Valuation E-Book #4

The Valuation of Small Cap Oil and Gas Companies[1][2]

Ian R. Campbell FCA FCBV[3]

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.

Commonly adopted abbreviations

2D	Two Dimensional Seismic		FD&A	Finding, Development and Acquisition costs
2P	Proven and Probable Additional Reserves		FDC	Future Development Capital
3D	Three Dimensional Seismic		GORR	Gross Overriding Royalty
APO	After Payout		GPP	Good Production Practice
bbl	Barrel of Oil or Natural Gas Liquids		mBOE	Thousands of Barrels of Oil Equivalent
bcf	Billions of cubic feet		mcf	Thousands of cubic feet
BOE	Barrels of Oil Equivalent (6,000 cu ft natural gas = 1bbl		mmcf	Millions of cubic feet
bod	Barrel of Oil per day		NG	Natural Gas
BPO	Before Payout		WTI	West Texas Intermediate

[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

[3] Ian R. Campbell is a graduate of the University of Western Ontario School of Business Administration, a Fellow of the Ontario Institute of Chartered Accountants, and a Fellow and founding member of the Canadian Institute of Chartered Business Valuators. He has been recognized for some thirty-five years as a leading Canadian authority on the valuation of publicly and privately held companies. Mr. Campbell is the author of the business valuation texts The Principles and Practice of Business Valuation (1975), Richard DeBoo Limited, Toronto, *The Valuation and Pricing of Privately Held Business Interests* (1990), and *The Valuation and Pricing of Business Interests* (2001), the latter two published by The Canadian Institute of Chartered Accountants, Toronto. He is a director and past director of several publicly and privately held Canadian Corporations.

Executive Summary

Valuation E-Book #1 discusses the differences in information typically available to Takeover Experts and Corporate Acquirers on one hand, and Public Market Participants, defined as investors and traders in public market securities, Investment Advisors and Securities Analysts on the other. In summary that discussion concludes:

- Public Market Participants typically have less information available to them than do Corporate Acquirers who execute confidentiality and standstill agreements and who complete in-depth due diligence processes prior to closing an acquisition. This results from prevailing Securities Laws that are outside the control of Public Market Participants;

- the information Public Market Participants don't have can be as, or more, important to the development of comprehensive, meaningful valuation determinations than is the publicly disclosed information they do have access to; and,

- whereas individual Public Market Participants may use a form of Research (i.e. 'Due Diligence') Questionnaire or Checklist in their analysis not all do, and there is no known 'recognized standard' such document available to them.

From an investment perspective few business ventures arguably are as risky as those pursuing natural resource opportunities. Aside from financing and 'finding' risk, this is because natural resource industries and the companies that participate in them are subject to product price cyclicality in circumstances where, particularly at the producer level, they are capital intensive, utilities dependent, infrastructure dependent, and subject to substantive government regulation. Further, in the case of Small Cap Oil & Gas Companies there typically is a dependence on company management that is not present to the same degree in large companies. Accordingly, an investor needs to have a clear understanding of the internal and external risks specific to Small Cap Oil & Gas 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. These factors include:

- macro-economic and other considerations under the heading 'Investor Commentary';

- exploration and mine development;

- Small Cap Oil & Gas E&P risk assessment. In this regard company specific considerations are discussed including:

  - ✓ Board and Management strategy with respect to whether the intention is to find and develop resources to then sell them to a major producer, or to build and exploit those resources as a producer themselves,

  - ✓ of fundamental importance management integrity, experience, depth, and demonstrated prior successful performance in and of itself and in the context of company strategy,

  - ✓ whether cash is on hand to fund the company's current operations, and whether that cash is held in what are perceived to be risk-free investments,

  - ✓ the company's property(ies) and the perceived potential related thereto, and

- ✓ the existing resource base at any given point in time measured by geographic location, average grade, existing proven and probable NI 43-101 resources, and the perceived potential to expand that resource base and the timing related thereto;

- the valuation of Small Cap Oil & Gas E&P's

- importantly, under the heading 'Required Rates of Return', a discussion of conventional rates of returns as contrasted to comparative rates of return that need to accrue to investments in the oil & gas sector; and,

- Reserve requirements pursuant to National Instrument 51-101.

Investor Commentary

Given the rapid macro-economic changes that have occurred in only a few short years, resultant global economic interdependence, demand and supply issues combined with continuous concerns related to political instability and terrorism, discussion with respect to the concept of Peak Oil, and so on, investors and their advisors increasingly have focused on the Oil & Gas industry. This Oil & Gas Company Valuation Synopsis has been prepared to assist investors and investment advisors in their review and analysis of Small Cap Oil & Gas explorers and producers – or so-called Oil & Gas E&P's.

