Valuation E-Book #3

The Valuation of Mining Companies[1][2]

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This Valuation E-Book is reviewed and updated from time to time based on changing Macro-economic and Industry conditions. Readers are directed to the date this E-Book was last updated, and should read it with reference to that date.

Introduction

From an investment perspective arguably few business ventures are as risky as those pursuing natural resource opportunities, particularly mining exploration companies and producers. Aside from financing and 'finding' risk in the case of pure exploration companies, and usual financing risk in the case of producers, this is because natural resource industries and the companies that participate in them are subject to product price cyclicality, ongoing changes in operating and capital cost structures, and stock market vagaries and volatility in circumstances where:

1. In the case of Small Cap Mining Companies (be they explorers or producers) there typically is a dependence on company management that is not present to the same degree in large companies.

2. At the explorer and especially producer level they are capital intensive and utilities dependent, with attendant cost structure variations related in particular to:

   - ✓ direct and indirect energy costs; and,
   - ✓ changes in environmental costs both during the period of resource exploitation and at the time of mine closure and environmental remediation.

3. They are dependent on the available infrastructure external to them for power, transportation, water, and so on.

4. At the exploration stage and the mine and processing infrastructure development stage they are dependent on a continued flow of external financing and a Board and Management team to effectively spend monies raised in the furtherance of their project(s).

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[1] The views expressed herein are those of the author. They are offered to readers for information and general guidance only. Nothing in this document is intended, and should not be taken, to constitute investment advice.

[2] For a comprehensive discussion of Share and Business Valuation see *The Valuation of Business Interests, Ian R. Campbell and Howard E. Johnson, The Canadian Institute of Chartered Accountants, 2001*, available through the websites of either Campbell Valuation Partners Limited www.cvpl.com, or The Canadian Institute of Chartered Accountants www.cica.ca. Canadian lawyers, public accountants, and persons giving share and business valuation advice broadly adopt that book as a reference text

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5. At all times their share prices and ability to raise new financing on reasonable terms (or in some market conditions raise new financing at all) are subject to stock market vagaries and volatility in times of both normal and abnormal trading patterns.

6. At all times important to assess how much net cash on hand (i.e. cash and equivalents less interest bearing debt) a company has when compared with its exploration and mine development capital spending programs. It is important to analyze this carefully in at least the following contexts:

    - ✓ Where the company does have net cash on hand, in what money market or other instruments is it invested, and at what risk are those investments?
    - ✓ Does the company have enough net cash on hand to fund those programs without raising additional capital?
    - ✓ In prevailing lending and capital markets does the company have an ability to curtail exploration or capital spending, 'mothball' its projects, and wait out a 'down-cycle'?
    - ✓ What is the likelihood of a requirement of near-term and longer term prospective dilutive primary share offerings on reasonable terms?
    - ✓ In prevailing lending and capital market conditions will it be necessary for the company to raise new financing on what fairly might be considered as 'unreasonable' terms, or in extreme circumstances, will the company be able to raise new financing at all.

7. They have no control over the pricing of their mineral outputs that are driven on world prices that historically have been cyclical.

8. At both the exploration and producer levels they are subject to the political and economic risks of the country(ies) in which they principally operate, and to substantive government regulation.

9. Whereas risk may change through the various stages of mine development from initial seeding funding through exploration to either sale of resources or reserves (typically to a 'major producer') or production, risk at virtually all times remains higher than the risk investors accept in more conventional investments that consistently generate positive free cash flow. In the 17th Post in this Post Series rates of return on investment criteria of multi-national and large public companies are compared with the rates of return I believe investors in higher risk mining ventures ought to require.

It follows that in order to invest in mining ventures an investor needs to have a clear understanding of the internal and external risks specific to such investments – and to make such investments with an appropriate idea of the returns they need to realize from them in order to justify putting capital at risk.

Investment Overview

Given recent and ongoing macro-economic change there has been increasing focus on the mining industry, and in particular on gold, silver, uranium, and base metal mining. This Series of Posts has been written to assist investors and investment advisors in their review and analysis of mining explorers and producers.

With respect to investment in publicly traded shares of mining companies, aside from company specific research and due diligence matters set out in these Posts, we believe investors who purchase or sell such shares should focus on at least the following things:

1. Current and prospective macro-economic conditions at the time they undertake their company research and make their investment decision.

2. It is critically important to understand the supply/demand and commodity cycle characteristics of the mineral(s) the company is exploring for or producing, and where the commodity price is in that cycle at any given point in time.

3. The fact that at any point in time both value and price are time specific, but in the case of public market shares at any point in time value and price might not coincide, particularly in periods of abnormal market conditions or unusually volatile markets, although over time they should converge.

4. In normal day over day stock market trading activity price is more important than 'value' to day-traders, whereas 'value' is more important to investors who hold for the long term.

5. Both value and price can change rapidly with positive announcements (e.g. a discovery), or negative announcements (e.g. an unexpected escalation in development or operating costs). In the context of stock market share price and trading patterns, value and price also can change rapidly in circumstances of abnormal stock market activity or volatility that has less to do with underlying value fundamentals and more to do with unusual near term market influences.

6. Many exploration companies are either not operationally successful or they financially fail.

7. Those exploration companies that find significant resources and reserves are an important source of prospective mineral supply, whether they sell them to an existing producer or themselves exploit them through to production.

8. Share liquidity (particularly in Small Cap) exploration companies can be poor depending on the size of a given company shareholding and the daily average trading volume of that company's shares. In this regard, see details of average daily trading volumes, moving average trading volumes, and share price volatility in the 'Comparators' and 'Company Details' pages of www.StockResearchPortal.com. This is partially due to the fact that shares of many Small Cap exploration companies are not qualified or are otherwise unsuitable for many investment funds.

9. Where a significant minerals discovery is made there can be significant upside leverage in share price.

10. There are two fundamentally different types of exploration, being exploration in areas where previously few or no commercial resources have been found, and exploration where commercial deposits previously have been found and exploited. Broadly, one would expect the latter to be somewhat less risky than the former, although it far from certain or even probable that this will be true in the case of any given exploration play.

11. It is critically important when considering whether to invest in any given mining explorer or producer to assess the Board and Senior Management in the contexts of:

    - ✓ integrity, avoidance of conflicts of interest, ability to access the capital markets on comparatively undilutive terms, and time and effort spent on the company. With respect to the latter, many (in particular Small Cap) mining executives spread their time and efforts among more that one company, and this is something that needs to be carefully considered in the context of whether this is potentially negative in a given company circumstance;

    - ✓ the knowledge and experience of staff geologists, geophysicists and engineers, and whether they have worked successfully together in the past; and,

    - ✓ the balance in the relationship between actual money invested by the Board and Management, option grants and terms, and the number of outstanding participating shares. Stated simply, how well are the Board and Management's respective economic interests balanced and aligned with those of company shareholders.

12. Understanding a company's property(ies) and project(s), including understanding:

    - ✓ their physical location and comparative geo-political risk;

    - ✓ the geology of the targeted deposit, discovery in progress, or deposit; and,

    - ✓ the resources and reserves in the ground in the context of quantity, grade, and metallurgy.

13. Understanding what:

    - ✓ available external infrastructure (roads, rail lines, water access, utilities access, ore processing facilities);

    - ✓ trained labour;

    - ✓ weather conditions in the context of whether year-round exploration and drilling is possible, thereby shortening exploration time, or whether weather conditions preclude that; and,

    - ✓ access to assaying laboratories is available to the company's projects, and the competence and 'on time delivery' of results from those laboratories.

14. When participating in a private placement understanding the:

    - ✓ number, exercise price (measured against the private placement common share price), and the comparative price, terms, and investment 'time window' of warrants offered as incentive to participate;

- ✓ quantum of any 'promote' inherent in or made concurrent with the offering (i.e. a 'promote' being any special treasury share price, option, or special warrant arrangement made in the context of, or concurrent with, the private placement). With respect to 'promotes' they tend to be more a feature of private placements in the Oil & Gas industry, and less a feature of private placements in the Mining industry;

- ✓ compensation terms of the financing agent; and,

- ✓ importantly, whether a company (or affiliated or associated company) has a history of issuing unannounced Board or Management options shortly after closing a private placement. If this has occurred it may well be evidence of a Board and Management that places its self-interest ahead of external shareholder interest, and hence a negative factor to be considered when deciding to participate in a private placement – or for that matter to invest in that company at all.

Although simplistic, it follows that as a general rule the least risky companies (which might or might not have the most exploration upside) ought to be those companies:

- ✓ with experienced, balanced Boards and Senior Executives with strong interest in the well-being of external shareholders, combined with an appropriate balance of personal economic self-interest;

- ✓ complemented by strong geologists and engineers; and,

- ✓ with properties located in stable regulatory and political environments that have good historical mineral deposits with strong expansion potential.

Exploration & Mine Development

Mining industries and the companies that participate in them face significant risks. These risks relate to:

1. The company's ability to raise financing as required at reasonable and affordable rates.

2. The company's ability to find mineralization that can be economically extracted in the contexts of:

   - ✓ commodity prices both in the context of their cyclicality and the fact a mining company's price recoveries are market dictated and entirely outside its control;

   - ✓ costs incurred in planning and constructing mine and ore processing facilities;

   - ✓ operating costs incurred during extraction and production; and,

   - ✓ mine closure and environmental remediation costs required to be incurred at the time production ceases.

3. The fact that finding, extraction and processing of minerals is:

   - ✓ subject to political and economic risks related to the country hosting the mineralization;

- ✓ at both the exploration and producer levels subject to substantive government regulation which could affect both production and cost structures;
- ✓ in the case of Small Cap Companies typically there is a dependence on company management that is not present to the same degree in larger companies;
- ✓ dependent on external infrastructure;
- ✓ capital intensive where actual capital costs incurred in constructing and maintaining mine and ore processing facilities might be quite different from those forecast during the feasibility study and final project budgeting processes. This is particularly true in periods of periods of high global growth rates, high mine development activity, and escalating direct and indirect energy costs; and,
- ✓ dependent on costs incurred during the extraction and production timeframe, which might be quite different (particularly in the context of direct and indirect energy related costs and environmental rehabilitation costs) than costs forecasted at the time of a feasibility study.

