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MINING, OIL & GAS INVESTMENTS

Valuation E-Book #2

Valuation Methodologies[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.

Executive Summary

This E-Book canvasses the valuation methodologies adopted by stock market investors, stock market analysts, corporate acquirers, merger and acquisition intermediaries, and business valuation experts. Each methodology is overviewed, and commentary is offered as to the reliability of each methodology, who is most likely to adopt each, and which should and should not be weighted in stock market and acquisition analysis. The methodologies reviewed are segregated by the basis of value adopted by each as follows:

- Asset Based Methodologies;

- Earnings and Cash Flow Methodologies (including an overview of the Discounted Cash Flow methodology);

- Comparables Based Methodologies – Mining;

- Comparables Based Methodologies – Oil & Gas; and,

- Other Methodologies – Mining, Oil & Gas, and Oil & Gas Service.

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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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Finally, for readers who want to delve deeper into the theory and construction of the discounted cash flow (DCF) methodology – by any measure the most sound business and securities valuation methodology – there is a detailed description of both that methodology and the Capital Asset Pricing Model, a finance model based on the so-called 'efficient market theory' developed to be applied in stock market comparative analysis but now widely adopted (in circumstances where it is arguably suspect) to develop the rates of return employed in DCF analysis. The DCF and Capital Asset Pricing model discussions are found under the following headings:

- Discounted Cash Flow Methodology - Detailed; and,

- The Capital Asset Pricing Model.

Valuation Methodologies

Different business valuation methodologies should not be equally weighted, or for that matter considered relevant, for any given valuation purpose. The primary reasons for this 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; 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 such things.

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 tend to adopt other valuation methodologies that either are not adopted by Corporate Acquirers, or not weighed heavily by Corporate Acquirers. The following five tables summarize methodologies adopted in the context of the Mining, Oil & Gas, and Oil & Gas Service Industries.

Each table denotes whether a particular methodology develops 'enterprise value' (simplistically, the sum of interest bearing debt and equity) or 'equity value', is principally used to develop 'en bloc' share value or stock market value, the comparative reliability of each methodology, and whether a methodology generally is adopted by Securities Analysts and/or Corporate Acquirers. The tables segregate the methodologies as follows:

- asset based methodologies;

- earnings and cash flow based methodologies;

- comparables based methodologies – Mining;

- comparables based methodologies – Oil & Gas, and Oil & Gas Service; and,

- other methodologies, including benchmark (or 'rule of thumb') methodologies.

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

Asset Based 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 the 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 notional going concern context by Corporate Acquirers as a risk measurement tool. It is rarely used in a stock market share price context, and is not adopted by Securities Analysts.

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 Corporate Acquirers 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. Such comparisons tend not 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:

- 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; and,

- intangible assets are thought to be at greater prospective risk than are tangible assets.

This methodology generally is adopted by Corporate Acquirers as a basis for post-acquisition financial and income tax reporting purposes. It is not widely adopted by Securities Analysts.

The Multiple of Net Assets (or Net Book Value) 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. 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, it is a theoretically unsound methodology. This is because:

- application of generally accepted accounting (GAAP) principles by different companies may result in different reported asset and liabilities values for similar assets and liabilities; and more particularly; and,

- 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.

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 Methodologies

	Multiple of Earnings	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	X
Principally Used to Develop:					
En Bloc Value		X	X	X	
Stock Market Price/Metrics	X	Sometimes	X	Sometimes	Sometimes
Reliability:					
Little or None					
Some	X		X		X
Greatest Reliance		X		X	
Information available to Securities Analysts:					
Historic Data	Yes	No	Yes	No	Yes
Prospective Data	Limited	Limited	Limited	Limited	Limited
Adopted by:					
Securities Analysts	Commonly	Sometimes	Commonly	Sometimes	Commonly
Corporate Acquirers	In Accretion Tests	Yes	Yes	Yes – in DCF Analysis	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 values 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 is 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:

