DISCUSSION PAPER: UNFC, USER MANUALS, AND WORKING GROUPS

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February 2009

DISCLAIMER

This note was prepared as a discussion paper for the 6th Session, Ad Hoc Group of Experts on Harmonization of Fossil Energy and Mineral Resources Terminology Geneva, 25-27, March 2009. It is intended to raise some questions and to provide a basis for discussion. It makes no pretence at completeness or detail and is inevitably biased towards the area with which the author is most familiar, oil and gas companies in the capital market system. Others will have to fill in any omissions and detail, especially on minerals other than oil and gas and on accounting matters.

The ideas and opinions in this note are those of the author, and may not be the views of the author's employer, the Alberta Securities Commission.

1. INTRODUCTION

A. United Nations Framework Classification System User Working Groups

Three working groups have been established to examine the needs of users of information generated by the United Nations Framework Classification (UNFC) and associated systems such as the Petroleum Resources Management System (PRMS). This note attempts to provide a basis for discussion of these needs, and how they can be fulfilled, with some additional discussion of financial reporting needs.

The three working groups are:

- Business Process Needs
- Financial Reporting Needs
- Government Resource Management Needs (combined International Energy Studies and Resource Management). For this note, because they have different characteristics, this group has been divided into:
  - Energy Studies (which may or may not be international)
  - Resource Management

B. Working Group Objectives

UNFC (and similar systems) structure information on mineral resources according to a standard classification system, and provide a means of communicating this information to facilitate decision-making. The working groups essentially recognise the different types of decisions made by different users. The following basic objective is proposed:

Objective. To identify the specific information needs of the various users and to best determine how it can be provided:

1. In a standard form.
2. In a manner that variations from the standard can recognised and understood.

Satisfying this objective requires an understanding of the use that is made of the information.

This note attempts to define the scopes of the working groups, and the boundaries between them, and will, hopefully, provide a framework in which to develop the more detailed information needs of the different users.

The working groups cover the needs of a variety of users with overlapping interests, and operating under different business structures and economic systems. Basic information

requirements will be the same, but there will be differences in the detailed information needed by different users even within the scope of a single working group.

The information generated by evaluations and reported using a system such as UNFC is part of a larger picture. For example, UNFC considers resource supply, but not demand or policies within which resources may be governed. Thought may need to be given as to how these different aspects mesh together.

C. Information Generated By UNFC

Information is generated for:

Geological units within defined physical boundaries. This is the physical volume within which the estimate is made. The extremes are an operating entity with one well or mine, and a government concerned with a whole country or a study of the resources of several countries. The volume will be defined by horizontal geographical limits that may be geographical, geological, or political (lease, mine, geological basin or province, political area, etc.), and vertically by depth or geological units.

Estimation entities, any organisation that prepares and classifies the results according to a system such as the UNFC, and includes:

- Operating entities, which are defined here as any organisation that carries out or controls directly or indirectly, physical recovery operations, whether it is a public, private, or government, or similar organisation. The operating entity is characterised by an ownership structure and related fiscal regime that, to some extent, determines the information that is of interest. These interests may be quite different, for example:
    - The prime interest of a public company with shares quoted and freely traded in the capital market will be in net volumes after taxes and royalties, in resources for which it has legal rights to produce, and in fulfilling any statutory reporting requirements.
    - The interest of an National Oil Company will be primarily in gross volumes for resources over which it has legal control, and in providing information to the government to which it reports,
    - The interest of a government will depend on the importance of the resources for the country. In all cases it will be in all volumes within its national boundaries irrespective of financial interests or operating entities, one aspect of which is the management of the assignment of legal rights to operating entities. When the resources represent material, or dominant national interests, then other elements of government will require information on the fossil energy and mineral resources in their decision support.

- Energy Study entities, that make estimates of mineral resources but do not control them, such as the International Energy Agency, or private groups such as Cambridge Energy Research Institute.

Product type is used to describe the material being produced and classified. This may be heavy oil, bitumen, coal bed methane, platinum, uranium, etc.

Projects. The ability to recover a resource can only be assessed by developing and evaluating a recovery project. The conditions and result of a project evaluation determine the classification into which various volumes fall. PRMS describes a project as the "link between the petroleum accumulation and the decision making process".