There are three fundamental concepts that need to be clearly understood (see Valuation Overview on the StockResearchPortal.com website for a broader discussion of Valuation Concepts and Principles):

- value is specific to a given point in time, and is subject to upward or downward change as events external and internal to the company change over time;

- the meaning of the term 'en bloc' value, being the value of all of the outstanding shares of a company which viewed collectively generally are not subject to liquidity or marketability constraints; and,

- those things related to and affecting what is commonly referred to as a minority shareholding. A minority shareholding is a share ownership position that by itself is unable to exercise control of a company. Shares owned by Public Market Participants typically (although not always) represent minority shareholdings who value/price them based on incomplete information. Moreover, aside from possible information deficiencies the price of those shareholdings at any given point in time may be influenced by broad stock market volatility and other factors that have little to do with their underlying 'intrinsic' or 'stand-alone' value – a value that does not consider synergies that might accrue to an arm's length purchaser pursuant to a takeover transaction. Further, such shareholdings have little or no say in the creation or timing of a 'liquidity event' that might result in a 'synergistic premium' accruing to them from a property sale by the company or an en bloc sale of the company's shares to an arm's length purchaser.

Specifically with respect to investment in shares of Small Cap Oil & Gas E&P's whose shares are publicly traded, aside from other company specific research and due diligence matters set out herein, investors who purchase such shares either in the open market or pursuant to a Private Placement should focus on at least the following things:

- share liquidity can be poor depending on the size of a given company shareholding and the daily average trading volume of that company's shares (see details of average daily trading volumes, moving average trading volumes, and share price volatility in the 'Comparators' and 'Company Details' pages of the StockResearchPortal.com website);

- where a significant discovery is made there can be significant upside leverage in share price;

- 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;

- careful ongoing assessment of management is both fundamental and critically important when considering whether to invest in any given Small Cap Oil & Gas E&P, in particular assessment of:

  - ✓ senior management from the point of view of integrity, avoidance of conflicts of interest, ability to access the capital markets on comparatively undilutive terms, and the time and effort spent on the company,

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

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

- understanding the property(ies) and project(s), including understanding their:

  - ✓ physical location and comparative geo-political risk, and

  - ✓ the company's reserves and potential reserves in the context of both quantity and, in the case of crude oil, grade;

- understanding what infrastructure (roads, rail lines, water access, utilities access, access to pipeline tie-in exists, as well as availability of trained labour and the influence on company operations of seasonal weather conditions;

- importantly, the current and prospective supply/demand characteristics of oil and gas, and where the commodity price is in that cycle at any given point in time; and,

- when participating in a private placement the:

  - ✓ number, exercise price (measured against the private placement common share price),

  - ✓ investment 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 with Management in the context of, or concurrent with, the private placement), and

- ✓ compensation terms of the financing agent.

Investors should look carefully at whether a company (or affiliated or associated company) has a history of issuing unannounced options or warrants shortly after closing a private placement – which could be evidence of a Board and Management that places its self-interest ahead of external shareholder interest.

Although trite, it follows 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 management with a strong interest in the well-being of external shareholders complemented by strong geologists and engineers, who have properties located in stable regulatory and political environments, and a good proven and probable reserve base that has strong expansion potential.

Small Cap Oil & Gas E&P Risk Assessment

From an investor perspective, important timing issues, risk assessment, and company information that needs to be considered when deciding whether to invest and what an appropriate 'risk related rate of return' ought to include:

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 flow'. Free cash flow in essence is after-tax annual cash flow expected to the generated over the life of the business less annual sustaining (or 'maintenance', 'no-growth') capital investment.

2. Experience and quality of the Board and Management in at least the following contexts:

   - reputation for integrity;

   - existence of critical mass, including consideration of management succession planning;

   - dependency (or lack thereof) on one or more individuals for exploration and production success;

   - does the company have employment contracts with key executives, and if so, what are the terms and conditions of those contracts?;

   - what are the Directors and Management terms of reference, contracts, compensation, compensation policies, benefit plans and prescribed retirement age;

   - are any of the Directors or Officers directors or officers of any other Reporting Issuers? If they are:

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

- ✓ do any of these relationships or any other business involvement they have create or result in the possibility of conflicts of interest?;

- what is the extent of management's technical skills?;

- what is the extent of management's banking, financial institution, and other important relationships?;

- how many dollars has each Board member and senior executive invested in common shares of the company?;

- what is the history of stock option and warrant 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 and warrants to each of total undiluted and fully diluted common shares, and current director and management option and warrant policies and practices?;

- what is the history and past practice of stock option replacement grants or stock option re-pricing?;

- 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?;

- what is the Director and Management prior successful experience in accumulating land positions and finding oil and gas reserves?;

- does the company provide prospective 'results guidance' to its shareholders, and if it does what has been the history of actual results measured against prior such guidance?; and,

- what is the Director and Officer history of insider trading?