There is, of course, the possibility of commensurate high rewards in the event mineralization in commercial quantities is found and successfully brought to market, particularly in circumstances where an explorer finds commercial mineralization at the peak of the relevant commodity price cycle and sells the deposit to a producer with capacity in existing ore processing facilities in physical proximity to the deposit.

The Important Difference between Resources and Reserves

There are important differences between a mineral ‘resource’ and a mineral ‘reserve’. Mineral Resources are of less near-term importance in a value context than are Mineral Reserves. However, following further exploration and ‘proving up’ Mineral Resources may become Mineral Reserves.

Mineral Resources

A Mineral Resource is an inventory of mineralization gathered from outcrops, trenches, pits, workings, and drill holes that in the opinion of a Qualified Person (as defined in Canadian National Instrument 43-101), have reasonable prospects for economic extraction. Mineral Resources are sub-divided in order of decreasing geological confidence into Measured, Indicated and Inferred categories described as follows:

1. A Measured Mineral Resource is that part of a Mineral Resource for which quantity, grade or quality, densities, shape, and physical characteristics are so well established that they can be estimated with confidence sufficient to allow the appropriate application of technical and economic parameters to support production planning and evaluation of the economic viability of the deposit.

2. An Indicated Mineral Resource is that part of a Mineral Resource for which quantity, grade or quality, densities, shape and physical characteristics, can be estimated with a level of confidence sufficient to allow the appropriate application of technical and economic parameters to support evaluation of the economic viability of the deposit and mine planning. An Indicated Mineral Resource estimate is of sufficient quality to support a Preliminary Feasibility Study that can serve as the basis for major development decisions.

3. An Inferred Mineral Resource is that part of a Mineral Resource for which quantity and grade or quality can be estimated on the basis of geological evidence and limited sampling and reasonably assumed, but not verified, geological and grade continuity.

Mineral Reserves

Mineral Reserves, supported by at least a Preliminary Feasibility Study, are those parts of Mineral Resources that, in the opinion of a Qualified Person, result in an estimated tonnage and grade that is the basis of an economically viable project after accounting for all mining factors including all relevant processing, metallurgical, economic, marketing, legal, environment, socio-economic and government factors. Mineral Reserves are sub-divided in order of decreasing confidence into Proven and Probable Mineral Reserves described as follows:

1. A Proven Mineral Reserve is the economically mineable part of a Measured Mineral Resource demonstrated by at least a Preliminary Feasibility Study.

2. A Probable Mineral Reserve is the economically mineable part of an Indicated Mineral Resource, and in some circumstances, a Measured Mineral Resource demonstrated by at least a Preliminary Feasibility Study.

The foregoing should be considered only a brief primer in respect of Resources, Reserves and the categorization of each. For a more detailed discussion see heading ***Resources and Reserves – National Instrument 43-101*** *at the end of this E-Book.*

Mining Company Risk Assessment

The following assumes a 'single project' company. If a company has more than one project the considerations discussed that are 'project specific' need to be considered separately with respect to each project. From an investor perspective important timing issues, risk assessment, company information, and an appropriate 'risk related rate of return' ought to be include a large number of common factors. *On a cautionary note, 'Risk Factors' are fact and circumstance specific, and no list or broad discussion of 'Risk Factors' should or can be considered all-encompassing.*

General Factors

1. The proper measurement of current business value is the present value of all future returns, where future returns are taken to be after-tax distributable or re-investable (in company growth) 'free cash flows'. In the context of a mining project 'free cash flow' typically include the aggregate after-tax annual cash flow expected to the generated over the life of the project less income tax effected annual sustaining (or 'maintenance', 'no-growth') capital investment, less the after-tax cost of any mine closure and related environmental remediation costs.

2. This value measure is fundamental and should be reflected upon at each stage in the life of a mining project, notwithstanding that prior to mine production there is no possibility of a project generating 'free cash flow'. During the finding stage and mine and process facilities development stage any such value process typically would assume assessment of the project on a 'stand-alone' basis. In circumstances where an arm's length purchaser (typically a 'major producer') bids for the project prior to production purchaser 'synergies' or multiple purchaser competition for the project are additional factors that ought to be considered an any value assessment.

Investment Time Frame

1. What is the investment time frame, combined with an assessment of the likelihood and timing of a likely liquidity event in the contexts of

   - ✓ an exploration company selling a commercial 'discovered' project to a producer; or,
   - ✓ a possible takeover by a producer?

   In this regard, it is important to know whether it is the company's strategy to grow organically, grow through new property acquisition, grow through company acquisition or merger, or grow through a combination of some or all of those things.

   Stock markets are comprised of traders and investors with varied short term to long-term time horizons. As a result, in general:

   - ✓ the shorter period of time the investor intends to hold stock in a particular company, the less that investor is likely to focus on long term macro-economic prospects, industry specific economics and long term commodity cycle prices – and the more they are likely to focus on things such as moving average share prices, share price volatility, and near term changes and volatility in commodity prices. In contrast, the longer an investor's investment horizon the greater needs to be the investor's ongoing and focused interest on long term macro-economic prospects, industry specific economics and long term commodity cycle prices; and,
   - ✓ it is important to understand the Board's and Management's strategy in the context of whether they intend to develop an exploration project to the point where it can be sold to an arm's length producer, or whether they intend to build a mine and processing infrastructure. If management plans the latter it is important to form a view as to whether management has the requisite operating experience, financial acumen and contacts, critical mass (i.e. lack of dependence on one or more individuals), and so on. It also is important to assess whether mine and plant development themselves result in a wrong risk/reward relationship resulting from permitting problems, mine and plant cost overruns, timing delays, unplanned post-production environmental costs, and so on.

Company Identified Risk Factors

1. What 'Risk Factors' does the company identify in its annual and quarterly corporate filings, including the company's and market's perception as to 'host country' (i.e. the country(ies) where the company conducts its exploration and production activities) political risks, foreign exchange rates, income tax rates, and so on?

   The company is obligated to make full disclosure of what it believes to be the risk factors affecting its business. Accordingly, it is important to review what the company declares to be those risk factors – such disclosure typically being made in the company's annual and quarterly Filings.

Ownership – Share Structure

1. What is the company's share structure, and what are the terms and conditions of each class of outstanding shares, options, and warrants?

Review and analysis of these things is important this both from the point of view of understanding the rights and entitlements of each of the company's issued share classes, and the number and exercise price of outstanding options and warrants. Analysis of the latter indicates possible future share dilution, and the price at which that dilution of existing outstanding shares will occur.

2. Is there a controlling shareholder? If there is, can the personal circumstances of the controlling shareholder be determined so as to conclude whether he/she/it is to likely to ensure or militate against good management practices and liquidity events?

Where there is a controlling shareholder this speaks to the issues of:

- ✓ the management competence of the controlling shareholder if an individual, and if he/she is active in management;
- ✓ if an individual, the controlling shareholder's willingness to hire proven management if that is an appropriate 'arm's length' thing to do;
- ✓ the controlling shareholder's willingness to give up control if commercial sensibility dictates that should happen; and,
- ✓ if an individual, the controlling shareholder's emotional attachment to the company and its projects, and hence his/her willingness to look to a liquidity event if commercial sensibility dictates that should occur.

There is little question that the presence of a controlling shareholder (whether or not an individual) tends to fetter corporate flexibility and liquidity. This should be reflected by investors in their assessment of investment risk and, all other things equal, should cause them in theory to demand higher returns than they ought to expect from an investment where there is no 'control overhang'.

Project Ownership

1. It is important to know whether the company owns the project outright, or at least has control or contractual control of the project. If contractual control, it is important to understand the terms of the contract and what jurisdictional law prevails?

If the company does not own or control the project outright it is important from a risk measurement perspective to understand:

- ✓ whether the contract terms with a third party partner(s) fetters either the company's operating control of the project or its ability to dictate both the timing and the terms of a 'liquidity event' (i.e. an amalgamation, joint venture, or outright sale of the project); and,
- ✓ how the laws in the jurisdiction in which the company (or if the project is owned through a subsidiary or joint venture) may influence both the company's and shareholder (or other form of ownership) rights.

Corporate Governance

1. What are the company's Corporate Governance policies and practice, and are they adequate?

   Companies typically disclosure their Corporate Governance policies and practices in their annual documentation. In simple terms the greater the stated strength of those policies and practices, the more comfort shareholders should have in the context of the Board and Management meeting their statutory fiduciary responsibilities.

Management

1. What is the reputation of the members of the Board and each of the Executives for, and fact of, integrity?

   The importance of this goes without saying. Without question, one of the most important factors to consider when assessing risk referable to a (particularly Small Cap) mining explorer or producer is the integrity, quality, knowledge base and experience of members of the Board and Senior Management.

2. Does critical mass exists within the company's management team?. What plans are in place for management succession planning in the event of the departure or death of a key employee?

   In circumstances where there is little or no 'management team critical mass' or 'management succession plan' it follows that there is increased dependency on specific individuals, and hence greater risk than where 'management team critical mass' and a documented management succession plan exists.

3. For exploration companies, what is the Director and Management prior successful 'discoverer' or 'finding' experience? Is there specific experience of, and related dependency on, one or more individuals for exploration and production success?

   Where there is dependency on the experience of one or more specific individuals it follows that there is greater risk than is the case where such 'dependency on specific individuals' does not exist.

4. What is the Director and Management proven 'mine development and operation success' in the case of exploration companies that have a strategy of developing a mineral deposit through to production – importantly, distinguishing between open pit and underground mining experience?

5. Does the company have employment contracts with key executives and if so, what are the terms and conditions of those contracts?

6. What are the Directors and Management terms of reference, contracts, compensation, compensation policies, benefit plans and prescribed retirement age – and how does each of these things impact on Company risk?

   In Small Cap companies in particular it is common to find Board and Senior Management compensation to be comprised of comparative low salaries and options that provide incentive to Senior Management to succeed. Having said that, it is particularly important to assess whether the Board and Senior Management has a reasoned and reasonable balance between their own self-interest and the economic interest of Company shareholders.