The basic information resulting from a project evaluation is a volume (e.g., m^3 or bbls) of a product type in a geological unit for the estimation entity. (The term "volume" is used here, interchangeably with weight or mass, to which it is related by density.) This volume then is categorised in a system such as UNFC (or PRMS, etc.), according to the likelihood of its recovery.

In order to be assigned to a particular category, the volume or weight must have satisfied a series of tests (or decision rules) that, in the UNFC, are of three types:

- Geological
- Economic
- Feasibility.

These tests may be quite complex (see the Canadian Oil and Gas Evaluation Handbook for examples of tests, such as drilling and testing requirements for oil and gas; Pincock Perspectives Issue 70, as an example of what is required in conceptual (scoping), pre-feasibility and feasibility studies for minerals).

Every estimate is made under a certain scenario (project in PRMS) and associated with most estimates is a forecast of the timing of production under the scenario. Several such estimates may be made for the same product, for instance volumes of heavy oil at different prices or at different recovery factors. Almost every piece of information has two key aspects:

- Best Estimate of what is expected
- Variance about that estimate

The most basic estimate is of the volume that is most likely to be recovered under a defined project scenario (sometimes described as a "best estimate"). An estimate of the variance about this best estimate is often critical information. For this reason, it is common to make high, medium, and low case estimates, or to generate a probability distribution of the volumes that may be recovered.

The importance of the variance is greatly under-rated, for instance different courses of action may result from estimates of a supply of oil of:

- 1,000,000 ± 10,000 barrels

    - i.e., 68% probability of getting between 990,000 and 1,010,000 barrels, and,
- 1,000,000 ± 500,000
    - i.e., 68% probability of getting between 500,000 and 1,500,000 barrels.

In systems such as PRMS and COGEH, this variance is expressed by categorizing the results by degree of certainty of recovery, e.g., Proved, Probable, and Possible reserves.

D. Reporting

A distinction should be made between the process of generating information (evaluation and classification), and the provision of this information (reporting) to others. Organisations that generate the information will have different degrees of obligation, willingness, and ability, to provide it to others. In some cases (e.g., public company regulatory disclosure requirements), there are formal obligations to provide information to a wide audience, in other cases (e.g., recent drilling results) there may be an unwillingness to provide information, or there may even be a formal requirement (e.g., contractual agreements with governments) for confidentiality. This note discusses information that might be available; it is not intended to imply any responsibility or requirement for it to be provided to a wider audience.

2. WORKING GROUP INFORMATION NEEDS

The information required by different users can be divided into three inter-related categories, with a related requirement that it is provided in a form that can be audited.

Basic information: Volume of a product type within specified geographic and/or geological limits, for an Estimation entity under a project scenario, classified according to the UNFC or other system. For a particular class (e.g., reserves, contingent resources, UNFC 111, etc.), each estimate of the results will typically be represented by a measure of variance, such as a range, Proved-Probable-Possible reserves; high-medium-low contingent resources, etc.)

Project Evaluation Results: Production forecasts including timing, cash flow forecasts, before and/or after government take, etc.

Project assumptions: the assumptions made in generating the estimate, including:

- Geological assumptions (porosity or grade cut-offs, recovery factors, etc.)
- Feasibility assumptions (stage of investigation: exploration, producing, etc., recovery process, etc.)
- Economic assumptions (capital and operating costs, price forecast, etc.). The economic conditions under which production will take place range from relatively simple producing agreements to complex production sharing contracts, and can change over time. A producing company's interests are in the volumes to which

it has the rights, that generate or may generate cash flow after the application of factors such as royalty and taxes (i.e., lease net volumes). A government will be less concerned about a fiscal and ownership regime that it controls, and can change, as long as someone produces a resource.

Audit information. Since all of the information is forecast, it should be prepared and presented in a form that can be audited. Examples: Technical Revisions to oil and gas reserves estimates, changes in production schedules or costs, time that PUDs have been on the books, etc. (It is the author's strongly held opinion that information that cannot be tested is of limited value).

Two factors characterise the information needs of the working groups

Time. The timeframe of a financial analyst or of a short term investor in the stock market may be for information on the next quarter, or even less.