One of the most important factors to consider when assessing risk referable to a Small Cap Oil & Gas E&P is the integrity, quality, knowledge base and experience of members of the Board and Senior Management. It is common to find Board and Senior Management compensation to be comprised in part of options that provide incentive to Senior Management to succeed, thereby building shareholder value. 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.

3. 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, say, 30,000 feet for that year and 27,000 feet is drilled. It is quite another if only 20,000 feet are drilled and there is nothing beyond management's control (weather, labour strikes, etc.) that contributed to that; and,

- a producer if management gives guidance with respect to production quantities and costs (metal prices being beyond management's control), that are materially greater than is actually achieved, and there is nothing beyond management's control that contributed to that.

It may be perfectly reasonable to excuse a management that fails to meet its guidance numbers by material amounts in any one year, particularly if that same management has succeed in achieving, or not materially missing its guidance in prior years. However, if management continuously materially misses its guidance for two consecutive years that ought to be seen as a serious 'red flag' by investors.

4. Macro-economic prospects, both near-term and long term, for crude oil in the case of 'Oily' companies (i.e. companies who produce more oil than they do natural gas) and for 'Gassy' companies (i.e. companies who produce more natural gas than they do crude oil).

   The price of both crude oil and natural gas historically has been, and is likely to continue to be, cyclical. This cyclicality is critical to risk measurement when assessing Small Cap Oil & Gas E&P's. Thus it is important to have an understanding of the macro-economic climate at any given point in time and its possible effects on prospective prices. Examples of issues that need to be considered when investing in shares of Small Cap Oil & Gas E&P's 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 prospective 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, thereby supporting emerging market manufacturing infrastructures;
   - the willingness of the U.S.'s trading partners prospectively to hold U.S. $ generated through trade deficits; and,
   - prospective crude oil and natural gas demand/supply issues.

5. What is the geographic location of the company's operations?

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

6. What is the extent of the company's third party debt obligations, and does it have off balance sheet obligations?

7. What is the company's cash on hand measured against exploration and development capital spending programs assessed in combination with the extent of the company's undrawn credit lines, and the likelihood of a requirement of near-term and longer term prospective dilutive primary share offerings?

Importantly, the issue of what money market or other instruments in which the company elects to invest its cash needs to be understood. With the U.S. sub-prime mortgage problems that came to market attention in August, 2007 this became ever more obvious.

Oil & Gas E&P's typically fund part of their activities pursuant to private placements and other primary share offerings. In private placements warrants typically are offered as incentives to cause investors to purchase. In these circumstances the following things need to be considered:

- where an accredited investor 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 egregiously place their own self-interest ahead of that of their company's shareholders.

8. What are the company's targeted land holdings and existing reservoirs?

9. What is the proximity of reserves and possible reserves to available water, utilities, transportation infrastructure, trained labour, and whether exploration activities are seasonal due to weather conditions?

   Consideration of these things is fundamental, as without water, utilities, transportation infrastructure and availability of trained labour the economics of any new reserve will be very different than if those things are readily accessible and in close physical proximity to such a reserve;

10. Does the company own the project outright, or at least have control or contractual control of the project? If contractual control, what are 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 ownership rights.

11. 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 likely to either 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 he/she is active in management;
- the controlling shareholder's willingness to hire proven management if that is an appropriate 'arm's length perceived' thing to do;
- the controlling shareholder's willingness to give up control if commercial sensibility dictates that should happen; and,
- 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.

As a practical matter, there typically is little question that the presence of a controlling shareholder tends to fetter, in some cases seriously so, corporate flexibility and liquidity. This possibility (or reality) should be reflected by investors in their assessment of investment risk and, all other things equal, should cause them in theory at least to demand higher returns then they ought to expect from an investment where there is no 'control overhang'.

12. What is the likely investment time frame, combined with an assessment of the timing of a likely liquidity event in the context of an Oil & Gas E&P selling a commercial 'discovered' project, or a possible takeover by a corporate acquirer? In this regard, it is important to know whether it is the company's strategy to grow organically, through new property acquisition, through company acquisition or merger, or through a combination of some or all of those things.