7. How many actual dollars has each Board member and Senior Executive invested in common shares of the company?

   As a general rule, where Board members and Senior Executives have significant amounts of personal capital invested in shares of a Company, as contrasted to simply holding options on treasury shares, common sense dictates such a commitment is positive for company shareholders because those Board members and Senior Executives then have:

   - ✓ demonstrated a willingness to invest their own capital beside that of external shareholders; and,
   - ✓ a personal vested interest in ensuring a balance between the interests of the Board and Senior Management on one hand, and other company shareholders on the other, in the context of prospective granting of stock options to Board members and management.

8. What is the history of stock option grants to directors and officers. Are they reasonable or unreasonable in the context of such things as annual compensation, the relationship of aggregate outstanding director and officer options to each of:

   - ✓ total undiluted and fully diluted common shares; and,
   - ✓ current director and management option policies and practices.

9. What is the history of, and past practice with respect to, stock option replacement grants or stock option re-pricing?

   Where there is a past practice of stock option replacement grants or stock option re-pricing that should be viewed with skepticism.

10. What is the extent of management's banking, financial institution, and other important relationships?

11. Do the Board and management have a demonstrated ability to raise capital as necessary with time and circumstance appropriate (i.e. not excessive) dilution of existing shareholder equity interests?

    This is particularly important in times of restraint in the lending and capital markets.

12. What is the Director and Officer history of insider trading?

    Insider trading patterns need to be looked at carefully and with a 'fair eye'. If there is a large amount of insider selling in any given period that may well be a cause for concern, just as a large amount of insider buying may signal a company worth seriously researching as a potential investment. However, if an insider with a substantial shareholding sells a comparatively few shares that may simply mean the vendor had an immediate personal need for some liquidity and a sale of those shares was the vendor's best route to that liquidity.

13. Are any of the Directors or Officers directors or officers of any other Reporting Issuers?

14. If any of the Directors or Officers are directors or officers of any other Reporting Issuers:

- ✓ Are their involvements with those other reporting issuers such that they will be less likely to satisfy their responsibilities to the company because of dilution of their respective time and effort?

- ✓ Do any of these relationships or their other business involvements (if any) create or result in the possibility of conflicts of interest?

Guidance

1. Historic management guidance measured against actual results needs to be carefully reviewed, and the reasons for material differences assessed. It is one thing in the case of:

- ✓ An exploration company, if management forecasts a drilling program at the beginning of a current year of 30,000 feet for that year and 27,000 feet is drilled. It is quite another if only 20,000 feet are drilled and little outside of management's control (weather, labour strikes, etc.) contributed to that.

- ✓ A producer, if management gives guidance with respect to mineral production quantities that are significantly less than those actually achieved, and little outside management's control contributed to that.

- ✓ A producer, if management gives guidance with respect to capital costs or operating costs that are significantly less than those actually incurred, and little outside management's control contributed to that.

It may be perfectly reasonable to excuse a management that fails to meet one or more of its key guidance numbers by significant amounts in any one year, particularly if that same management has succeeded in achieving or at least not significantly missing its guidance in prior years. However, if management misses some or all of its guidance numbers by significant amounts for two or more consecutive years that ought to be seen as a serious 'red flag' by investors.

Macro-Economic Conditions

1. Macro-economic prospects, both near-term and long term, for the principal commodities the company is exploring for, or planning to mine, need to be continuously monitored.

The price of minerals historically has been, and is likely to continue to be, cyclical. This cyclicality is critical to risk measurement when assessing mining projects. Comparatively poorer mining projects (measured by Measured, Indicated, and Inferred resources and Proven and Probable reserves, capital cost requirements, mining and other operating costs, etc.) can be economic at times of high prices for the minerals produced or planned to be produced, while comparatively excellent mining projects can be uneconomic in periods of poor mineral prices and escalated capital and operating costs. Thus it is important to have an understanding of the macro-economic climate at any given point in time and its possible effects on both prospective relevant mineral prices and capital and operating costs. Examples of issues that need to be considered when investing in shares of mining companies, be they explorers or producers include:

- ✓ Prospective forecasts for continued shifting of production to low labour rate countries and the near-term and long term prospects for those emerging market countries.

- ✓ Prospective comparative country specific GDP, inflation rates, and household savings rates.
- ✓ The prospective direction of the U.S. $ exchange rate measured against other currencies.
- ✓ The ability of the U.S. consumer to continue to spend at recent historic levels given U.S. housing prices and the U.S. consumer debt levels at any given point in time, thereby supporting emerging market manufacturing infrastructures.
- ✓ The willingness of the U.S.'s trading partners prospectively to hold U.S. $ generated through trade deficits.
- ✓ Prospective metal demand/supply issues.
- ✓ Prospective capital cost escalations where mine and ore processing infrastructure has yet to be built, or has been built and needs to be maintained.
- ✓ Prospective operating costs. This is particularly relevant in an escalating energy and general operating cost environment.

Geography of Principal Operations

1. The geographic location of the Company's project(s) is of significant importance.

   Many mining explorers have one or a small number of geographically scattered projects. On one hand it can be argued that this mitigates risk through diversification. On the other hand it can make a company's prospects more difficult to assess, and leads to questions related to whether company management is capable of maximizing opportunity as a result of time and effort dilution.

   Of particular importance, current and prospective government stability, political risks, and political attitudes with respect to labour and safety laws, the environment, mining, mine permitting, mine infrastructure, and income tax law and rates all bear on project risk. Hence all are things that require careful consideration by investors in their respective risk assessments.

Balance Sheet & Access to Capital

1. It is important to assess how much net cash on hand (i.e. cash and equivalents less interest bearing debt) a company has when compared with its exploration and mine development capital spending programs. It is important to analyze this carefully in at least the following contexts:

   - ✓ Where the company does have net cash on hand, in what money market or other instruments is it invested, and at what risk are those investments?

   The U.S. sub-prime mortgage problems that came to market attention in August, 2007 highlighted this as an important consideration;

   - ✓ Does the company have enough net cash on hand to fund those programs without raising additional capital?
   - ✓ In prevailing lending and capital markets does the company have an ability to curtail exploration or capital spending, 'mothball' its projects, and wait out a 'down-cycle'?

- ✓ What is the likelihood of a requirement of near-term and longer term prospective dilutive primary share offerings on reasonable terms?

- ✓ In prevailing lending and capital market conditions will it be necessary for the company to raise new financing on what fairly might be considered as 'unreasonable' terms, or in extreme circumstances, will the company be able to raise new financing at all.

Assessment of lending and capital markets at any given point in time is very important. For example, this began attracting increasing importance in the summer of 2008 as lending and capital markets tightened. In September, 2008 (as this is being written) many Small Cap Mining Companies are having difficulty raising capital at anything other than on highly dilutive terms, or simply finding it impossible to raise new capital.

2. As a general rule exploration companies fund their exploration activities though private placements and other primary share offerings (i.e. a sale of treasury – newly issued – shares that results in dilution to existing shareholders). In private placements warrants typically are offered as incentives to cause investors to participate. In these circumstances the following things need to be carefully considered:

- ✓ where an accredited investor (as that term is used in Canadian Securities Law) is considering investing in a private placement the term of escrow (typically four months in the case of a Canadian company) and more importantly the terms and conditions of the warrant offering that typically forms part of a private placement 'unit'; and,

- ✓ whether there is any provision in the private placement documents with respect to director and management options that may be issued in the near term following the closing of the private placement. Where this is the case, or in particular where such options are granted shortly after the closing of the private placement without disclosure in the private placement documents, this can be a clear sign of director and officer 'option featherbedding' and may speak directly to a circumstance where directors and officers place their own self-interest ahead of that of their company's shareholders.

Financing Requirements

1. What are the company's current and prospective financing requirements, including whether the company is in compliance with outstanding loan covenants?

2. If an exploration company, does the company have debt on its balance sheet, or off balance sheet obligations?

It is unusual for a Mining Explorer to finance exploration activities with debt or off-balance sheet financing. Where debt or off-balance sheet financing exists the reasons should be clearly understood having regard to incremental risk that likely results vis a vis mining exploration companies who finance exploration solely with equity.

Hedging Contracts

1. Does the company have a history of hedging or a stated hedging policy?

2. Does the company have any hedge contracts outstanding?

If so, the impact of those contracts on prospective operating results need to be analyzed.

External Infrastructure

1. It is important to understand the proximity of a company's mineral deposits and possible deposits to available transportation infrastructure, utilities, water, trained labour, existing ore processing infrastructure, and to understand whether exploration is seasonal due to weather conditions.

   Consideration of these things is fundamental, as without transportation infrastructure, utilities, water and available of trained labour the economics of any new deposit will be very different than if those things are readily accessible and in close physical proximity to such a deposit. Further, if exploration is weather dependent and hence exploration is seasonal, value enhancement if exploration is successful typically will take longer than it otherwise would.

Internal Infrastructure

1. It is important to understand whether mine and ore processing infrastructure already exists (even if it is somewhat rudimentary), or whether if a commercial deposit is found or is planned to be expanded a Greenfield mine plan and ore processing infrastructure would have to be built.

   This is important because deposit economics (and hence commercial viability) can be far different if:

   - ✓ *a mine infrastructure and ore processing plant exists on or in proximity to the company's property that can be acquired, or*

   - ✓ *if there is an existing ore processing infrastructure with excess capacity that can be contracted with,*

   than if a Greenfield mine and ore processing infrastructure must be built. This is particularly true in periods of economic growth and periods of high and escalating energy and capital costs.

Development Stage of Project

It is important to know what exploration or mine development stage the Company's project currently is at. Project 'stages' can be summarized as:

1. The 'seed money' stage, where one or more exploration properties have either been identified as acquisition targets, or have been either recently acquired or targeted. Investment at this stage obviously is highly risky, as any investment made at this point is to a very large degree a 'bet on the Board and Management' both being able to find and negotiate acquisition on commercially sensible terms if they have not already accomplished that.

