYMEX, if there is information available. I do all of my cash flow modeling in constant (real) currency terms, thereby assuming prices stay flat beyond any forecast real price change.

For most mineral commodities involved in my mineral property market valuations, there are no price specific forecasts. Therefore, my own interpretation of the commodity market drivers and the perceptions of the likely buyer of the property is necessary.

If a hedge is in place which would remain an obligation for the likely buyer, I would take that into account, just as if a coal sales contract were in place that would transfer as an obligation to the likely buyer of a coal mine.

e) Do you apply differentials to the future price estimates? If so, what is your source for estimated differentials?

I consider such exercises of commodity price accuracy and refinement to be futile and unwarranted given the multitude of larger potential variances involved in estimations of Market Value for mineral properties. The same is true for determination of Investment Value, except in circumstances involving specialized needs for sensitivity analysis.

f) Do you reflect currency exchange risks to future income and operating cost projections in the cash flow or in the discount rate?

For an Investment Valuation, I will if it is pertinent to my client.

For a Market Valuation, I almost always develop my valuation analysis and value estimate in constant US dollars, thereby removing most needs for inclusion of currency exchange risk.

g) Do you include corporate overheads when estimating the value of mining, oil and gas reserves, or just the selling, general and administrative costs associated with operating and producing the reserves?
For a Market Valuation of a mineral property, I never include corporate overheads. In evaluating transactions for extraction of inputs for my DCF analysis of the subject property, and in evaluating the investment requirements of the likely buyer, corporate overhead information is not readily available or easily obtained. More importantly, I have not observed corporate overhead as a factor in negotiation of a mineral property transaction.

h) How often do you use the DCF method to value probable or possible reserves?

For Market Valuation of a mineral property containing Probable Reserves, I will almost always use both a sales comparison method and the DCF method.

Possible mineral reserves do not exist in the CRIRSCO-based classifications and the US SEC’s Industry Guide 7 classification.

Question 6.2:

a) What methods do you use or are familiar with for determining the discount rate used for valuations of reserves and resources?

For Investment Valuations, I use my client’s specified investment rate of return requirement and/or a weighted average cost of capital. I adjust the discount rate to be appropriate for whether the cash flows from the model are before or after income tax, and whether they are in constant (real) currency terms or nominal currency terms.

For Market Valuations, I attempt to measure the prevailing discount rate in the market place for transactions of the type of mineral property asset I am valuing. My preferred method for measuring the prevailing discount rate is extraction of internal rates of return from transactions of mineral properties with similar characteristics to my subject. This requires taking care to design the cash flow model for a transaction so that the assumptions being used correctly correlate with those of the cash flow model for the subject. I also review mining industry discount rate surveys and sometimes consider weighted average cost of capital information or inputs from surveys of North American stock exchange filing for major mining, industrial minerals, or aggregates industry companies.

My cash flow models for use in my Market Valuations are almost exclusively before income tax and in constant currency terms. I derive my discount rates to be appropriate for those.

b) Do you separately consider and evaluate market (systemic) risk and asset specific risk?

No, I do not deal with risk in this manner for market valuations. I instead attempt to measure the required rate of return for the seller and likely buyer to come to an arms length sales agreement. Some asset specific risk and systemic risk are likely included in that number. However, my discount rate for the subject is designed around major risk points for the project being modeled by probability factors for success and failure, such as mine and processing plant startup and product market entry. That is, representation of major single point project risk factors are removed from the discount rate and represented as a single point probability on a decision tree. This is a much sharper tool for
representing point risk than an increase in discount rate that may be carried through the project cash flow model, compounding its discount factor for decades.

c) Please indicate the factors that you normally consider and reflect in the discount rate and any source you use to determine the appropriate rate adjustment.

As explained above, this question normally does not apply to me. For Market Valuations, I am measuring the prevailing market discount rate for transactions of properties with similar characteristics. For Investment Valuations, I normally rely on the investment parameters provided by my client or his financial advisor.

d) Do you use multiple discount rates to reflect the changing risk profile as an extractive process moves through its life cycle?

During my career, I have occasionally used multiple discount rates in this way, for Investment Valuations. I have rarely, if ever, used this strategy for Market Valuations. As stated above, I prefer to apply point risk probabilities to model project risk.