COMMENT FROM GLENN BRADY

Not sure I fully agree…While analysts and short-term investor are interested in information on current performance, they are also interested in longer-term prospects. Both are factored into an analyst's assessment when making an investment decisions to invest in or divest in the company.

From an "accounting" financial reporting perspective, the frequency of reporting will be at least annually, with most jurisdictions also requiring interim reporting, which may be half yearly or quarterly. Those income statements will report the sales, profits etc for the period. The balance sheet however will report the entity's assets and liabilities – time to production is not really a factor to consider when determining if an asset exists, but it may be relevant to working out the measurement amount that the asset should be recorded in the balance sheet at.

An operating entity (business or NOC) and a large scale investor (substantial institutional investor) will in addition look at growth potential in a longer timeframe. A government or international agency planning for long term resource supply may be interested in something (e.g. methane hydrates) with a time to production, if ever, measured in tens of years.

Level of Aggregation[1]. The interest of an operating entity with one well or one mine will be limited to just that. A large company or NOC will be interested in all of its properties and maybe in properties that it may acquire in the future. A government will be interested in all assets within its borders and also in potential imports from outside its borders. There are statistical complexities related to the aggregation of estimates that must be taken into account in order to provide meaningful information. The information needs of the working groups overlap considerably, but in a highly simplified form:

- Business Process Needs

[1] Aggregation here refers to the addition of different estimates either arithmetically or probabilistically

- Time: Generally short time frame, quarterly to a few years; larger operating entities will usually have both a short and a longer time perspective.
- Aggregation: from Low, un-aggregated (the most basic unit of estimation, often at the level of a well or zone mine), to Medium, the total volumes controlled by an operating entity.

- Financial Reporting Needs
  - Time: Generally short, monthly, quarterly, to one or two years, capturing the long term forecasts in the form of recoverable quantities.
  - Aggregation: Usually Medium, aggregated to operating entity sub-divisions and to the total operating entity.

- Government Resource Management Needs (combined International Energy Studies and Resource Management). Although these have been combined, they have different characteristics:

  - Resource Management Needs
    - Time. Short to medium term (one transient period).
    - Aggregation. Generally low to medium (e.g., monthly production reporting, well licensing & abandonment, lease agreements).

  - Energy Studies Needs
    - Time. Generally from one to many years (more than one transient period).
    - Aggregation. Generally high (e.g., supply studies may cover sources from several countries).

3. USER MANUALS

Since the phrase "specifications and guidelines"[2] is interpreted in different ways by various people, the term "user manual" has been used here a neutral alternative. However, it is intended only a term of convenience to be replaced by another term – as soon as one can be agreed upon.

A User Manual contains directions in the form of rules and guidelines on a particular procedure.

[2] There has been considerable debate about the meaning of the terms "specifications and guidelines", which appear to mean different things to different people. The term "complementary texts" has been proposed. For this note, "user manual" has been used as interim, neutral terminology until such time as there is agreement in the AHGE on terminology and usage. Refer to Appendix B for further discussion of terminology.

It will not be possible to provide a standard UNFC assessment without a set of user manuals. In fact, user manuals would be required for several purposes, with sections for specific product types, purposes, or user communities. Possible user manuals include:

- Use of the UNFC as a standalone system.

- For product oriented systems as "feeders" to the UNFC, such as PRMS, JORC, and COGEH. The existing guidelines etc, would not be replaced, but there could be a User Manual that describes how the results of estimations under these guidelines would be classified (mapped) according to the UNFC. It may not be possible to map all other systems to UNFC in a consistent manner.

- UNFC and working groups
  Business Process Needs
  Financial Reporting Needs
  Government Resource Management Needs
  Resource Management
  International Energy Studies
  These would describe how the UNFC (and supporting systems such as PRMS, JORC, etc.), would be used to satisfy various needs.

Comment [SHEI1]: About 150 different classifications were mapped when the UNFC was initially developed. While we are seeing a convergence of principles now, it takes the form of variations of other classifications, creating more rather than less. The New Russian Classification and the ongoing SEC revision examples. It is possible to adjust the UNFC to match any of these, but if two of them are incompatible, mapping them to the UNFC will not resolve the problem accurately enough for the principal applications that are targeted (International energy and mineral studies, government resource management, business process management and financial reporting.)