    Given that stock markets are comprised of investors with short term to long-term time horizons, it is difficult to comment sensibly other than to suggest that:

    - the shorter period of time the investor intends to hold stock in a particular company, the less that investor likely needs to focus on long term macro-economic prospects, industry specific economics and long term commodity cycle prices; and,
    - in contrast, the longer an investor's investment horizon the greater need be the investor's ongoing and focused interest on those things.

    It is important to understand the Board's and Management's strategy with respect to continuous build versus selling the company.

13. 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?

    Broadly, risk factors can be distinguished between those beyond a company's control (i.e. its Board's and Management's control) being 'external risks factors', and those within a company's control being 'internal risk factors'. Host country risks fill into the 'external risk' category. A example of external risk is the just announced (coincident with final drafting of this Valuation Synopsis) Province of Alberta change in its Royalty Tax Structure that in some cases will materially affect the prospective free cash flows of Alberta based Oil & Gas E&P's.

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

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

16. What are the company's:

    - accounting policies and critical estimates, including the way it accounts for Foreign Exchange Gains and Losses, non-monetary transactions, and off-balance sheet arrangement disclosure?;

    - Internal Control Procedures and Practices, and has there been a recent change in Auditors?; and,

    - royalty, hedge, and 'take or pay' contracts if any such contracts exist?

    Hedging strategies are particularly important in times of significant output price volatility such as that being experienced with respect to crude oil concurrent with the final drafting of this Valuation Synopsis as, aside from affecting profit reporting for accounting purposes, far more important from a company value perspective is the material affect in terms of opportunity gains or losses in free cash flow that hedging contracts may have;

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

18. With respect to 'producer' operations, what are the company's historic and prospective reserve 'finding costs', cash operating costs per BOE produced, and its annual EBITDA (earnings before interest, taxes and depreciation), EBIT (earnings before interest and taxes), after-tax income, and free cash flow?

19. With respect to the company's labour force:

    - is trained labour readily available, both in the context of the company itself and in the context of its important suppliers?;

    - is the labour force unionized and is so what are the contract terms?;

    - are there labour productivity enhancement opportunities?; and,

    - what Labour Laws exist in the country where the company conducts its operations with respect to severance and safety?

20. Does the company have clear title and/or operating rights to its owned and leased properties?

21. What are the company's Proven, Probable and Inferred Reserves, are they NI 51-101 Compliant, what are the crude oil grades, and is there scope to significantly expand the reserves?

22. What is the near-term drilling and exploration program, is it a seasonal or year-round program, and what is the budgeted cash spend?

23. Importantly, are funds for planned spending in hand, including contingent funds for possible budget overruns?

24. With respect to reserves, capital assets, production capacity and efficiency:

    - what is the company's estimated reservoir life (lives) at any given point in time?;
    - what is company's 'capitalization v. expense policy' with respect to capital equipment and spare parts?;
    - what is their technological state and state of repair and what is the dollar amount of forecasted capital expenditures over next three fiscal years, and are required new equipment and spare parts readily available?;
    - importantly, what % of Capex is of a 'sustaining' versus a 'growth' nature?;
    - in the case of depleting reservoirs, is there either a water flood or CO2 flood recovery enhancement opportunity?; and,
    - are power, water, and other utilities supplies readily available to the company's properties, does the company have long-term supply contracts for these things and if so on what terms, and does the company prospectively face possible significant escalated utilities and water costs?

25. With respect to environmental issues:

    - is there both a Board approved environmental policy and system of internal ongoing environmental surveys, prevention policies, and environmental liability audit procedures in place?;
    - 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?;
    - has the company commissioned Phase I or Phase II environmental studies with respect to its properties?;
    - is there adequate environmental liability insurance to cover any existing or possible liabilities?;
    - 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?; and,
    - does the company have environmental liabilities related to properties it previously owned?

26. Other matters of interest include:

    - what liability insurance, operations insurance, and property insurance does the Company have in place?;

- has the company or any of its Directors and Officers been in the past, or are they currently, subject to penalties or sanctions related to bankruptcy, income tax, breach of securities law, and so on?;
- is the company or its operations subject to Government Approvals or Regulations?;
- are there outstanding disputes with tax authorities, including unresolved income tax assessments or reassessments?;
- are there known unresolved regulatory compliance issues?;
- is the company a litigant or potential litigant in threatened or ongoing litigation?; and,
- does the company have any contractual obligations outside it normal course of business, or any material contingent liabilities?