- transaction market (i.e. merger and acquisition activity) in the case of development of en bloc equity value; and,

- stock market multiples in the case of development of stock market prices

based on respective perceived relevant transaction and '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:

- in a transaction (M&A) context there frequently is information available through data providers and others as to what are analyzed to the price/earnings ratios that were paid in open market transactions involving companies that appear to the be similar to the subject company;

- in a stock market context there is ready data available with respect to the price earnings ratios of so-called 'peer group companies'. Analysts may or may not adjust these 'peer group' multiples for 'comparability issues' when developing their value conclusions; and,

- 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 this methodology are inherently subjective and should be reviewed carefully and with scepticism. This is because:

- as a general rule businesses are sufficiently different in their respective management capability, capital base, operations, and future prospects to make direct comparisons at best uncertain;

- where en bloc values are developed pursuant to the use of M&A transaction information, post-acquisition synergies anticipated by the purchaser are not reflected in the price/earnings ratio attributed to the transactions. That is to say whereas a reported transaction price-earnings ratio may, based on publicly available information, appear to be (say) 14X, the purchaser may have built post-acquisition synergies into its price and concluded that it was only paying 11X the 'synergistic earnings' that would accrue to it from the acquisition;

- 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;

- reported earnings of each peer group company and the subject company are dictated by fact specific application of GAAP; and,

- 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 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, but

  - ✓ adopt the Multiple of Earnings methodology when determining whether the public markets are likely to assess the acquisition as 'accretive'.

The Discounted Cash Flow Methodology

This methodology develops either an en bloc enterprise value, or en bloc equity value if interest bearing debt and equivalents are deducted from enterprise value. Again, this 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 is 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. Redundant assets are added to derive en bloc enterprise value. Interest-bearing debt is deducted to derive en bloc equity value. This methodology is the primary one adopted by Corporate Acquirers in acquisition analysis. It is used periodically in stock market pricing and forecasting by Securities Analysts, but again analysts typically do not have access to all relevant information resulting in share trading price conclusions that are more subjective than those of 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 Industry Valuation Synopsis found under each Industry Tab at StockResearchPortal.com.

The Multiple of EBITDA Methodology

This methodology develops either an en bloc enterprise value, or en bloc equity value if interest bearing debt and equivalents 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 is deducted to derive en bloc equity value. This methodology may have some merit when applied to 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 exists an annual 'sustaining capital reinvestment' requirement. This methodology is commonly adopted by Securities Analysts when developing prospective stock market prices pursuant to peer group analysis. This methodology also is commonly adopted by Transactions Experts, and sometimes is adopted in conjunction with other valuation methodologies by Corporate Acquirers when negotiating and pricing business acquisitions or divestitures, given that it is expedient.

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 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. Free after-tax 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. 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 generally cannot be as meaningful as it is when adopted by Corporate Acquirers. This methodology is the most technically valid way in which to develop the pre-interest expense DCF terminal value component, and hence 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, 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'. This methodology sometimes is adopted by Securities Analysts, and by Corporate Acquirers when determining whether the public markets are likely to assess an acquisition as 'accretive' to them.

Comparables Based Methodologies - Mining

	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

Comparables Based Methodologies – Oil and Gas

	Comparable Transaction Prices	Enterprise Value per BOE of Reserves	Enterprise Value per BOE of Production	Market Value per BOE of Reserves	Market Value per BOE of Production	Reserve Life Index/Debt Adjusted Cash Flow
Develops:						
Enterprise Value	X	X	X	X	X	X
Equity Value	X	X	X	X	X	X
Principally Used to Develop:						
En Bloc Value	X	X	X	X	X	X
Stk Mkt Price/Metrics	X	X	X	X	X	X
Reliability:						
Little or None						
Some	X	X	X	X	X	X
Greatest Reliance						
Information available to Securities Analysts:						
Historic Data	Yes	Yes	Yes	Yes	Yes	Yes
Prospective Data	N/A	N/A	N/A	N/A	N/A	N/A
Adopted by:						
Securities Analysts	Commonly	Commonly	Commonly	Commonly	Commonly	Commonly
Corporate Acquirers	Commonly	Commonly	Commonly	Commonly	Commonly	Commonly