Question 7:
a) Please indicate what methods you use or are familiar with that fall under the Cost Approach and that are used in valuing assets in the Extractive Industries.

Cost Approach methods that I sometimes use for mineral properties are:

- The Geoscience Matrix Method
- The Rural Cost Method of land mix adjustment
- Multiples of Exploration Expenditures

I am also familiar with the use of the Appraised Value Method.

For buildings and plant and equipment, I have sometimes found need for the Depreciated Replacement Cost Method.

b) If you use or are familiar with the Cost Approach, please indicate in your experience how the cost of an equivalent asset is determined.

For mineral properties we rarely find equivalent assets. Therefore this question seems inappropriate for mineral property valuation. In the Rural Cost Method, the unit value of property components are determined from transaction analysis, then adjusted to the components of the subject property.

To determine the cost of equivalent plant and equipment assets, I have used industry journals and cost manuals, computer databases, inquired with equipment brokers, and had my client hire a machinery and equipment appraiser.
c) If you use or are familiar with the Cost Approach, please indicate the three most common adjustments that are made in your experience to reflect physical, functional or economic obsolescence, and what metrics are used to determine these adjustments.

This question implies the use of the use of Depreciated Replacement Cost (DRC) Method, which has negligible application to the valuation of components of land. Due to the large scale of uncertainties in our valuations of the minerals estate, formal application of the DRC method to buildings, plant and equipment can rarely be justified. The presence of the buildings, plant and equipment is inherently incorporated in the valuation of the mineral property through its stage of development classification. Separate assessment of their values would only add a supplemental note to the valuation report for the mineral property, except possibly for liquidation situations involving lender and lessor claims on residual assets.

Question 8:

This question deals with philosophical aspects of asset component value accounting for financial reporting for which I as a geologist and mineral economist have negligible experience. It is rare that my mineral property valuations have a financial reporting use.

Question 9:

a) How do you estimate the cost of future reinstatement or environmental protection obligations?

Use of a sales comparison method captures much of the environmental obligations through incorporating them in the units of value being adjusted from similar property types.

Estimates of environmental protection obligations are usually incorporated in the engineering assessment in the studies (typically preliminary feasibility studies) necessary to move mineral properties from a Mineral Resource classification to a Mineral Reserve classification. Later stage feasibility studies and design engineering provide greater detail and accuracy.

b) Do you discount the future cost of reinstatement obligations using a risk free rate or another rate? If another rate please identify and provide rationale for this approach.

The philosophical argument can be made that environmental protection and remediation obligations remaining after cessation of profitable mining operations should be discounted at a safe rate. Consideration of this argument in turn raises other questions:

What is the intended use of the valuation – to represent the Fair Value of a long term liability in the corporate accounts for financial reporting under IFRS standards for current value accounting? If it is IFRS Fair Value, should that be akin to Market Value, an isolated component value, an investment value, or something more akin to an insurance liability value? For whom is the Fair Value estimate really being estimated for as the users of the value estimate – current stockholders, lenders, potential investors, stock exchange regulators, corporate insurers, the government agency that may have to take over the liability if the company goes bankrupt? Is there an offsetting asset in the accounts such as a sinking fund,
a reclamation bond, or a specified investment, with capital and revenue generation assigned to service the liability, which is earning a higher or lower rate of return than the safe rate?

Substantially overvaluing or undervaluing a relatively large on-going liability could cause significant harm. Before attempting to answer the main question, it seems necessary to investigate these questions raised in response. A “one size fits all” rule may not be a fair and appropriate answer.

**Question 10:**

a) If you provide valuations of mineral assets, what investigations do you undertake to established the reasonableness or otherwise of estimates of the extent of reserves or resources provided by geologists?

Mineral Resource and Mineral Reserve estimate technical report filings with the major western world stock exchanges, usually are required to abide by the CRIRSCO-based classifications and the associated Qualified or Competent Person requirements for the signer of the report. This is not true for USA filings under Industry Guide 7 requirements.

On the occasions when I receive a valuation assignment for which I am to rely on a technical report with CRIRSCO-based Mineral Resource or Mineral Reserve estimate, I review the qualifications statement of the signing Competent or Qualified Person to see if their experience seems appropriate for the type of deposit and estimate. I also browse through their work quickly reviewing their main inputs and analyses. The mining industry regulators of the major western world stock exchanges are also doing quite a thorough job of reviewing such technical report filings.