   It is important for anyone investing in a private placement at this stage in the company's evolution to be satisfied with the terms of the private placement offering (including the number of warrants offered in conjunction with shares, the escrow period, the promote (if any), including options (if any) granted to the Board and Management concurrent with the financing. It also is important to reflect on whether the size of the private placement will be sufficient to ensure completion of the initial project exploration and resource and reserve determination without the likelihood of the company having to dilute shareholders pursuant to subsequent financings. Investors who purchase the company's shares in the open market should assess these same things in a risk context. While highly subjective, in order to invest in a mining exploration company at this stage an investor ought not to invest unless he/she believes the near-term return on investment potential has a real potential of being very significantly higher than returns expected:

- ✓ *by corporate acquirers when they acquire conventional businesses with established products, customer bases, and after-tax free cash flow – this is discussed in the last Post in this Post Series; and,*

- ✓ *from investments in normal sized trading lots of 'Mid and Large Cap' public companies.*

2. Partway through its exploration program without proven success.

   This is arguably the riskiest investment stage where an exploration program has been partially completed and has yet to find what it expects to be find. Any investment made at this point continues largely to be a 'bet on the Board and Management', in circumstances where the Board and Management to date has not realized success. Again, investors ought not to invest unless they believe the near-term return on investment potential has a real potential of being significant higher than returns expected by corporate acquirers when they acquire conventional businesses, and from investments in normal sized trading lots of 'Mid and Large Cap' public companies.

3. Partway through its exploration program with some demonstrated success.

4. At the stage of having NI 43-101 measured, indicated and inferred resources.

5. At the stage of having NI 43-101 proven and probable reserves.

6. At the pre-feasibility study stage.

7. At the feasibility study stage.

8. At the permitting stage.

9. At the mine and processing facilities funding stage.

10. Successfully completed the mine and processing facilities funding stage.

11. Partially completed the mine and processing facilities construction.

    It is particularly important at this stage to monitor both cost overruns against forecasted costs and the actual time of construction measured against the planned construction timelines.

12. Completed mine and processing facilities construction and in production.

   Arguably risk diminishes as the project proceeds through each stage in its evolution from demonstrated exploration success to production. Once in production risk can be assessed on a day-to-day basis based on conventional rate of return expectations.

   Importantly, during the mine and mill construction phase the risks of cost overruns, equipment shortages, timing delays, unanticipated problems with infrastructure tie-in, and so on are always present, and need to be carefully monitored.

Feasibility Studies

1. Pre-feasibility and Feasibility Studies are comprehensive study of the viability of a mineral project that has advanced to a stage where the mining method in the case of underground mining, or the pit configuration in the case of an open pit, has been established and an effective method of mineral processing has been determined. These studies include financial analysis based on reasonable assumptions of technical, engineering, legal, operating, economic, social, and environmental factors that enable:

   - ✓ *a Qualified Person (as defined in Canadian NI 43-101 to determine if all or part of the Mineral Resource may be classified as a Mineral Reserve;*
   - ✓ *the Board and Management to determine if in their respective views a project is commercially viable; and,*
   - ✓ *ultimately for lenders, investors, and perhaps in the end corporate acquirers to determine if in their respective views a project is commercially viable.*

   Things that must be considered when determining whether a project is commercially viability include:

   1. *The existing resource and reserve base at any given point in time in the contexts of geographic location, average grade, existing proven and probable NI 43-101 resources and reserves, and the perceived potential to expand the mineable deposit and timing of such expansion.*
   2. *The project's physical location and comparative geo-political risk.*
   3. *The geology of the deposit in the contexts of extraction method (open pit versus underground), quantity, grade and metallurgy.*
   4. *Whether company determined mineral cut-off grades are commercially viable over commodity pricing cycles expected over the life of the project.*
   5. *What infrastructure (roads, rail lines, water access, utilities access, ore processing facilities), trained labour, weather conditions (enabling year-round exploration and drilling), and access to assaying laboratories is available to the property.*
   6. *The economics of the project in the context of forecasted metal prices, mining, milling and processing costs, recovery of secondary metals, and project financing.*
   7. *Specifically with respect to financing, it is important to understand the company's (read Board of Director's and Management's) philosophy and strategy of financing through debt, equity or a combination of the two. The company's resultant debt:equity ratio is an important measure of project and company risk – and speaks directly to investor-specific risk tolerance.*

   Where a company has completed a pre-feasibility study or a feasibility study it is important to review it or them in detail to gain an understanding of the assumptions that have been made with respect to both revenues and costs, and the resultant internal rate(s) of return imputed in those studies.

Mineralization & Mining Technique(s)

1. *It is important to understand the targeted mineralization and expected mining technique, including consideration of historic mine workings and proximity to existing commercial deposits.*

   Generally, but in particular with respect to an early stage exploration company, the anticipated grades and potential quantities of targeted mineralization need to be carefully considered both in and of themselves and in the context of the physical characteristics of the prospective ore body. Essentially there are two distinctly different mining techniques, being 'open pit' mining, and 'underground mining'. The former typically enjoys lower operating costs per unit of production, and faces less risk on many fronts than the latter. Accordingly, one typically would expect low grade ore bodies to be commercial only if they were found in reasonably consistent quality and large quantity near the surface such that they can be 'quarried' pursuant to an 'open pit' mining process.

Mine & Processing Infrastructure

1. It is important to understand the project's mine and processing infrastructure in at least the following contexts:

   - ✓ If the mine and processing infrastructure is of a 'greenfield' nature, what is the likelihood of it being permitted on a timely basis, and of it being built on time and within budget?
   - ✓ If the mine and processing infrastructure is completed and mineralization is being mined and processed, how well maintained is that infrastructure in the contexts of annual repairs and maintenance expenses being incurred?
   - ✓ If the mine and processing infrastructure is completed and mineralization is being mined and processed, how well maintained is that infrastructure in the context of annual sustaining capital expenditures being incurred?

Mining & Processing Costs

1. With respect to 'producer' operations, it is important to understand and assess the company's historic and (more importantly) prospective processing and refining costs per unit of output, cash operating costs per ounce produced and metal credits, and its annual EBITDA (earnings before interest, taxes and depreciation), EBIT (earnings before interest and taxes), after-tax income, annual sustaining capital reinvestment, prospective free cash flows, and what might be ultimate mine closure and environmental remediation costs?

2. With respect to the company's labour force, what Labour Laws exist in the country where the company conducts its operations with respect to severance and safety, is trained labour readily available, are there labour productivity enhancement opportunities, and is the labour force unionized and what are the contract terms?

Mine Life

For a producer at least the following questions need to be addressed with respect to resources, reserves, capital assets, production capacity and efficiency:

1. What is the company's estimated mine life at any given point in time having regard to where in the commodity cycle metal prices then are?

2. What is company's 'capitalization v. expense policy' with respect to capital equipment and spare parts?

3. What is their technological state and state of repair and what is the dollar amount of forecasted capital expenditures over next three fiscal years?

4. Are required new equipment and spare parts readily available?

5. Importantly, what % of Capex is of a 'sustaining' versus a 'growth' nature, where 'sustaining capital reinvestment means 'the capital outlay required each year to maintain operations at existing levels'?

6. What is mine output capacity, mine efficiency, processing plant capacity, processing plant efficiency, and so on?

7. Does the mine experience, or is it at risk of experiencing, water flood issues?

8. Are power, water, and other utilities readily available to the company's exploration and mining sites?

9. Does the company have long-term supply contracts for power, water, and other utilities and if so on what terms?

10. Does the company prospectively face possible significant escalated utilities and water costs?

Environmental Issues

For both explorers and producers at least the following questions need to be addressed with respect to environmental issues:

1. Is there both a Board approved environmental policy and system of internal ongoing environmental surveys, prevention policies, and environmental liability audit procedures in place?

2. Are there known environmental liabilities, or have there been third-party environmental complaints, inspections, or examinations? If so, how have these liabilities been quantified and accounted for?

3. Has the company commissioned Phase I or Phase II environmental studies with respect to its properties?

4. Is there adequate environmental liability insurance to cover any existing or possible liabilities?

5. What were the prior uses of the company's properties, and have appropriate steps been taken to ensure the company has not assumed environmental liabilities created by prior owners or lessees – including ensuring that prior owners and lessees are contractually committed with respect to environmental liabilities that existed when the company took the properties over?

6. Does the company have environmental liabilities related to properties it previously owned?

Other Matters of interest

For both explorers and producers at least the following additional questions need to be addressed:

1. What liability insurance, operations insurance, and property insurance does the Company have in place?

2. Are, or in the past have, the company or any of its Directors and Officers been subject to penalties or sanctions related to bankruptcy, income tax, breach of securities law, or been found guilty of criminal or fraudulent activities?

3. Is the company or its operations subject to unusual Government Approvals or Regulations?

4. Does the company have any outstanding disputes with tax authorities, including unresolved income tax assessments or reassessments?

5. Does the company have any known unresolved regulatory compliance issues?

6. Is the company a litigant or potential litigant in threatened or ongoing litigation?

7. Does the company have any contractual obligations outside it normal course of business, or any material contingent liabilities?

Valuation Methodologies

Introduction

The following sections of this E-book canvass the valuation methodologies adopted by stock market investors, stock market analysts, corporate acquirers, merger and acquisition intermediaries, and business valuation experts when they value shares in mining companies. In these sections the following terms have the following meanings, where each is 'point in time specific':

1. Enterprise Value: *The total value of a business including both its interest bearing debt and equity components.*

2. Equity Value: *The total value of the shareholders' equity of a business, where shareholders' equity is stated at its fair market value, not at its 'book' or 'carrying' value.*

3. En Bloc Value: *The value of all outstanding shares (or other ownership interests) of a business viewed as a whole.*

4. Per Share Value: *That portion of the 'en bloc' value appropriately attributed to each class of outstanding share capital divided by the number of shares of that share class that are outstanding at a particular point in time.*

Valuation Methodologies are segregated by underlying basis of value as follows:

1. Asset Based Methodologies .

2. Earnings and Cash Flow Methodologies – Part 1.

3. Earnings and Cash Flow Methodologies – Part 2.

4. Comparables Based Methodologies.

5. Other Methodologies.

Tables summarizing each valuation methodology are included. Each table sets out:

1. Whether a particular methodology develops 'enterprise value' or 'equity value'.

2. Whether a particular methodology is principally used to develop 'en bloc' share value or per share value

3. The comparative reliability of each methodology.

4. Whether a particular methodology generally is adopted by Securities Analysts.

5. Whether a particular methodology generally is adopted by Corporate Acquirers.

Following each table, each valuation methodology is described, and the strengths and weaknesses of each are discussed.