The Comparable Transactions Methodology

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

- developing prospective stock market prices, Analysts often 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. This is a primary valuation methodology adopted by Securities Analysts. Assuming the 'peer group companies' and financial and stock price metrics this arguably is a sensible methodology for them to use in their analysis; and,

- 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, this methodology is at best a 'test methodology' unless the Corporate Acquirer and their advisors 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.

The Market Capitalization per Ounce of Annual Production Methodology (Mining)

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 it should not be considered meaningful, and should be given little if any weight.

The Dollars per Ounce of Reserves Methodology (Mining)

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 it should not be considered meaningful, and should be given little if any weight.

The Capitalization per Ounce of Reserves Methodology (Mining)

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 it should not be considered meaningful, and should be given little if any weight.

The Imputed Bullion Price Methodology (Mining)

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 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 it should not be considered meaningful, and should be given little weight.

The Zero Discount Net Present Value Methodology (Mining)

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 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 is unlikely to be adopted by Corporate Acquirers in acquisition analysis.

The Enterprise Value per BOE of Reserves Methodology, The Enterprise Value per BOE of Production Methodology, The Market Value per BOE of Reserves Methodology, and The Market Value per BOE of Production Methodology (Oil and Gas)

These methodologies are grouped because they are derived in similar ways. They develop either en bloc enterprise value, or en bloc equity value if interest bearing debt and equivalents are deducted from enterprise value. Pursuant to this methodologies the dollar value of Barrels of Oil Equivalents measured as point in time 'Reserves' or 'Production' are imputed from what are taken to be 'peer group companies' and a 'comparator based' stock market price is derived for the shares of the company being analyzed by applying the average, or some other multiple derived from that analysis, to the Reserves or Production of

that company. Broadly speaking, these methodologies should be thought of as 'point in time' litmus tests which may or may not produce reliable results, depending on the true comparability of the selected 'peer group' companies from the standpoint of comparative management depth and strength, land base and prospective exploration potential, depletion of known oil and gas resources, balance sheet strength or weakness, sources of financing, and so on.

These methodologies are commonly adopted and relied on by Security Analysts as primary valuation methodologies when developing prospective stock market prices for Small Cap Oil and Gas Companies. These methodologies also are commonly adopted by Corporate Acquirers and their advisors in circumstances where they typically have a greater degree of both operating experience and information available to them than do Securities Analysts.

The Reserve Life Index/Debt-Adjusted Cash Flow Multiple Methodology (Oil and Gas)

This methodology is a 'company comparator' methodology and develops either an en bloc enterprise value, or en bloc equity value if interest bearing debt and equivalents are deducted from enterprise value. Pursuant to this methodology the 'Reserve Life Index' – which measures the number of years of production (taken as either current or forecasted) represented in a company's current reserve base is compared with that company's cash flow multiple following 'debt' adjustments that impose common capital structures among the subject company and companies taken to comprise that company's 'peer group'. This methodology is commonly adopted by Securities Analysts when developing prospective stock market prices, and by Corporate Acquirers in acquisition analysis.

Other Methodologies – Mining (except 'Dividend Yield' which is Mining, Oil & Gas, and Oil & Gas Service)

	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 (Mining)

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. This methodology is not typically 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 generally is adopted (being a discounted cash flow methodology) and relied on by Corporate Acquirers and their advisers in 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. It is a value measurement comparator commonly adopted by Securities Analysts where a company and its peer group pay dividends. It 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 (Mining)

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. This methodology typically is not adopted by Securities Analysts or by Corporate Acquirers, is noted in this paper only for completeness, 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 (Mining)

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 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, neither Securities Analysts nor Corporate Acquirers typically adopt this methodology. It is noted only for completeness. Where adopted as a comparator test it should not be considered meaningful, and should be no weight, perhaps with the exception of the 'Proximity to Past or Active Mines Methodology' which absent discovering a resource is at best a 'indicator' of possible resource potential.