Due to these reviews, if I have found nothing substantially wrong, I am then confident that the estimates were reasonable at the date the estimates were completed, based on the regulatory requirements that the estimator had to follow. For Market Valuation assignments, I often then make adjustments to the estimates for changes in commodity prices, operating and capital costs, and the expected approach to mining the property of the likely buyer.

b) If you provide valuations of mineral assets, are you routinely provided with estimates from engineers of the cost and feasibility of extraction? What enquiries do you make to satisfy yourself as to the reasonableness of these estimates?

Though I do receive such estimates for many of my mineral property valuation assignments, it is almost unknown for me to have received such an estimate that is up-to-date and appropriate for use as the basis of a current Market Valuation. I, or a subcontract mining engineer, often revamp the estimates to match currently prevailing circumstances, particularly if it is a seller’s market for the type of mineral property. In a seller’s market, this sometimes involves matching the size and style of mining operation to that which a likely buyer will employ.

c) If you are a recipient or other user of valuations of assets in the Extractive Industries, are you satisfied that the valuations properly reflect any uncertainties in the current estimates of either the extent of the reserves or the costs of recovery? What information would you expect
to see in a valuation report that would improve your understanding of the sensitivity of the reported value to uncertainties in the identified reserve or the costs of recovery?

Not Applicable.

**Question 11**

a) Please identify any intangible assets that are normally separately identified and valued;

i. In transactions between entities in the Extractive Industries and

ii. When accounting for the acquisition of a business in the Extractive Industries.

In both cases, *overriding mineral royalties* may be separately valued.

b) In your experience what, if any, value is attributed to components of goodwill, eg an assembled skilled workforce, in corporate transactions in the Extractive Industries. Please briefly indicate any valuation techniques used to establish the value of goodwill in such circumstances.

I have never been involved in the valuation or assignment of goodwill. Generally, where I have reviewed allocations of goodwill in my transaction analyses, my conclusion has been that an error in the asset value allocation or an inappropriate allocation of asset value has required a balance to be assigned to goodwill.

c) When considering the valuation of previously uneconomic reserves that can now be recovered using advanced technology, eg shale gas, deep water drilling, do you attribute an element of the overall value to the intellectual property involved? If so please explain briefly the method used to estimate this.

No. Particularly if it is a change in Market Value, that change gets applied to the mineral or petroleum reserves.

It is possible to hypothetically devise an Investment Valuation circumstance where a unique technology, non-transferable to any other mineral property owner or operator, even by corporate merger or acquisition, is generating unusually high levels of profit relative to that being attained by other parties from similar mineral properties. In that case, an assignment of value to the unique intellectual property would be appropriate.

**Question 12**

a) Please provide any examples of which you are aware of significant differences between the value of otherwise similar resources arising solely from different Governmental policies.

The value of undeveloped gold properties in Montana trade for a small fraction of what they would in Nevada. This is due to the government of Montana banning the use of sodium cyanide solution for recovery of gold, other permitting difficulties, and a lack of an encouraging political and social environment for mining in Montana. Nevada allows sodium cyanide use, rapidly permits gold mines, and has an encouraging political and social environment.
Old underground gold mine properties in eastern California, some with over 100,000 oz of delineated remaining gold resources and substantial exploration potential, must almost be given away relative to the valuations they would have if in Nevada. The same circumstances as specified above for Montana, apply to California.

For gold properties in Venezuela, slow permit approvals for mine development and growing expropriation risk caused their values to plummet since 2006, particularly in relation to Nevada gold property values.

b) Please indicate how “country risk” factors are reflected in the way in which you price or value extractive assets.

I obtain information about political and other country risks, such as expropriation and civil risk, from a number of publications. For the Market Approach, sales comparison adjustments of mineral property values for country risk from high risk countries such as Venezuela, Sudan, and Zimbabwe, to low risk countries such as Botswana, Chile, and Finland, can be a number of multiples of value. The appropriate scale of country risk adjustment can only be obtained through observation and analysis of transactions. Double counting of factors incorporated in country risk must be carefully avoided in other adjustment factors.

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