Overview

Different business valuation methodologies should not be equally weighted, or for that matter considered relevant, for any given valuation purpose. The primary reasons are:

- value conclusions reached by Investors, Investment Advisors and Securities Analysts based only on information in the Public Domain necessarily must be more subjective than value conclusions based on both information in the Public Domain and Insider Information;

- at any given point in time quoted share prices, analyst or investor views as to what an appropriate price for a particular traded security might be, or a takeover price per share for a given public company may all be different;

- the market price of a normal sized trading lot of publicly traded securities may be quite different than a takeover price. This is because takeover prices typically reflect post-acquisition synergies anticipated by the purchaser; and,

- some valuation methodologies are not useful or applicable when determining the value of some businesses. For example, cash flow or earnings based valuation methodologies may not be relevant to the valuation of a mining exploration company that has no production assets or revenues, neither operating cash flow nor earnings, and no near term prospects of operating cash flow nor earnings.

That said, where a business generates cash flow and earnings, an en bloc share value (i.e. the aggregate value of all outstanding preference and common shares viewed as a whole) generally is developed pursuant to a Discounted Cash Flow ('DCF') methodology. Assuming full information access the DCF methodology is the most theoretically sound of all share and business valuation methodologies. This is because it necessitates careful review of near-term forecasted after-tax discretionary cash flows, which typically results in more informed analysis and valuation judgments than otherwise would be the case.

Public Market Participants typically do not have adequate information available to them to complete the same 'fully informed' DCF analysis that Corporate Acquirers are able to. Accordingly Investors, Investment Advisors and Securities Analysts may adopt valuation methodologies that either are not adopted by Corporate Acquirers, or not weighed heavily by Corporate Acquirers.

The following discussion is subject to important caveats:

1. **Any conclusion as to whether a particular valuation methodology is reliable or who does or does not adopt it is fact and circumstance specific. Accordingly, the categorizations set out in the following table and commentary may be inaccurate in any given fact situation**.

2. **'Corporate Acquirer' means a corporation that acquires all of the outstanding shares or control of another company where it is able to access all relevant information of the target company pursuant to a detailed due diligence process after executing Confidentiality and Non-Circumvention Agreements**.

3. **'Corporate Acquirer' in the context of the following discussion *does not mean* a corporation who makes a takeover bid for a public company or portion of the shares thereof where the 'bidder' has access only to publicly available information with respect to the target company. In the latter circumstance the 'bidder', typically being a company who expects post-transaction synergies, will have specific knowledge of its synergy 'expectations' and be in a**

better position to assess the value of the 'target' to it than any analyst not directly advising on the transaction.

Asset Based Valuation Methodologies

	Liquidation Value	Tangible Asset Backing	Multiple of Net Asset Value
Develops:			
Enterprise Value			
Equity Value	X	X	X
Principally Used to Develop:			
En Bloc Value	X	X	
Stock Market Price/Metrics			X
Reliability:			
Little or None			X
Some	X	X	
Greatest Reliance			
Information available to Securities Analysts:			
Historic Data	Generally not	Generally not	Yes
Prospective Data	N/A	N/A	N/A
Adopted by:			
Securities Analysts	No	Not Commonly	Commonly
Corporate Acquirers	No/Limited	Sometimes	No/Limited

The Liquidation Value Methodology

This methodology develops en bloc equity value where a business is deemed not to be a going concern. Pursuant to this methodology the liquidation value of each tangible and intangible asset is determined by appraisal or otherwise estimated, and those 'liquidation values' are aggregated. All liabilities (whether or not recorded on the books of the business) are deducted. This methodology generally is more theoretical than practical, and is seldom if ever adopted in a going concern context by Corporate Acquirers as a risk measurement tool. In my experience it is rarely used by itself in a stock market share price context, and typically is not adopted by Securities Analysts. Having said that, where a company owns assets redundant to its operations and strategy those assets might be valued on a liquidation value (net of income tax on disposal) basis by both Securities Analysts and Corporate Acquirers, and added to what otherwise would be either an enterprise value, an en bloc share value, or a 'proportionate' per share price.

The Tangible Asset Backing Methodology

This methodology develops an en bloc equity value. Pursuant to this methodology the 'value in use' (going concern value) of each tangible and identifiable intangible asset owned by a company is determined by appraisal or otherwise estimated and aggregated. The liabilities of the business are deducted. This methodology is the theoretically correct methodology to develop 'net asset value' pursuant to so-called 'peer group' analysis. However, whereas business owners and those Corporate Acquirers who have executed confidentiality agreements have data available to them to meaningfully adjust reported asset and liability values from their book values for accounting purposes to 'value in use' values, Securities Analysts typically do not have the same depth of information with respect to these things available to them. In my experience, such comparisons do not tend to be particularly meaningful, and any such comparisons should be carefully assessed before placing any reliance on them. The Tangible Asset Backing methodology may be adopted by Corporate Acquirers and their advisors as a risk measurement tool where:

1. The difference between the price paid for a business and the underlying tangible asset backing is taken to be a measure of the 'intangible value component' inherent in the purchase price.

2. Intangible assets are thought to be at greater prospective risk than are tangible assets.

In my experience this methodology generally is adopted in part by Corporate Acquirers as a basis for post-acquisition financial and income tax reporting purposes, but is not widely adopted by Securities Analysts.

The Multiple of Net Assets Methodology

This methodology typically is used by analysts to develop stock market price estimates, being equity values. Pursuant to this methodology multiples of reported net book value (or 'shareholders' equity') are imputed from what are taken to be 'peer group companies' and a comparator based stock market price is developed by applying the average, or some other multiple derived from that analysis, to the net book value (or 'Shareholder Equity') of the subject company. My experience suggests this methodology is widely adopted by Securities Analysts as a primary valuation methodology when valuing mining exploration companies and companies without cash flow and earnings, and is adopted extensively by them as a secondary valuation methodology in other valuation analysis. Broadly speaking, absent a very detailed and consistent analysis of the net assets of each 'peer group company' application of this methodology is likely to produce unsound results – and hence ought not as a general rule to be thought 'reliable'. This is because:

1. Application of generally accepted accounting (GAAP) principles by different companies may result in different reported asset and liabilities values for similar assets and liabilities.

2. More particularly, at any given point in time the current values of historically acquired assets may be quite different than the carrying value of those same assets – a great deal of which current information typically is not publicly disclosed – or for that matter known at any point in time by company Boards or Managements pursuant to either appraisal or analysis.

In my experience this methodology typically is not adopted or relied on by Corporate Acquirers or their Advisers, other than perhaps as a litmus test in the context of attempting to determine whether the public markets are likely to assess an acquisition as accretive or negative to the Purchasing Company's share price.

Earnings and Cash Flow Based Valuation Methodologies – Part 1

	Multiple of Earnings
Develops:	
Enterprise Value	
Equity Value	X
Principally Used to Develop:	
En Bloc Value	
Stock Market Price/Metrics	X
Reliability:	
Little or None	
Some	X
Greatest Reliance	
Information available to Securities Analysts:	
Historic Data	Yes
Prospective Data	Limited

Adopted by:	
Securities Analysts	Commonly
Corporate Acquirers	In Accretion Tests

The Multiple of Earnings Methodology

This methodology develops an en bloc equity value, and also is adopted by Public Market Participants to develop stock market price and value comparators. Pursuant to this methodology after-tax earnings are derived either from actual historic operating results, from forecasted operating results, or from some combination of those two things. In simple terms, after-tax earnings so determined then are multiplied by a 'risk assessment based' multiple (or multiples), and redundant assets are added to the result. The earnings multiple is typically derived through a combination of intuitive deduction and:

1. Transaction (i.e. merger and acquisition activity) market published and 'experienced based' 'perceived relevant' data in the case of development of en bloc equity value.

2. Stock market multiples in the case of development of stock market prices based in part on what are taken to be 'stock market peer group' comparators.

This methodology is commonly adopted by Securities Analysts where a company has and is expected to generate earnings. This is because at any point in time:

1. In a transaction (merger and acquisition) context there frequently is information available through data providers and others as to what are analyzed to be the price/earnings ratios that were paid in open market transactions involving companies that appear to be similar to the subject company.

   However, it is important to understand that to adopt such 'transaction multiples' from available 'transaction data' as proxies for 'earnings based value' is highly simplistic where those reported 'earnings multiples' are developed from recent reported earnings of the purchased businesses. This is because purchasers typically expect to realize post-acquisition synergies which are not reflected in those reported 'earnings multiples'.

2. In a stock market context there is ready data available with respect to the price earnings ratios of what are taken to be 'peer group companies', although it is necessary to adjust these 'peer group' multiples for 'comparability issues' when developing their value conclusions.

3. Much of the detailed data and information required to complete meaningful DCF analysis frequently is not publicly available.

Whether adopted in an en bloc or stock market valuation context, value conclusions developed pursuant to the 'multiple of earnings' methodology are inherently subjective and should be reviewed carefully and with scepticism. This is because:

1. As a general rule businesses are sufficiently different in their respective management capability, capital base, sustaining capital requirements, operations, and future prospects (and hence related

required ‘growth capital’ expenditures and enhanced ‘growth related’ working capital requirements) to make direct comparisons at best uncertain.

2. Where en bloc values are developed pursuant to the use of merger and acquisition transaction information, post-acquisition synergies anticipated by the purchaser typically are not reflected in the price/earnings ratio attributed to the transactions. That is to say a reported transaction price-earnings ratio, based on publicly available information, may appear to be 14X. However, the purchaser may have built post-acquisition synergies into its price and concluded that it was only paying 11X the post-transaction ‘synergistic earnings’ that would accrue to it post-acquisition.

3. Where stock market prices or ‘target prices’ are developed, much information relevant to either the ‘peer group companies’ or the business being analyzed is not public.

4. Reported earnings of each peer group company and the subject company are dictated by fact specific applications of Generally Accepted Accounting Principles.

5. Reported earnings are unlikely to be directly proportional to free cash flow among the peer group companies and the subject company. This is because their respective capital bases, capital investment requirements, financial structures, and so on, all are likely to be different. As a result of these and other things, Corporate Acquirers who have full access to all relevant information related to a target company in my experience typically:

   ✓ Place primary reliance on the DCF methodology when determining company value.

   ✓ Do not rely on the Multiple of Earnings methodology as a primary methodology.