Discounted Cash Flow Methodology

The Discounted Cash Flow ('DCF') Valuation Methodology is the most theoretically sound of the valuation methodologies. Its application forces detailed analysis of key forecast and valuation variables and hence facilitates an understanding of important external and internal business drivers, revenue and expense behavior, and business risks. The DCF methodology, in many respects an extension of the capitalization of discretionary cash flow methodology, is premised on:

- an assumed realization of redundant assets on hand at the beginning of the cash flow period;

- a forecast of the prospective after-tax discretionary cash flows, being the amount of after-tax 'free' cash that can be withdrawn from the business without impairing its income generating ability;

- the application of a discount rate to those cash flows to determine their present value;

- an assumed realization of the residual value of the business in the last year of the cash flow forecast based on a terminal value calculation using the capitalization of discretionary cash flow methodology;

- recognition that after-tax free cash flow based analysis typically is more meaningful than earnings based analysis;

- recognition that DCF analysis forces separate and detailed analysis of variables that collectively dictate value; and,

- where the discount rate used is a weighted average cost of capital, 'financial risk' related to interest bearing debt is either largely or entirely accounted for in the valuation model.

Pursuant to the DCF methodology:

- annual prospective cash flow from operations (EBIT-DA) is forecast, generally for a period of three to seven years;

- income taxes at applicable rates are applied against annual EBIT-DA to derive net operating cash flows (before financing costs). Income tax loss carry-forwards (where they exist) are applied in the year they are expected to be utilized;

- capital investment (net of the present value of the related CCA income tax shield) is deducted on an annual basis. When used in the discounted cash flow methodology, capital investment during the forecast period includes both sustaining capital reinvestment and growth capital required to meet operating projections;

- annual increases (decreases) during the forecast period in net trade working capital are deducted from (added to) net operating cash flows;

- the resultant annual forecasted net operating cash flow less capital investment (net of taxes) and the changes in working capital represents the (unlevered) annual discretionary cash flow;

- the value of cash flows beyond the forecast period are estimated using the capitalization of discretionary cash flow methodology. The resultant capitalized discretionary cash flow commonly is referred to as the 'terminal value';

- the annual discretionary cash flows and terminal (or residual) value are discounted to present value at a rate, which reflects an appropriate weighted average cost of capital. The discounted cash flows are then aggregated to determine total net present value;

- where not accounted for during the forecast period, the present value of the tax shield on tax pools in existence at the valuation date is determined and added to the discounted discretionary cash flow;

- the net realizable value of redundant assets (if any) is added to the aggregate discounted discretionary cash flow resulting in the 'enterprise value' of the business; and,

- because discretionary after-tax cash flows have been determined <u>before</u> debt servicing costs, and the discount and capitalization rates reflect a weighted average cost of capital (being a blended rate of return on debt and equity), the amount of interest bearing debt and equivalents outstanding is deducted to determine the en bloc value of the equity (i.e. outstanding shares) of the business.

Discount and Capitalization Rates

A discount rate is a rate of return that converts a series of forecasted cash flows to present value. Conversely, a capitalization rate is a rate of return that converts a point estimate of continuing cash flows to value. A discount rate is applied to forecast annual discretionary cash flows in a DCF calculation. A capitalization rate is applied to estimated maintainable discretionary cash flows beyond the forecast period when developing terminal value. Because terminal value at that point is expressed in a future dollar amount it must be discounted to the valuation date at the discount rate used in the DCF analysis to derive its present value.