Valuation Methodologies – Small Cap Oil & Gas Companies – see Valuation E-Book #2

The Valuation of Small Cap Oil & Gas Companies[4]

The first step in the valuation of any company, be it a Small Cap Oil & Gas E&P or otherwise, is to understand the company's near-term and longer term strategy. In the case of a Small Cap Oil & Gas E&P, a straightforward strategy might be stated as follows:

> ABC Limited E&P is pursing investing its capital in a drilling dominated program leveraging off its technical strengths targeting Clastic and carbonate reservoirs in its core geographic areas. In pursuing these plays we will first establish whether we can lead the play technically and compete technically and financially with the competitors in the play area.

There are a number of important Small Cap Oil & Gas E&P 'valuation primers' evident in such a strategy statement. These are:

- the importance of a company having the financial strength to compete effectively, whether competition means competing at land sales, or being able to hold one's own from a financial point of view (i.e. not have to face ownership dilution or loss of control as the project progresses) in joint venture or partnership relationships. E&P's typically finance their exploration and production opportunities through a combination of arm's length debt and equity. Similar to Small Cap Mining Exploration Companies who almost always finance their exploration activities from equity, Small Cap Oil & Gas E&Ps tend to finance their initial property acquisitions and exploration costs from equity, but unlike Small Cap Mining Exploration Companies who frequently sell the reserves they find to a mining producer, Small Cap Oil & Gas E&Ps typically 'tie-in' the oil and gas they find to existing third party infrastructure (i.e. pipelines) thereby generating revenues and positive cash flows which enable them to finance further exploration and production activities through a combination of additional equity and arm's length debt. At all times investors need to be conscious

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of where a Small Cap Oil & Gas E&P is in its maturation cycle, and be satisfied that the amount of arm's length debt on its balance sheet is reasonable when measured against each of its:

- ✓ tangible equity,
- ✓ current and prospective cash flow from operations, and
- ✓ exploration and production near-term business plan, including in particular its near-term sustaining capital requirements and capital growth plans;

- importantly, persons valuing businesses who adopt what is referred to as a 'weighted average cost of capital' (a blended return on debt and equity viewed together assuming an 'optimal' or 'best balanced risk/reward' debt/equity ratio) discount rate to develop 'enterprise value' (the aggregate fair market value of a company's interest bearing debt and its equity at a point in time) pursuant to the discounted cash flow methodology often make the simplistic assumption with respect to interest bearing debt that:

  - ✓ an arm's length purchaser of all of the company's outstanding shares would base their purchase price on enterprise value, not equity value, and would inject funds or borrow incremental funds (depending on whether the target company was over-levered or under-levered) post acquisition, thereby stabilizing the post-acquisition debt/equity ratio at a level consistent with the assumed blended debt/equity ratio implicit in the weighted average cost of capital discount rate that the purchaser assumed in its discounted cash flow analysis, and hence
  - ✓ the actual quantum of arm's length interest bearing debt measured against actual shareholder's equity in any given company is irrelevant to their value conclusion.

  This assumption fails to consider the reduced flexibility and lack of negotiating strength available to a company that is over-levered versus that available to a company that is appropriately levered or under-levered. Whereas this may be an appropriate assumption where there likely are multiple strategic purchasers for all of the outstanding shares or all or a portion of the business assets of a company, such multiple purchasers do not always exist at a given point in time. Accordingly, irrespective of what information investors have available to them, in simple terms they should always consider the amount of interest bearing debt a company has on its balance sheet when assessing both the value and the riskiness of the investment they are making. This is particularly true in the case of Public Market Participants in circumstances where:

  - ✓ even if the simplistic broad assumption described above is taken to be appropriate in the context of a sale of all of a company's outstanding shares, in a public market context involving normal sized trading lots there is no day over day arm's length purchaser acquiring all of the company's outstanding shares. In other words, unless a public company is subject to a takeover bid, the 'company's debt is the company's debt', and an over-levered or under-levered position ought to be considered as adding more or less risk respectively to the company than would be the case if the company operates with an 'optimal debt/equity' ratio, and

- ✓ a public company's trading price inherently is assumed to consider (pursuant to the so-called 'efficient market theory' – a fundamental concept underlying the Capital Asset Pricing Model which many securities analysts adopt, see heading Discounted Cash Flow Methodology following) the company's debt/equity ratio but may not do so if the market price is influenced by 'peer group' analysis that has its basis in the aforementioned 'enterprise value' concept in circumstances where differing debt/equity ratios among so-called peer group companies are not notionally adjusted;

- identification by the company of the importance of technical and operating strengths and weaknesses of management, presumably based on a history of past success; and,

- the importance of 'leading the play' (i.e. driving the result for any particular oil & gas play), as contrasted with being a passive partner.