However, as an example of the potential complexities, Financial Reporting Needs for oil and gas are currently set by a number of bodies, including:

- The USA Securities Exchange Commission (recently amended)
- The Canadian Securities Administrators (National Instrument 51-101)
- The London Stock Exchange
- Accounting standard setters, most notably the Financial Accounting Standards Board in the USA and the International Accounting Standards Board. Relevant FASB accounting standards include FAS 19 *Financial Accounting and Reporting by Oil and Gas Producing Companies* and FAS 69 *Disclosures about Oil and Gas Producing Activities*. Relevant IASB accounting standards include IFRS 6 *Exploration for and Evaluation of Mineral Resources*. The IASB also has a research project underway that is considering the development of comprehensive requirements to address financial reporting issues associated with exploring for, finding, developing and extracting minerals, oil, and natural gas. When finalised, these requirements will supersede IFRS 6. However this is not expected to occur until 2014 or thereabouts.

There are variations in content and detail between these, for example the table below compares some aspects of the recently amended US and Canadian oil and gas securities disclosure regulations:

	Reserves			Contingent	Prospective
	Proved	Probable	Possible	Resources	Resources
US SEC	*Applies only to filings; other disclosure not covered*				
Constant Price Case	Mandatory	Allowed		Not allowed	
Price Sensitivity Cases	Allowed				
Canada NI 51-101	*Applies to all disclosure, not just filings*				
Constant Price Case	Allowed				
Forecast Price Case	Mandatory		Allowed		

Because of this variation, User Manuals should cover two aspects:

- Standard assessments in which assessment and classification conditions are rigorously specified so that the results can be compared under standard conditions.
- Tailored assessments in which the conditions are modified to meet the requirements of various users (e.g., although fundamentally similar, as indicated above, US and Canadian oil and gas reporting systems have specific differences that are built into legislation. At this time, we do not know the conditions for the future IFRS for Extractive Industries).

Tailored assessments are required because various users have different requirements.

A third factor should be a basic requirement:

- Quality Control (auditing). A limitation of many reporting systems is that there is little or no ability for quality control. Any user manual should be designed in such a manner that the result of an evaluation can be audited. Without this ability, there is no way of determining that reported information meets technical standards and is unbiased. It is the author's opinion that any system that fails to provide information that can be audited is deficient.

4. SCOPE OF THE WORKING GROUPS

Each of the working groups is discussed briefly, with more detail on Financial Reporting.

A. Business Process Needs

- Business Processes Needs. The information needed by an operating entity and its partners in order to make decisions on the execution of its operations.

This is the most basic working group, since without it, there would be no production. It addresses the internal information that the operating entity needs in order to carry out its operations, and consists primarily of the information needed to make investment and operational decisions, such as forecast volumes, economic measures, resource requirements, etc. These decisions will often be taken on the background of the aggregated commitments that each partner of the operating entity holds, thus creating a need for a common terminology in the various (international) partnerships. An operating entity or a partner may also be required to provide information that it may not need itself, or in a specified format, to the other users. The ones discussed below are essential.

B. Financial Reporting Needs

- Financial Reporting Needs. The information on resources that is reported to outside parties by an operating entity.

Three types of this information are addressed here:

- The information prescribed by regulatory agencies for regulatory reporting. Examples include:
  - Canadian National Instrument 51-101, *Standards of Disclosure for Oil and Gas Activities*
  - Canadian National Instrument NI 43-101, *Standards of Disclosure for Minerals Projects*
  - US SEC regulatory disclosure requirements for oil and gas have recently been revised, and have many similarities with the Canadian system and PRMS. Other countries with particularly large and active capital markets and related regulatory regimes for oil and gas and minerals disclosure are Australia and the UK.

- Information prescribed by accounting standards varies between countries. Over 100 countries use International Financial Reporting Standards, which are issued by the IASB. Canada and the USA use their own accounting standards but Canada is committed to adopt IFRS in 2011 and the USA is considering whether to do so in the next few years (Refer to SEC Proposed Rule *Roadmap for the potential use of Financial Reporting Standards by US Issuers).* This is further discussed in Section 5B, below.