The discount rate applied to determine the present value of the annual cash flows and to discount terminal value must be determined consistent with the determination of the cash flows. That is, where:

- inflation has been incorporated into the determination of discretionary cash flows throughout the forecast period, the discount rate selected to be applied to the those forecasted cash flows should reflect a nominal rate, inclusive of inflation;

- inflation has not been incorporated into the determination of discretionary cash flows throughout the forecast period, the discount rate selected to be applied to those forecasted cash flows should reflect a real rate, exclusive of inflation;

- discretionary cash flows have been determined before consideration of interest expense (which typically is the case), the discount rate should reflect a weighted average cost of capital, including both an appropriate debt and equity component; and,

- discretionary cash flows have been determined net of interest expense (which is a theoretically acceptable, but generally not practical, approach), the discount rate should reflect only a return on levered equity.

The components of the capitalization of discretionary cash flow methodology where the capitalization rate is a weighted average cost of capital are:

Present value of Discretionary After-tax Cash Flows during Forecast Period

Plus

Present value of Terminal Value

Equals

Present value of All Prospective Discretionary Cash Flows

Plus

Present Value of Existing Tax Shields Not Included in Discretionary Cash Flows

Plus

Net Realizable Value of Redundant Assets

Equals

Enterprise Value

Less

Interest Bearing Debt and Equivalents Outstanding

Equals

En bloc Equity Value

The Capital Asset Pricing Model

The Capital Asset Pricing Model ('CAPM') is a theoretical comparative risk assessment model that relates risk and return. It is based on the concept that the required rate of return for the outstanding shares or net assets of a business is directly related to their comparative riskiness to other risky businesses and the prevailing risk-free rate of return where greater risk requires a higher expected rate of return. CAPM measures risk in terms of the volatility of the asset price relative to a stock market index benchmark. CAPM adopts the Efficient Market Theory as a principal tenant.

The Capital Market Theory, of which the Capital Asset Pricing Model is a component, divides risk into two types:

- systematic risk – being the uncertainty of future returns due to the sensitivity of the return on the asset (e.g. a particular business) to movements in the return for the market as a whole; and,

- unsystematic risk – being related to the specific characteristics of the subject business, the industry, and the type of business interest.

The total risk to a particular business interest is the sum of its systematic and unsystematic risks. However, CAPM postulates that unsystematic risk can be eliminated by investors who choose to hold a totally risk diversified portfolio and accordingly, that the risk premium in CAPM relates solely to systematic risk.

The basic CAPM formula is expressed as follows:

$$R_e = R_f + B\,(R_m - R_f)$$

Where:

- R_e is the rate of return on equity for a particular company;

- R_f is the risk free rate (normally taken as the rate on long term government bonds);

- B is Beta, a measure of relative risk (volatility); and,

- R_m is the long-term rate of return of the equity markets.

The CAPM formula essentially is a variation of the build-up methodology discussed previously. That is, an equity risk premium is added to the risk free rate.

The equation $(R_m - R_f)$ is a measure of the equity risk premium. That is, the additional return required over the risk free rate for investing in the public equity market where industry risk factors are assumed to be incorporated through the use of the Beta factor, and specific company risk is assumed to be eliminated pursuant to an assumption of a 'fully diversified' portfolio. The equity risk premium is calculated by subtracting the historic risk-free rate (normally expressed as the return on long term government bonds) from the historical return on common stocks. The return on long-term government bonds is a pre-tax return. The return on common stocks is a long term after corporate tax return, based on increases in market indices (such as the S&P 500 index), and normally includes notional income from dividend reinvestment. These statistics normally are obtained from publications such as Stocks, Bonds, Bills and Inflation.

Beta is a measure of stock price volatility relative to the overall benchmark market index. Mathematically, Beta is equal to the covariance between the returns on a particular stock and those of the market portfolio. If a stock moves up or down proportionately to the overall market against which it is measured, it has a Beta of 1.0. If the stock movements are comparatively:

- greater than the overall market, the stock has a Beta greater than 1; and,

- less than the overall market, the stock has a Beta less than 1.