   ✓ Adopt the Multiple of Earnings methodology when determining whether the public markets are likely to assess the acquisition as ‘accretive’.

Earnings and Cash Flow Based Valuation Methodologies – Part 2

	Discounted Cash Flow	Multiple of EBITDA	Multiple of Free Cash Flow	Market Price/Gross Cash Flow
Develops:				
Enterprise Value	X	X	X	
Equity Value	X	X	X	X
Principally Used to Develop:				
En Bloc Value	X	X	X	
Stock Market Price/Metrics	Sometimes	X	Sometimes	Sometimes
Reliability:				
Little or None				
Some		X		X
Greatest Reliance	X		X	
Information available to Securities Analysts:				
Historic Data	No	Yes	No	Yes
Prospective Data	Limited	Limited	Limited	Limited
Adopted by:				
Securities Analysts	Sometimes	Commonly	Sometimes	Commonly
Corporate Acquirers	Yes	Yes	Yes – in DCF Analysis	Possibly in Accretion Tests

The Discounted Cash Flow Valuation Methodology

This methodology develops either an en bloc enterprise value, or en bloc equity value if interest bearing debt and equivalents and other non-operating liabilities (e.g. unfunded pension obligations, unfunded environmental liabilities, etc.)are deducted from enterprise value. It is the most theoretically sound share and business valuation methodology. Pursuant to this methodology a detailed forecast of revenues, cash operating expenses and required prospective sustaining capital reinvestment, capital invested to support growth assumed in the forecast period, and required working capital changes are discounted to present value by a discount rate which incorporates a blend of what are taken to be appropriate after-tax rates of return on equity and long-term prospective interest rates (in 'finance speak', a 'weighted average cost of capital'). Benefits related to existing future depreciation claims for income tax purposes and redundant assets are added to derive en bloc enterprise value. Interest-bearing debt and equivalents and other non-operating liabilities are deducted to derive en bloc equity value.

In our experience this methodology is the primary one adopted by Corporate Acquirers in acquisition analysis, and is adopted periodically in stock market pricing and forecasting by Securities Analysts. However, analysts typically do not have access to all relevant information resulting in share trading value and price conclusions derived by them typically being more subjective than those made by Corporate Acquirers. More than other methodologies, the DCF methodology explicitly considers the cyclical nature of commodity prices. This methodology is described in more detail in the '*Valuation Methodologies*' E-Book found under the E-Leaning tab on the Main Navigation Line of www.StockResearchPortal.com.

The Multiple of EBITDA Valuation Methodology

This methodology develops either an en bloc enterprise value, or en bloc equity value if interest bearing debt and equivalents and non-operating liabilities (e.g. unfunded pension obligations, unfunded environmental liabilities, etc.) are deducted from enterprise value. Pursuant to this methodology EBIT-DA (earnings before interest, income taxes, depreciation and amortization) is derived either from actual historic operating results, from forecasted operating results, or from some combination of those two things and is multiplied by a 'risk assessment based' multiple (or multiples). Redundant assets are added to derive en bloc enterprise value. Interest-bearing debt and equivalents and other non-operating liabilities are deducted to derive en bloc equity value. This methodology may have some merit when applied to specific non-capital intensive (i.e. service) businesses, but is inherently less reliable than a discounted free cash flow methodology when applied to capital-intensive businesses where there is an annual 'sustaining capital reinvestment', 'growth capital investment' requirement, 'growth related' working capital requirement, and an asset base that is depreciable for income tax purposes. In our experience this methodology is:

- ✓ commonly adopted by Securities Analysts when developing prospective stock market prices pursuant to peer group analysis;
- ✓ commonly adopted by Transactions Advisors when negotiating and pricing business acquisitions or divestitures; and,
- ✓ sometimes is adopted in conjunction with other valuation methodologies by Corporate Acquirers when negotiating and pricing business acquisitions or divestitures.

In my experience it is a valuation methodology that also is adopted from time to time by Transaction Advisors when developing the terminal value component pursuant to the discounted cash flow valuation methodology.

The Multiple of Free Cash Flow Methodology

This methodology develops either an en bloc enterprise value, or en bloc equity value if interest bearing debt and equivalents and non-operating liabilities (e.g. unfunded pension obligations, unfunded environmental liabilities, etc.) are deducted from enterprise value. This methodology also is referred to as the 'capitalization of discretionary cash flow methodology'. Pursuant to this methodology after-tax free cash flow before consideration of interest expense is multiplied by a 'risk assessment based' multiple (or multiples), and redundant assets are added to the result to derive en bloc enterprise value. Simplistically, after-tax free cash flow is equal to total after-tax cash flow less a tax-effected amount to account for estimated annual 'sustaining' capital requirements. It is derived either from actual historic operating results, from forecasted operating results, or from some combination of those two things. Prospective growth rates and related required investment in growth capital and working capital are incorporated in the 'risk assessment based' multiple. In my experience this methodology sometimes is adopted by Securities Analysts when developing prospective stock market prices. However, given that Securities Analysts only have access to publicly available information, which typically does not disclose the annual sustaining capital reinvestment requirement, application of this methodology by Securities Analysts in my view generally cannot be as meaningful as it is when adopted by Corporate Acquirers. Assuming post-forecast period multiples appropriately reflect 'real' (as contrasted with 'nominal' (or 'inflation included')) after-tax free cash flow growth rates, this methodology is the most technically valid way in which to develop the pre-interest expense DCF terminal value component, and hence for that application in my experience typically is adopted by Corporate Acquirers in acquisition analysis.

The Market Price/Gross Cash Flow Methodology

This methodology results in development of equity value in the context of stock market price, not corporate acquisition price. It is a 'comparative market value' methodology whereby the company being analyzed and companies taken to comprise that company's 'peer group' are compared, and 'comparative differences' are analyzed by Securities Analysts to derive conclusions and recommendations. Pursuant to this methodology the market share price of the subject company and each 'peer group' company (in each case adjusted for redundant assets) is divided by the pre-tax gross cash flow derived from historic operating results, from forecasted operating results, or from some combination of those two things. This results in (subject to adjustment for comparative company risk related to interest bearing debt ratios, political risk, and so on) time-specific comparative 'market price multiples'. While perhaps of some limited use, in my view results derived from this methodology should be viewed with scepticism. In my experience this methodology sometimes is adopted by Securities Analysts, and may in some circumstances be adopted by Corporate Acquirers when determining whether the public markets are likely to assess an acquisition as 'accretive' to them.

Comparables Based Valuation Methodologies

	Comparable Transaction Prices	Market Capitalization per Ounce of Annual Production	Dollars per Ounce of Reserves	Capitalization per Ounce of Reserves	Imputed Bullion Price	Zero Discount Net Present Value
Develops:						
Enterprise Value	X	X	X	X	X	
Equity Value	X	X				X
Principally Used to Develop:						
En Bloc Value	X					
Stk Mkt Price/Metrics	X	X	X	X	X	X
Reliability:						
Little or None		X	X	X	X	X
Some	X					
Greatest Reliance						
Information available to Securities Analysts:						
Historic Data	Yes	Yes	Yes	Yes	Yes	No

Prospective Data	N/A	N/A	N/A	N/A	N/A	N/A
Adopted by:						
Securities Analysts	Commonly	Infrequently	Infrequently	Infrequently	Infrequently	Sometimes
Corporate Acquirers	Commonly	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely

The Comparable Transactions Methodology

This commonly adopted methodology can result in the development of either enterprise value or equity value. Pursuant to this methodology, in the context of:

1. Developing prospective stock market prices Securities Analysts commonly adopt this methodology by comparing prevailing stock market price metrics for the company they are analyzing to stock market prices prevailing for companies they believe to be 'peer group' companies. Assuming proper selection of the 'peer group companies' and appropriate analysis and application of financial and stock price metrics this arguably is a sensible methodology for them to use in their analysis. However, it is a highly subjective methodology and hence each application of it should be reviewed carefully to ensure its application seems sensible.

2. Acquisitions by Corporate Acquirers. 'Valuation ratios' are developed from analysis of open market transactions involving the arm's length sale of companies that are considered sufficiently similar to the company being valued that reliance can be placed on the results of that analysis. Applied in this way, in my experience this methodology is at best a 'test methodology' unless persons adopting it have detailed knowledge of the 'comparable transactions' including the comparative negotiating strengths of vendor and purchaser and the post-acquisition synergies the purchaser expected at the time of the acquisition. Absent that specific knowledge on the part of the analyst, in my view this methodology at best is a value 'litmus test'.

The Market Capitalization per Ounce of Annual Production Methodology

This methodology is a 'company comparator' methodology that develops en bloc enterprise value for mining and mining project related assets. Pursuant to this methodology the ounces of current production are multiplied by the current market price of the metal(s) being mined for the company being analyzed and companies taken to comprise that company's 'peer group'. The results are adjusted by adding all debt and future capital requirements related to each company's respective mining assets, and deducting all cash on hand and all non-mining assets. This methodology is simplistic, does not take into account operating costs or income tax rates, and is 'time dependant' on the prevailing metal price. Neither Securities Analysts nor Corporate Acquirers typically adopt this methodology. It is noted only for completeness. It is sometimes used by company's themselves in company presentations. Where adopted as a comparator test in my view it should not be considered meaningful, and should be given little if any weight.

The Dollars per Ounce of Reserves Methodology

This methodology is a 'company comparator' methodology that develops en bloc enterprise value for mining and mining project related assets. Pursuant to this methodology the ounces of proven and probable reserves (see NI 43-101 for definitions) are multiplied by the current market price of the metal(s) being mined for the company being analyzed and companies taken to comprise that company's 'peer group'. The results are adjusted by adding all debt and future capital requirements related to each company's respective mining assets, and deducting all cash on hand and all non-mining assets. This methodology is simplistic, does not take into account operating costs or income tax rates, and is 'time dependant' on the prevailing metal price. Neither Securities Analysts nor Corporate Acquirers typically adopt this methodology. It is noted only for completeness. Where adopted as a comparator test in my view it should not be considered meaningful, and should be given little if any weight.