Production

Once a Small Cap Oil & Gas E&P develops reserves and begins production, its production typically has either a higher crude oil component than a NG component or vice-versa. Crude oil is found in different grades, from 'light sweet' to 'heavy'. It is important that WTI and Brent Crude oil prices, common benchmarks, both are based on light sweet crude prices and contain approximately 0.24% and 0.37% sulphur and have API's of 39.6 and 38.1 respectively. On the other hand, all NG has common characteristics.

In the StockResearchPortal.com website a company with a higher crude oil component is referred to as 'oily', and a company with a higher NG component is referred to as 'gassy'. This distinction is important from a valuation point of view. This is because whereas there are a number of common factors influencing the current and prospective price of crude oil on one hand and NG on the other, they also each are influenced by divergent factors. Hence at any given point in time risk with respect to the near-term and longer term trend price of crude oil is different from the near-term and long term trend price of NG, which different risks are reflected both en bloc value and in stock market prices.

Valuation

There is little to value in a start-up Oil & Gas E&P that has yet make a discovery except whatever cash and perceived property value it has (in the latter case typically based on the price paid) less any debt and other liabilities it has on its balance sheet, combined with the perceived value of management team it has assembled to the point in time of value. However, once an Oil & Gas E&P has made one or more discoveries, the theoretically correct way to value an Oil & Gas E&P is pursuant to the discounted cash flow methodology – particularly as the Oil & Gas E&P matures and builds its BOE per day output. When adopting this methodology the key forecast variables are:

- forecasted gross revenue expected to be generated from existing and prospective reserves at forecasted extraction rates based on forecasted BOE per day extracted over the estimated life of known reserves multiplied by forecasted crude oil and gas prices at the point in time the value is determined. This gross revenue forecast typically is based on reserve estimates and annual decline (extraction) rates prepared by independent engineering firms. Forecast pricing tends to be based on NYMEX strip prices combined with WTI and Brent crude forecast prices, in each case adjusted to consider the quality of the E&P's reserves (measured against the standard quality that is the basis of those daily market prices) and the location of the E&P reserves relative to the benchmark location of the NYMEX strip price and WTI/Brent crude price being relied upon. The adjustment to reflect the quality and the location of a particular reserve is commonly referred to as the 'price differential';

- royalties, production taxes, operating costs, so-called 'finding costs', and general and administrative cash expenses are deducted from gross revenue over each year in the forecast period, resulting in year-over-year EBITDA;

- income taxes are deducted from the resulting annual EBITDAs at prevailing corporate income tax rates (the values of income tax pools on hand are picked up separately, see following);

- from the annual 'after-tax EBITDA' net annual capital expenditures are deducted. Net annual capital expenditures in the this context basically are annual forecasted FD&A costs per BOE required to sustain the company's production at existing levels beyond the forecast period, although where capital expenditures for growth are anticipated these too are included in the forecast period (although not in the year the 'terminal year' of the forecast;

- annual forecasted increases and decreases in cash working capital based on the resultant forecasts is deducted or added respectively;

- the resultant annual net cash flow is discounted by a weighted average cost of capital, and a terminal value is calculated and discounted back to the valuation date; and,

- to the resulting discounted cash flow amount are added the present value of existing income tax pools and redundant assets to generate an 'enterprise value' from which interest bearing debt is deducted to generate an 'equity value'.

When developing the forecast and selecting an appropriate discount rate the following things need to be considered:

- the value of any given business, be it a Small Cap Oil & Gas E&P or otherwise, is a finite number that cannot be changed by arithmetic. That is to say, if a coffee cup has a retail price of $12, one could derive that amount by multiplying 1 X 12, 2 X 6, or 3 X 4 all of which would result in a retail price of $12. It would make no economic sense to randomly multiply any two of those multiplicands thereby deriving a theoretical retail price different than $12. In the context of valuing a business pursuant to the discounted cash flow methodology (or any other methodology for that matter) there must be internal consistency between the variable adopted in the value determination. Stated differently, if a forecast is optimistically developed, that should be reflected in selection of a higher discount rate than otherwise would be selected in order to reflect the forecast optimism. In reverse, if a forecast is pessimistically developed, that should be reflected in selection of a lower discount rate than otherwise would be selected in order to reflect the forecast pessimism;