In CAPM theory, Beta is a measure of risk. A stock with a Beta of 1.5 is considered riskier than a stock with a Beta of 1.0, which in turn is considered riskier than a stock with a Beta of 0.5.

The Beta for a particular company usually is estimated based on some average of the Beta factors for to so-called 'comparable' public companies. This presumes that there are closely comparable public companies in the same line of business, and that these companies have sufficient trading activity to permit a meaningful estimate of Beta. Where the equity risk premium is multiplied by Beta, the equity risk factor is adjusted for the price volatility of the 'comparable' companies.

Interpreting CAPM Results

Because public stock market data is used, CAPM based rates of return represent those of freely tradable minority interests. Therefore, in the context of valuing either comparatively illiquid publicly traded securities or developing the en bloc share value, an adjustment may be required in respect of reduced liquidity compared to a freely tradable and readily marketable security. In addition, CAPM-based rates of return represent capitalization rates, not discount rates. An adjustment for the growth factor implicitly built into the CAPM capitalization rate must be made in order to determine the discount rate suggested by CAPM. Unfortunately, the growth factor implied in market rates of return is not readily identifiable.

CAPM rates of return are levered after-tax rates of return on equity and not after-tax returns on enterprise value. Therefore, CAPM based rates of return should be applied to discretionary cash flows determined net of debt service costs. The inherent leverage adjustment in the CAPM model is based on the 'comparables' used in the derivation of the Beta factor. Therefore, to be consistent, the debt to equity ratio of the securities or business being valued should be notionally adjusted to reflect the average debt to equity ratio of the group of companies adopted as 'comparable', thereby eliminating the need for any further adjustments for financial risk. Alternatively, the Betas of the 'comparable' companies can be unlevered to derive an average unlevered Beta. A leverage factor then can be applied to the business being valued to determine levered equity. The formula to derive unlevered Beta:

$$\text{Beta (unlevered)} = \text{Beta (levered)} / [1 + (1-T) \, D/E]$$

and;

$$\text{Beta (levered)} = [1 + (1-T) \, D/E] * \text{Beta (unlevered)}$$

where:

- T = marginal corporate tax rate; and,

- D/E = the market value of debt to equity.

Adjustments to the Basic CAPM Model

CAPM postulates that company specific risk is irrelevant based on the assumption that it can be eliminated through a 'fully diversified' portfolio. Where this assumption is not valid, to account for the unique characteristics of a particular business, the CAPM formula can be modified to:

$$R_e = R_f + B (R_m - R_f) + R_c$$

where R_c is business specific risk.

Business specific risk factors in theory represent incremental risk not associated with 'comparable' public companies. It is important to note that industry-specific adjustments are not required in the CAPM model because such influences are assumed to be addressed through the use of Beta.

Issues with CAPM

There are many issues surrounding the use of CAPM as a basis for determining appropriate discount and capitalization rates. These include:

- the fact that it is reliance on the validity of the efficient market theory which, given the fact that the public markets do not have access to all data and information with respect to the prospects of public companies is clearly suspect;

- the identification of so-called 'comparable' public companies is a difficult and subjective task in circumstances where true 'comparables' seldom exist;

- CAPM postulates that investors are 'price takers' which eliminates the negotiating element that occurs in open market transactions;

- Beta is a measure of the relationship between the stock of a particular company and a market portfolio. It is influenced by returns that are both better than and worse than market performance. However, investors typically are more concerned with inadequate investment performance, and likely do not interpret excessive returns as returns incremental to 'normal market risk';

- CAPM assumes that all investors have the same holding period, and does not recognize the incremental risks associated with longer term investment horizons;

- Beta factors for a given public company vary based on:

  - ✓ the 'market portfolio' (i.e. the 'R_m' component of CAPM) to which individual stock returns are compared. There are differences between the volatility of a particular equity market that is adopted in computing Beta for a particular business and the hypothetical market comprising all risky assets. This sometimes is referred to as 'benchmark error',