- Other information released to investment analysts or to the general public. Many of the users of financial reporting information prefer to receive much of it in "raw" form, so that they can carry out their own analyses. These analyses may be tailored to the user. A bank operating in the debt market will, for instance have a different risk tolerance from a brokerage operating in the equity market, and an analysis may be tailored accordingly. (However, see the comments on selective disclosure below.)

The UNFC needs to be able to accommodate the financial reporting needs of different types of users. There should be a dialogue between the providers of the information and the users, to ensure that the reported information is meaningful.

Financial reporting is discussed further in Section 5 of this note.

C. Government Resource Management Needs

- Government Resource Management Needs. The information required by governments and other organisations that administer and study resource management, and supply.

a. Resource Management

- Resource Management. This is the administration of the development of resources, and includes such things as issuing licences, approval of the drilling of wells or mining activities, collecting information on production volumes, etc.

The management of a country's resource assets requires information on the assets as the basis for administrative policies such as lease sales, production sharing contracts, tax and royalty policies, policies and decisions on national infrastructure and services and for supply studies that attempt to ensure the provision of energy and minerals for a country's industries.

Examination of the requirements of organisations such as the Alberta Energy Resources Conservation Board (including day to day administration), Alberta Energy (resource development policies, taxes, royalties, etc.), the Canadian federal National Energy Board (national energy supply and policies), and their equivalents in other countries provides an example of these information needs.

b. International Energy Studies

- International Energy Studies (although this is the title of this working group, studies may be national or international). Studies of actual and potential supply over short to long time periods.

The information needs for Energy Studies (which may not only be of an international nature) overlap and are similar to those of such bodies as the Canadian federal National Energy Board and their equivalents in other countries. These studies are also carried out by inter-governmental organisations such as OPEC and the International Energy Agency and by non-governmental organisations.

5. FINANCIAL REPORTING NEEDS

A. Introduction

In Section 4 of this note, Financial Information Needs were described as "the information on resources that is reported to outside parties by an estimating entity", and three areas were identified:

- The information prescribed by regulatory agencies for regulatory reporting
- Information prescribed by accounting standards.
- Other information disclosed to private organisations (e.g., investment analysts, banks, government departments) or to the public.

The first two would apply, perhaps with some changes in wording to adopt it to a more limited audience, not just to public companies, but to any Estimating Entity, such as an NOC.

A distinction should be made between:

- Reporting on resources
- Accounting systems

Although it may not be their primary role, resource reporting systems should include the relevant information required for accounting. Conversely, any information provided to, and used for accounting, should be consistent with the fundamental principles that govern the estimation of resources.

"Other information", that may be disclosed to private organisations (e.g., investment analysts, banks, government departments) or to the public, will vary in type and amount. Disclosure to private organisations will generally be on a voluntary basis or by agreement between the parties involved. However, in many situations, such as for public companies, this is subject to certain limitations:

- Selective disclosure. Securities regulation in Canada and many other countries has a prohibition against selective disclosure, that is, disclosure to a limited selection of people, with significant penalties for breaching this requirement.

- Misleading disclosure and secondary market liability. Disclosure should not be misleading. Many Securities Acts (including Alberta and Ontario) contain secondary market[3] liability provisions enabling investors to seek a right of action for damages if the issuer releases a written or oral public statement that contains misrepresentations. This liability may extend to experts, such as evaluators, who have provided the information.

[3] The primary market is the initial offering of share on an Initial Prospectus Offering (IPO). Most trading takes place in the subsequent secondary market.

B. Information Required for Accounting

As noted above, the major capital markets for oil and gas use three different financial reporting regimes:

- International Financial Reporting Standards (IFRS), used by more than 100 countries. This includes IFRS 6 *Exploration for and Evaluation of Mineral Resources*, which does not cover the period before legal rights to produce have been obtained or the period after technical and commercial feasibility have been demonstrated, and there is no comprehensive IFRS for the extractive industries. An Extractive Activities research project is under development and a discussion paper is expected early in 2009, with issuance of an IFRS in 2014 (estimated). Since the research project scope includes "in particular, whether and how to define, recognise, and disclose reserves and resources", it appears that it is not limited to purely accounting issues.

- Canadian Generally Accepted Accounting Practice (GAAP).

- US GAAP.