- if the forecast is developed in nominal (i.e. inflation included) dollars, then the risk rate should include an inflation component. If the forecast is developed in real (inflation excluded) dollars, then the risk rate should not include an inflation component. This should be a point of particular focus for investors in Small Cap Oil & Gas E&Ps, since reserve estimates (and hence DCF analysis) may be based, pursuant to NI 51-101 on either constant or forecasted prices and costs (see heading Reserves – National Instrument 51-101 following);

- value is relevant to a point in time. Hence, the principal value driver of an Oil & Gas E&P is the prospective production of BOE as at the date of value based on proven, probable and possible reserves. Where management has a proven track record of successfully proving up and finding new BOE reserves and a company has an infrastructure to support exploration it may be appropriate to forecast an ongoing expenditure of 'finding costs' and resultant and prospective BOE production. Where this is the case, the incremental risk associated with the assumed achievement of new proven, probable and possible BOE reserves should be reflected in selection of a higher 'risk adjusted' discount rate (rate of return) than is applied to forecast cash flows associated with BOE reserves known at the date of value. This 'risk adjusted' discount rate obviously would be dependent on 'fact specific' circumstances. Under any circumstance, the discount rate selected must be internally consistent with the forecast assumptions and the risk related thereto; and,

- when developing forecasts for producing properties and prospective properties (i.e. properties not yet producing), at least the following things need to be carefully considered:

  - ✓ average sales price of crude oil measured in $ per bbl,
  - ✓ average sales price of natural gas liquids measured in $ per bbl,
  - ✓ average sales price of natural gas measured in $ per mcf,
  - ✓ proven reserve life index,
  - ✓ proven plus probable reserves divided by reserve life index,
  - ✓ cash cost per BOE produced in trailing twelve months,
  - ✓ % increase/decrease in BOE Daily production trailing twelve months,
  - ✓ prospective 'finding costs' per BOE per day,

- ✓ wells drilled net in trailing twelve months,
- ✓ % net wells drilled success rate in trailing twelve months,
- ✓ for wells that are declining, are there 'waterflood' or 'CO2 flood' opportunities to further well production and, if so, have they been appropriately considered in the forecast, and
- ✓ well abandonment costs.

For a more detail outline of the discounted cash flow methodology see Valuation E-Book #2.

Required Rates of Return

Conventional 'starting point' 'targeted' 'strategic corporate acquirer' 'nominal' (i.e. before 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 after-tax 'inflation included' operating free cash flow of an acquisition target pursuant to a discounted cash flow methodology. In recent years 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%.

	Conventional Acquisition Target	Discovery Stage Oil & Gas E&P (early Proven & Probable Reserves)	Oil & Gas E&P with Significant Proven & Probable Reserves and Production
Management	Critical mass, little individual dependence	Generally individual dependence	Generally individual dependence
Product(s)	Proven, market accepted, branded, established customer base	Commodity	Commodity
Plant and Equipment	In place, generally well maintained	Non-existent	In place, generally well maintained
Cost Structure	Reasonably predictable	Reasonably predictable based on exploration program	Reasonably predictable based on exploration program
Environmental Liability Risk	Typically low/medium high	Some Risk	Some Risk
Underlying Tangible Assets net of capitalized exploration costs	Generally comparatively high	Cash plus value of reserves	Generally reasonably high
After-tax free cash flow	Yes	No	Yes
% Equity Acquired in Takeover	Typically 100%	100% (company or one or more properties)	100% (company or one or more properties)
Investor in Marketable Securities	n/a	Typically less than 1%	Typically less than 1%

Comparative Required After-tax Real Rate of Return on Equity	10% - 15% (historic – although latterly 10% - 12%)	High – say for example purposes 25% to 40% - the latter being a typically quoted 'Venture Capital ROR)	10% - 15% (historic – although latterly 10% - 12%)
Timeframe - Investment Double - Say	+/- 7 years	+/- 2 - 3 years	+/- 7 years

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. Such synergies may be speculatively be 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. 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 3-4) 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 Small Cap Oil & Gas E&P's are broad benchmarks that are based on discussions with large multi-national and national companies during the 1970 – 2007 time period. In practice, these discount rates typically are not adjusted in a material way except in unusual circumstances (e.g. periods of unusually high inflation). Thus 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 real rate of return on equity' rates suggested in the foregoing table have been selected subjectively, but almost certainly are 'directionally correct' in that they reflect the highest risk rates at the time a Small Cap Oil & Gas E&P commences operations, with those risk rates diminishing to conventional rates through its evolution to producer.

Importantly, where a discounted cash flow methodology is adopted important variables such as forecasted product 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 prices proving to be accurate is reflected in the discount rate adopted. 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 Small Cap Oil & Gas E&P that is exploiting a wasting asset the discount period adopted is that of the estimated finite commercial life of the reserves, subject to assumptions with respect to property and reserve additions. Having said that, assumptions are often made that the Company will continue to operate to infinity, in part because the present value of future expectations diminishes with the passage of time.