The Capitalization per Ounce of Reserves Methodology

This methodology is a 'company comparator' methodology that develops en bloc enterprise value for mining and mining project related assets. Pursuant to this methodology the market capitalizations of companies that are being compared are adjusted by adding all debt and future capital requirements related to each company's respective mining assets, adding all future capital requirements expected to be incurred in relation to those mining assets, and deducting all cash on hand and all non-mining assets. Results then are divided by the number of ounces of reserves, and the results derived for each company are compared. This methodology is dependent on detailed knowledge of information that typically would not be publicly available (detailed future capital requirements, for example), does not take into account operating costs or income tax rates, and is 'time dependant' on the prevailing metal price. Neither Securities Analysts nor Corporate Acquirers typically adopt this methodology. It is noted only for completeness. Where adopted as a comparator test in my view it should not be considered meaningful, and should be given little if any weight.

The Imputed Bullion Price Methodology

This methodology is a 'company comparator' methodology that develops en bloc enterprise value for mining and mining project related assets. Pursuant to this methodology 'life of mine costs' are added to the results derived from the 'Adjusted Market Capitalization per Ounce of Reserves' Methodology. Given that the latter methodology in my view has no theoretical or practical merit, neither does the 'Imputed Bullion Price Methodology'. Neither Securities Analysts nor Corporate Acquirers typically adopt this methodology. It is noted only for completeness. Where adopted as a comparator test in my view it should not be considered meaningful, and should be given little weight.

The Zero Discount Net Present Value Methodology

This methodology is a 'company comparator' methodology that develops an equity value. Pursuant to this methodology recoverable ounces of reserves are multiplied by the point in time cash margin generated from metals production for the company being analyzed and companies taken to comprise that company's 'peer group'. Cash margin is defined as the difference between the assumed average forward metals price and the company's long-term average cash cost per ounce of production based on 'life of mine' averages for costs and recoveries assuming no post-valuation date inflation. Future capital requirements are deducted from the result, and the balance is tax-effected at each company's long-term average income tax rate. Working capital and the value of any non-mining assets are added, and long-term debt is deducted. This methodology is simplistic, and in my view from an acquisition perspective has

little or no merit. It is adopted from time to time by Securities Analysts when developing prospective stock market prices, but in my view is unlikely to be adopted by Corporate Acquirers in acquisition analysis.

Other Methodologies

	Internal Rate of Return Surplus	Dividend Yield	Present Value of Exploration Expenditures	Historic Reserves per Km of Camp Structure	Land Area	Past Exploration Budgets	Proximity to Past or Active Mines
Develops:							
Enterprise Value	X		X	X	X	X	X
Equity Value		X					
Principally Used to Develop:							
En Bloc Value	X						
Stk Mkt Price/Metrics		X	X	X	X	X	X
Reliability:							
Little or None			X	X	X	X	X
Some	X	X					
Greatest Reliance							
Information available to Securities Analysts:							
Historic Data	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Prospective Data	Yes	No	No	N/A	N/A	N/A	N/A
Adopted by:							
Securities Analysts	Infrequently	Commonly	Infrequently	No	No	No	Sometimes
Corporate Acquirers	Yes	No	Unlikely	Unlikely	Unlikely	Unlikely	Sometimes

The Internal Rate of Return Surplus Methodology

This 'project valuation' methodology (i.e. a 'quasi-enterprise' value, not an equity value) develops a form of en bloc enterprise value. It is sometimes used as a valuation methodology where a Small Cap mining company has made a major discovery and a feasibility study has been completed. Pursuant to this methodology a full 'life of mine' cash flow model is built and the project forecasted Internal Rate of Return is determined. If the project (or the outstanding shares of the company if that is the only project the company has) is offered for sale, in theory (and absent considerations of synergy and competitive bidding) acquirers would apply their respective project investment 'hurdle rates' to their own full 'life of mine' cash flow forecasts, thereby developing their respective bid prices for the project or the vendor company's shares as the case may be. To my knowledge this methodology typically is not adopted by Securities Analysts (or if it is, likely not in a reliable way) when developing prospective stock market prices due to lack of complete project cost information, but I believe generally is adopted (being a discounted cash flow methodology) and relied on by Corporate Acquirers and their advisers as one component of acquisition analysis.

The Dividend Yield Methodology

This methodology is a 'companies comparator' methodology and results in development of a company's equity value. Pursuant to this methodology annual cash dividends are divided by current market price, and the results are compared between the company being analyzed and companies taken to comprise that company's 'peer group'. It is a methodology that is not by itself determinative of point-in-time value, and should be employed in conjunction with other value methodologies. In my experience it is a value measurement comparator commonly adopted by Securities Analysts where a company and its peer group pay dividends, but is not relied on by Corporate Acquirers other than in the context of determining what post-acquisition dividend payout the public markets may expect, and whether as a result the public markets are likely to assess an acquisition as 'accretive'.

The Present Value of Exploration Expenditures Methodology

This 'project valuation' methodology (i.e. a 'quasi-enterprise' value, not an equity value) is sometimes advanced as an alternate valuation method where mining projects are at an early stage of exploration and development. This methodology develops a form of en bloc enterprise value. Pursuant to this methodology the present value of historic exploration and development expenditures and so-called 'justifiable' proposed exploration and development expenditures, are aggregated to develop a 'fair market value' for a project. In turn, depending on how many projects a given 'early stage' mining exploration company has, this methodology might be adopted to develop an imputed market value for its outstanding shares. I do not believe this methodology typically is adopted by Securities Analysts or by Corporate Acquirers, and is noted only for completeness. In my view it should not be considered meaningful, and should not be given any weight.

The Historic Reserves per Km of Camp Structure Methodology, The Land Area Methodology, The Past Explorations Budget Methodology, The Proximity to Past or Active Mines Methodology

These 'project valuation' methodologies (i.e. 'quasi-enterprise' values, not equity values) sometimes are advanced as alternate methods of valuation where mining projects are at a very early (typically 'showings') stage of exploration and development. The basis for each methodology is obvious from their respective descriptions. These methodologies develop a form of en bloc enterprise value. As a practical matter values determined or estimated pursuant to any of these methodologies in my view are of little use in determine a point-in-time value. With the exception of the 'Proximity to Past or Active Mines Methodology' that sometimes is assigned some weight by them, to my knowledge neither Securities Analysts nor Corporate Acquirers typically adopt this methodology. These methodologies are noted only for completeness. Where adopted as a comparator test in my view they typically should not be considered meaningful, and should be no given weight, perhaps with the exception of the 'Proximity to Past or Active Mines Methodology' which absent discovering a resource is at best an 'indicator' of possible resource potential.

Required Rates of Return on Investment

As a result of the high risks inherent in mining exploration and mineral mining and production, in my view the rates of return investors should seek are much higher at the beginning of the exploration process and through to and including production than are conventional required rates of return. Required rates of return are relevant to, and hence determined at, specific points of time. They can change instantly with mineralization discoveries, enhancements, poor drilling results, quantification of NI43-101 compliant proven and probable reserves, mine permitting, material changes in commodity pricing, and so on.

In my experience conventional 'starting point' 'targeted' 'strategic corporate acquirer' 'nominal' (i.e. including consideration of prevailing inflation rates) unlevered (i.e. a pre-levered 'return on equity') after-tax rates of return have for many years fluctuated in a range of 10% - 15% when developing the present value of 100% of the forecasted 'inflation included' and 'synergy included' after-tax operating free cash flow of an acquisition target pursuant to a discounted cash flow methodology. In recent years (to mid-2008) these so-called 'hurdle rates', which are applied by corporate purchasers to forecasted after-tax cash flows that include post-acquisition synergies expected by the purchaser, typically have been in the order of 10% - 12%. A broad management, product and functionality comparison between on one hand an established 'product based' target company where such 'rates of return' typically are required by sophisticated corporate acquirers on one hand and mining explorers and producers on the other hand are set out in the following table. This table assumes what I would describe as a market functioning under 'normal market conditions' which is not in my view the case on November 11, 2008, the date of this Post, and readers should consider the contents of the following table in that context:

	Conventional Acquisition Target	Early Stage Explorers	Discovery Stage Explorers (early Proven & Probable Resources and Reserves – no feasibility study	Explorers with Significant Proven & Probable Resources and Reserves and favourable feasibility study	Companies in process of converting from explorer to producer (i.e. building mine and processing facilities)	Mining Companies (producers)
Management	Critical mass, little individual dependence	Generally individual dependence	Generally individual dependence	Generally individual dependence	Generally some critical mass, less individual dependence	Critical mass, less to little individual dependence
Product(s)	Proven, market accepted, branded, established customer base	Commodity	Commodity	Commodity	Commodity	Commodity
Plant and Equipment	In place, generally well maintained	Non-existent	Non-existent	Non-existent	Being Developed	In place, generally well maintained
Cost Structure	Reasonably predictable	Reasonably predictable based on exploration program	Reasonably predictable based on exploration program	Reasonably predictable based on exploration program	Less predictable	Reasonably predictable, but dictated by volume
Environmental Liability Risk	Typically low/medium high	Some Risk	Some Risk	Some Risk	Some Risk	Medium/High Risk
Underlying Tangible Assets net of capitalized	Generally comparatively high	Cash and little else	Cash plus value of reserves	Cash plus enhanced value of reserves	Higher, and very high if mine and production	Comparatively high

exploration costs					facilities financed largely by debt	
Operating Revenues	Typically some ability to influence price, or adjust prices over time in step with underlying operating costs	Non-existent	Non-existent	Non-existent	Non-existent	Based on market dictated commodity prices over which producer has no measurable influence
After-tax free cash flow	Yes	No	No	No	No	Yes
% Equity Acquired in Takeover	Typically 100%	Takeover is unlikely to occur	Typically 100% (company or one or more properties)	Typically 100% (company or one or more properties)	Typically 100% (typically at this stage company would be acquired)	Typically 100%
Investor in Marketable Securities	n/a	Typically less than 1%	Typically less than 1%	Typically less than 1%	Typically less than 1%	Typically less than 1%
Required Unlevered Nominal After-tax Rate of Return on Equity	10% - 15% (historic – although latterly 10% - 12%*)	Extraordinarily high – say for example purposes 80% - 90%	Extremely high – say for example purposes 65% - 75%	Very high – say for example purposes 50% - 60%	Higher than conventional – say for example purposes 20% - 30%	10% - 15% (historic – although latterly 10% - 12%**)
Timeframe - Investment Double- Say	+/- 7 years	+/- 1 year	+/- 1.5 years	+/- 2 years	+/- 4 years	+/- 7 years

* *during the 2005 – mid 2008 time period.*

** *during the 2005 – mid 2008 time period, and assuming commodity price cycle and appropriate operating expenses, sustaining and growth capital costs, and working capital requirements are built into the after-tax free cash flow forecast*.