Canada will convert to the IFRS in 2011, and the USA is likely to do so within the next few years. Some of the elements of the Extractive Activities research project that are relevant to resource evaluation and classification are listed below. The list is not exhaustive and there will, no doubt be considerable discussion.

Ownership. Classification should reflect the right to the future economic benefits realized from the oil and gas assets. In some cases, this extends beyond the traditional concept of who has mere ownership in title (e.g., Production Sharing Agreements).

A high "ownership" standard is required in order for a volume to be classified as a "Proved reserve". New ownership structures, such as Production Sharing Agreements, make this more than a simple issue:

- The right to produce may be subject to a time limit, with an extension at the discretion of the host government. A decision has to be made on the likelihood of a renewed agreement, subsequent to which, reserves or other type of asset may or may not be recognised.

- An operator may have a Service Agreement, under which it carries out all aspects of oil and gas activities in an area and is rewarded on a dollars-per-barrel basis but has no ownership of the product. Although the value of the operator is a function of the reserves, because of the lack of ownership, reserves would not generally be assigned by an evaluator.

Other issues from an accounting standpoint may be the use of an appropriate accounting standard when a company has an interest in another entity. Consideration needs to be given to the disclosure of resource volumes attributable to:

- Wholly and partly owned subsidiaries that are included in the entity's consolidated financial report;
- Resources attributable to interests in joint venture arrangements; and,
- Resources attributable to entities which are accounted for by the equity method

Accounting methods[4]. There are two common approaches (quoted from AICPA Oil and Gas Guide):

- "Full Cost accounting generally provides for capitalizing (within a cost centre) all costs incurred in exploring for, acquiring, and developing oil and gas reserves – regardless of whether or not the results of specific costs are successful, Thus, even the costs of abandoned leaseholds and unsuccessful drilling efforts are capitalized. This method is based on the premise that the costs of unsuccessful exploration efforts are necessary for the discovery of reserves even though such expenditures are made with the knowledge that specific efforts may not actually locate any oil and gas reserves."

- Successful Efforts accounting. "Acquisition costs are capitalized. Exploration costs such as geological and geophysical costs and costs of unsuccessful exploratory wells (dry holes), as well as delay rentals, are expensed. The cost of drilling development wells, including unsuccessful development wells should be capitalised."

"Under the full cost method, all of these costs are capitalized and are charged to expense through depletion as the oil and gas cost centre is produced. Thus, successful efforts entities tend to have lower earnings and equity in their early stages and relatively lower charges due to depreciation, depletion, and amortization (DD&A) in later periods."

Successful Efforts accounting is common under IFRS. Full cost accounting and successful efforts accounting is allowed under US and Canadian GAAP

Price. Accounting practices may use information on volumes and associated values that have been determined under specified conditions, in particular, price. There are two general approaches:

- Constant Price. Evaluations are carried out using a specified constant price. US SEC requirements currently call for this to be the price on the last day of a financial year. This has proved to be problematic; at the end of 2004, the price of bitumen collapsed for a few days over the end of the year, resulting in many companies writing off all their reserves even though they continued to produce. The SEC requirement has been revised recently to be an average of the price on the first day of the month for the previous year. The revision also allows the use of price sensitivity cases, which may include a forecast price.

[4] These brief explanations are from the AICPA Task Force Entities with Producing Activities Industry Gas Guide. Consult an accountant for full information.

- Forecast Price. Canadian securities disclosure and also PRMS, is based on a forecast price (subject to certain limitations) with optional disclosure using a constant price.

Impairment Tests. In Canada, this is the application of a "ceiling test" for issuers applying a Full Cost basis of accounting (Accounting Guideline 16) and a similar cost recovery test for issuers applying a Successful Efforts basis of accounting.

Generally, an impairment write down is triggered when carrying values are in excess of estimated future undiscounted cash flows of proved reserves for the affected properties. The actual amount of the impairment write down is calculated to be the difference between carrying value and fair value. In Canada, Fair values are determined using net present value of future cash flows arising from Proved + Probable reserves using forecast prices and a risk free interest rate (risk free interest rate is used because the cash flows derived from the reserves information have already been risked). In the US, an impairment test is carried out based on an evaluation at a constant price that is currently the spot price on the last day of a financial year. This has proved to be problematic and in 2004, a fall in the price of bitumen for a few days over the end of the year led to major write downs of bitumen reserves even though production and investment continued.