Reserves – National Instrument 51-101

Reserves definitions and related matters are found in 'Part 2 – Definitions of Reserves' found in National Instrument 51-101 (NI 51-101). See unofficial consolidation at OSC.gov.on.ca/Regulation/Rulemaking/Current/rm_part5_index.jsp, (note: 'rrn' in the URL is 'r r n') then link to NI 51-101.

Reserves are the estimated remaining quantities of oil and natural gas and related substances anticipated to be recoverable from known accumulations, from a given date forward, based on

- analysis of drilling, geological, geophysical and engineering data;
- the use of established technology; and,
- specified economic conditions, which are generally accepted as being reasonable, and shall be disclosed (see following under constant prices and costs and forecast prices and costs).

Reserves are classified according to the degree of certainty associated with the estimates, and are segregated into the following reserves categories. These categories apply to both estimates of individual reserves entities and the aggregate of reserves for multiple entities:

- Proved Reserves are those reserves that can be estimated with a high degree of certainty to be recoverable, where it is likely that the actual remaining quantities recovered will exceed the estimated proved reserves, and where there is at least a 90 percent probability that the quantities actually recovered will equal or exceed the estimated proved reserves;
- Probable Reserves are those additional reserves that are less certain to be recovered than proved reserves, where it is equally likely that the actual remaining quantities recovered will be greater or less than the sum of the estimated proved plus probable reserves, and where there is at least a 50 percent probability that the quantities actually recovered will equal or exceed the sum of the estimated proved plus probable reserves; and,
- Possible Reserves are those additional reserves that are less certain to be recovered than probable reserves. It is unlikely that the actual remaining quantities recovered will exceed the sum of the estimated proved plus probable plus possible reserves, and where there is at least a 10 percent probability that the quantities actually recovered will equal or exceed the sum of the estimated proved plus probable plus possible reserves.

For the purposes of NI 51-101, the key economic assumptions will be the prices and costs used in the estimate, being either:

- constant prices and costs as at the last day of a reporting issuer's financial year. In this regard, NI 51-101 specifies (para 4.2) that constant prices and costs are to be based on the reporting issuer's prices and costs as of the effective date of the estimate being made (generally, the reporting issuer's financial year-end), and that in general, these prices and costs are assumed not to change, but rather to remain constant, throughout the life of a property, except to the extent of certain fixed or presently determinable future prices or costs to which the reporting issuer is legally bound by a contractual or other obligation to supply a physical product (including those for an extension period of a contract that is likely to be extended); or,

- forecast prices and costs. In this regard, NI 51-101 specifies (para 4.1) that except to the extent that the reporting issuer is legally bound by fixed or presently determinable future prices or costs, forecast prices and costs are future prices and costs 'generally recognized as being a reasonable outlook on the future'. The Canadian Standards Association does not consider that future prices or costs would satisfy this requirement if they fall outside the range of forecasts of comparable prices or costs used, as at the same date, for the same future period, by major independent qualified reserves evaluators or auditors.

With respect to Development and Production Status each of the reserves categories (proved, probable and possible) may be divided into developed and undeveloped categories:

- Developed Reserves are those reserves that are expected to be recovered from existing wells and installed facilities or, if facilities have not been installed, that would involve a low expenditure (for example, when compared to the cost of drilling a well) to put the reserves on production. The developed category may be subdivided into producing and non-producing as follows:

  - ✓ Developed Producing Reserves are those reserves that are expected to be recovered from completion intervals open at the time of the estimate. These reserves may be currently producing or, if shut-in, they must have previously been on production, and the date of resumption of production must be known with reasonable certainty, and

  - ✓ Developed Non-producing Reserves are those reserves that either have not been on production, or have previously been on production, but are shut-in, and the date of resumption of production is unknown; and,

- Undeveloped Reserves are those reserves expected to be recovered from known accumulations where a significant expenditure (for example, when compared to the cost of drilling a well) is required to render them capable of production. They must fully meet the requirements of the reserves classification (proved, probable, possible) to which they are assigned.

Where there are multi-well pools NI 51-101 states that it may be appropriate to allocate total pool reserves between the developed and undeveloped categories or to subdivide the developed reserves for the pool between developed producing and developed non-producing, which allocation should be based on the estimator's assessment as to the reserves that will be recovered from specific wells, facilities and completion intervals in the pool and their respective development and production status.