  - ✓ the time period covered. Beta examines historical data and assumes that the historical variability of the security, the market and the correlation between the two will persist. Where a company or the industry in which it operates have undergone recent significant changes, Betas calculated based on historical data typically do not account for this, and

  - ✓ whether they are computed based on weekly or monthly data

and hence can be different depending on the source of data and the way in which it is calculated;

- empirical evidence indicates that actual returns do not match the theory of CAPM. Lower Beta stocks have been found to generate higher than projected returns and vice versa;

- CAPM ignores the fact that stock market prices are based on factors other than Beta;

- CAPM represents a capitalization rate, being a discount rate net of growth implicitly incorporated therein, neither of which is separately identifiable. The general rate of growth in the securities markets may not be reflective of the growth rate for the business being valued. Further, any adjustment to that growth rate necessarily is subjective; and,

- as a practical matter, Canadian public equity markets lack the broadness of the U.S stock markets and therefore the quantity of 'comparable' companies often is insufficient in Canada for the purposes of using the CAPM methodology. Proponents of CAPM in Canada often advocate the use of U.S. data to generate a greater number of 'comparables'. However, important differences between the two countries still exist (such as income tax rates and degree of market liquidity), which on a fact specific basis may have a significant impact on the application of U.S. data in Canada.

Individual and institutional investors in public equity market security analysis and portfolio management commonly use CAPM. Subject to recognition of, and adjustment for, the aforementioned things the model lends itself reasonably well to that purpose. However, there are significant differences between valuing a minority interest in a public company in the context of the Securities Markets, and the en bloc valuation of a business. In particular:

- the basic CAPM model ignores company specific risk. Although this may be acceptable for a portfolio manager or an adequately diversified individual investor, it is inconsistent with the basis upon which businesses typically are bought and sold en bloc;

- CAPM is based on public market data, which assumes liquidity. En bloc or controlling equity interests normally do not satisfy the strict definition of liquidity, which generally assumes the ability to readily realize a known price in a relatively short time frame;

- business owners typically have long-term investment objectives. Although individual and institutional investors may intend to hold marketable securities for the long term, the ability to readily liquidate their position typically results in a reduced level of risk;

- individual and institutional investors generally rely primarily on publicly available information when making investment decisions. Conversely, where the en bloc equity value of a business is determined the due diligence and acquisition process in an open market transaction typically is much longer, more detailed, and based on a greater base of information;

- individual and institutional investors can measure returns on public market investments almost immediately, and are able to continuously do so. Business owners typically measure returns on a monthly, quarterly or annual basis. This delay in return measurement capability may increase the perceived risk associated with such investments;

- Beta is meant to indicate prospective risk based on historical results. As Beta changes, an individual investor or portfolio manager can readily alter his or her portfolio to compensate for such changes. However, most business owners cannot readily change the composition of their of business; and,

- the risk of acquiring of 100%, or control, of a business generally is much greater than is the risk attached to acquiring a portfolio investment. This is because the risk associated with a failed business acquisition (which risk may go beyond the failed acquisition itself) generally is significantly greater than the risk associated with a 'bad stock pick'.

As a practical matter, corporate acquirers tend to use pre-established threshold rates of return as opposed to short-term models such as CAPM. This is not to suggest that CAPM has no relevance to a corporate acquirer. It generally is important to consider prevailing market rates of return when determining an appropriate discount or capitalization rate, and CAPM does accomplish that. Further, from the perspective of a public company acquirer, CAPM may be useful in measuring the minimum rate of return a public company acquirer should seek at a given point in time.

Endnote

The Capital Asset Pricing Model relates risk and returns for assets based on the risk free rate, public equity market risk premiums, and a Beta factor, which is a measure of industry risk. CAPM often is used as a tool of public equity market analysts and portfolio managers, but generally is not an appropriate principal basis on which to develop rates of return for the purpose of evaluating long term en bloc equity investments.