An important distinction to be made between takeover transactions and normal course stock market transactions is that in the former purchasers typically reflect expected post-transaction synergies in the forecasts they develop. Thus takeover transaction prices typically incorporate consideration of said synergies, which synergies may be speculatively priced into public market trading prices where a takeover is believed imminent, possible, or likely, but otherwise likely are not factored into public market trading prices to any material degree, if at all. As previously noted, the comparative timeframes shown other than in the column headed 'Conventional Acquisition Target' (second column from the left) are based on an assumption of normal public market trading price activity. A takeover of each type of public company described in the chart (columns 3-7) in theory should result in an investment 'double' in a shorter period of time than that set out in the chart.

The discount rates suggested for conventional businesses and mining companies in production are broad benchmarks that are based on discussions with large multi-national and national companies during the 1970 – 2008 time period. In practice, these discount rates typically are not adjusted in a material way except in quite unusual circumstances (e.g. periods of unusually high inflation). Thus in my view they represent a reasonable base from which to benchmark appropriate discount rates in circumstances of either higher or lower risk investments with characteristics or functionality differences significantly different from conventional businesses. Other than the 'conventional' stated hurdle rates, the comparative required 'after-tax rates of return on equity' suggested in the foregoing table have been selected subjectively and linked subjectively to investment timeframes for a 'required value (or 'price') double', but are almost certainly 'directionally correct' in that they reflect the highest risk rates at the time a mining exploration company commences operations, with those risk rates diminishing to conventional rates from the evolution of a mining company from early stage explorer through to becoming a producing mine.

Importantly, where a discounted cash flow methodology is adopted important variables such as forecasted selling prices, prospective cost structure, and sustaining capital investment over the forecast period used to develop the terminal value component of the calculation are reflected in the forecasted results that are discounted. The risk of those forecasted selling prices and forecasted costs proving to be accurate is reflected in the discount rate adopted, as is general market and economic uncertainty. It is also important to understand that when developing the value of a conventional business pursuant to a discounted cash flow methodology (or any other valuation methodology for that matter) an inherent assumption is made that the business will survive to infinity, whereas when valuing a company such as a mining company that is exploiting a wasting asset the discount period adopted is that of the estimated finite commercial life of the mine. This finite life typically is reflected through the adoption of a finite forecast period and is not reflected per se in the discount rate itself.

Resources and Reserves – National Instrument 43-101

Overview

Reports written by persons issuing technical reports that disclose information about exploration or other mining properties to the public are governed by a number of regulations in Canada, the most important being Standards of Disclosure for Mineral Projects (NI 43-101), which became effective February 1,2001.

On November 14, 2004 an update to the CIM Definition Standards was adopted to reflect the more detailed guidance available and effect certain editorial changes required to maintain consistency with current regulations. The CIM Definition Standards can be viewed on the CIM website at www.cim.org.

Definition Standards – November 22, 2005

The CIM Definition Standards provide standards for the classification of Mineral Resource and Mineral Reserve estimates into categories dependant on:

- the level of confidence in the geological information available on the mineral deposit;
- the quality and quantity of data available on the deposit;
- the level of detail of the technical and economic information which has been generated about the deposit; and,
- the interpretation of the data and information.

Where appropriate, 'quality' may be substituted for 'grade' and 'volume' may be substituted for 'tonnage'. Technical Reports dealing with estimates of Mineral Resources and Mineral Reserves must adopt only the terms and definitions set out in the CIM Definition Standards.

Exploration Information

Exploration information means geological, geophysical, geochemical, sampling, drilling, trenching, analytical testing, assaying, mineralogical, metallurgical and other similar information concerning a particular property that is derived from activities undertaken to locate, investigate, define or delineate a mineral prospect or mineral deposit. In the review and compilation of data on a project or property, previous or historical estimates of tonnage and grade, not meeting the minimum requirement for classification as Mineral Resource, may be encountered. If a Qualified Person reports Exploration Information in the form of tonnage and grade, it must be clearly stated that these estimates are conceptual or order of magnitude and that they do not meet the criteria of a Mineral Resource.

Mineral Resources

A Mineral Resource is an inventory of mineralization gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings, and drill holes that under realistically assumed and justifiable technical and economic conditions might, in the opinion of a Qualified Person having regard to:

- its continuity, form, grade, location, geological characteristics, quality and quantity, estimated or interpreted from specific geological evidence and knowledge; and,

- consideration of technical, economic, legal, environmental, socio-economic and governmental factors,

has reasonable prospects for economic extraction. A Qualified Person's opinion typically is based on numerous assumptions, all of which must be presented explicitly in both public and technical reports.

Mineral Resources are sub-divided, in order of increasing geological confidence, into Inferred, Indicated and Measured categories. An Inferred Mineral Resource has a lower level of confidence than that applied to an Indicated Mineral Resource, which in turn has a lower level of confidence than that applied to a Measured Mineral Resource.

Inferred Mineral Resources

An Inferred Mineral Resource is that part of a Mineral Resource for which quantity and grade or quality can be estimated on the basis of geological evidence and limited sampling and reasonably assumed, but not verified, geological and grade continuity. Due to uncertainty, it cannot be assumed that following continuing exploration all or any part of an Inferred Mineral Resource will be upgraded to an Indicated or Measured Mineral Resource. Inferred Mineral Resources must be excluded from estimates forming the basis of feasibility or other economic studies.

Indicated Mineral Resources

An Indicated Mineral Resource is that part of a Mineral Resource for which quantity, grade or quality, densities, shape and physical characteristics, can be estimated with a level of confidence sufficient to allow the appropriate application of technical and economic parameters to support evaluation of the economic viability of the deposit and mine planning. Such estimates must be based on detailed and reliable exploration and testing information gathered through appropriate techniques form locations such as outcrops, trenches, pits, workings and drill holes that are spaced closely enough for geological and grade continuity to be reasonably assumed. A Qualified Person may classify mineralization as an Indicated Mineral Resource when the nature, quality, quantity and distribution of data allow confident interpretation of the geological framework so as to reasonably assume continuity of mineralization. An Indicated Mineral Resource estimate is of sufficient quality to support a Preliminary Feasibility Study which can serve as the basis for major development decisions.

Measured Mineral Resource

A Measured Mineral Resource is that part of a Mineral Resource for which quantity, grade or quality, densities, shape, and physical characteristics are so well established that they can be estimated with confidence sufficient to allow the appropriate application of technical and economic parameters, to support production planning and evaluation of the economic viability of the deposit.

Such estimates must be based on detailed and reliable exploration and testing information gathered through appropriate techniques form locations such as outcrops, trenches, pits, workings and drill holes that are spaced closely enough to confirm both geological and grade continuity. A Qualified Person may classify mineralization or other natural material of economic interest as a Measured Mineral Resource when the nature, quality, quantity and distribution of data are such that the tonnage and grade of the mineralization can be estimated to within close limits and variation from the estimate would not significantly affect potential economic viability. This requires a high level of confidence in, and understanding of, the geology and controls of the mineral deposit.

Mineral Reserves

Mineral Reserves, supported by at least a Preliminary Feasibility Study, are those parts of Mineral Resources that, in the opinion of a Qualified Person, result in an estimated tonnage and grade that is the basis of an economically viable project after accounting for all mining factors including:

- all relevant processing, metallurgical, economic, marketing, legal, environment, socio-economic and government factors;
- all diluting material that will be mined in conjunction with the Mineral Reserves and delivered to the treatment plant or equivalent facility;
- allowance for all losses that may occur when the mineral is mined; and,
- reasonable expectations of all necessary government approvals, but without assurance that either extraction facilities or all such government approvals are operative or in place.

Mineral Reserves are sub-divided in order of increasing confidence into Probable Mineral Reserves and Proven Mineral Reserves. A Probable Mineral Reserve has a lower level of confidence than does a Proven Mineral Reserve.

Probable Mineral Reserve

A Probable Mineral Reserve is the economically mineable part of an Indicated Mineral Resource and, in some circumstances, a Measured Mineral Resource demonstrated by at least a Preliminary Feasibility Study.

Proven Mineral Reserve

A Proven Mineral Reserve is the economically mineable part of a Measured Mineral Resource demonstrated by at least a Preliminary Feasibility Study. Where a Qualified Person concludes that a portion of a Measured Mineral Resource should properly be considered a Proven Mineral Reserve there is an implication that the Qualified Person has the highest degree of confidence in the estimate. The term Proven Mineral Reserve should be restricted to that part of the deposit where production planning is taking place and for which any variation in the estimate would not significantly affect potential economic viability.

Resource and Reserve Classification

The CIM Definition Standards provide for a direct relationship between Indicated Mineral Resources and Probable Mineral Reserves and between Measured Mineral Resources and Proven Mineral Reserves. In other words, the level of geoscientific confidence for Probable Mineral Reserves is the same as that

required for the in situ determination of Indicated Mineral Resources and for Proven Mineral Reserves is the same as that required for the in situ determination of Measured Mineral Resources.

Qualified Person

Mineral Resource and Mineral Reserve estimates and resulting Technical Reports must be prepared by or under the direction of, and dated and signed by, a Qualified Person. A Qualified Person means an individual who:

- is an engineer or geoscientist with at least five years of experience in mineral exploration, mine development or operation or mineral project assessment, or any combination of these;
- has experience relevant to the subject matter of the mineral project and the technical report; and,
- is a member or licensee in good standing of a professional association.

Preliminary Feasibility Study

A Preliminary Feasibility Study is a comprehensive study of the viability of a mineral project that has advanced to a stage where the mining method, in the case of underground mining, or the pit configuration, in the case of an open pit, has been established and an effective method of mineral processing has been determined. It includes a financial analysis based on reasonable assumptions of technical, engineering, legal, operating, economic, social, and environmental factors and the evaluation of other relevant factors sufficient for a Qualified Person, acting reasonably, to determine if all or part of the Mineral Resource may be classified as a Mineral Reserve.