A separate impairment assessment may be done for unproved properties (for which there are no attributable reserves). The resulting impairment write down is based on the difference between fair value of the unproved properties (usually based on recent land prices) and its carrying value.

Depletion and Depreciation. Depreciation and depletion for assets associated with producing properties begin at the time when production commences on a regular basis. Depreciation for other assets (e.g., refineries) begins when the asset is in place and ready for its intended use.

Acquisition costs of proved properties net of salvage values and estimated costs to develop proved undeveloped reserves are subject to depletion using a unit-of-production method, computed on the basis of total proved oil and gas reserves and an energy conversion rate of 6:1 natural gas to oil (Barrels of Oil Equivalent, BOE)[5].

Depreciation of other plant and equipment is calculated using the straight-line method, based on the estimated service life of the asset.

Terminology. The importance of standard terminology cannot be overemphasized; without it, confusion reigns.

Availability of Funding. There is no requirement to report availability of funding in Canadian financial statement disclosures. However, the preparation of financial

[5] Author's note. This ratio has varied considerably over time and any parameter based on a BOE should be treated with considerable caution.

statements in Canadian GAAP presumes that the entity will continue as a going concern (i.e., be able to realize its assets and discharge its liabilities and obligations). Management disclosure and analysis (MD&A) disclosure is mandated by Canadian securities law which requires that the issuer provide an analysis of its ability to generate sufficient funds to maintain current capacity and to fund planned growth and development activities. (NI 51-102 F1, item 1.6[6])

There are, no doubt, other issues to be considered at the interface between resource evaluation and classification, and accounting practice. At this time, because of the adoption of IASB standards in Canada and the likely adoption in the US over the next few years, it is particularly important that bodies such as the AHGE work with the IASB in the development of the Extractive Activities research project to ensure that there is an efficient and effective interface between them.

C. The Canadian Securities Regulatory Reporting System

a. Introduction

The extractive industries are particularly important in Canada and about half of the world's public oil and gas companies, and over half of the world's public mining companies are listed on the Canadian exchanges, more than in any other country. Because of the importance of these to the Canadian economy, specific disclosure legislation has been developed.

Resource development is the responsibility of the Canadian provinces and territories, rather than of the federal government. Canada does not have a federal securities commission, but there is a coordinating body, the Canadian Securities Administrators (CSA) to which the provincial and territorial commissions belong, that has led to a high degree of coordination of securities legislation across the country. As implied by the name "National Instrument", the oil and gas, and the mining, regulations are national and apply across the country. The lead on oil and gas has been taken by the Alberta Securities Commission, and on mining, by British Columbia and Ontario.

Oil and gas and minerals reporting under securities legislation is part of a broader regime of securities regulation. Some basic principles underlie all such reporting:

"**Full, true, and plain**" disclosure, is the basic principle for prospectus offerings. There is no equivalent standard in the continuous disclosure regime, for instance, not all disclosure (e.g., news releases) must meet the "full" requirement although the "true" requirement is necessary. In the continuous disclosure regime, securities law requires that issuers ensure the timely reporting of all material facts to avoid selective disclosure. Issuers must also ensure that their disclosure does not contain a misrepresentation, to avoid secondary market liability.

[6] Canadian National Instrument 51-102 is legislation that governs all ongoing securities disclosure not only the extractive industries.

Materiality. A fundamental aspect of Canadian securities reporting and of Canadian financial reporting is the concept of materiality. There are legal complexities and subtleties to this concept, but the fundamental idea is that reporting is required only on those issues that are considered material to the activity of a company, the measure of "material information" being information that would affect the decision of a reasonable investor to buy, sell, or hold, a security. This is not always easy to establish, but trading by insiders on undisclosed material information constitutes insider trading, for which there are significant penalties. The general concept of materiality is relevant to all extractive industry reporting.

Continuous Disclosure. The specific disclosure requirements on the oil and gas, and mining industries are part of an overall disclosure regime that includes things such as financial statements, management discussion and analysis, etc., the parts of which are covered by other legislation.

b. Canadian National Instrument 51-101, Standards of Disclosure for Oil and Gas Activities

In 1998, the Alberta Securities Commission commissioned an Oil and Gas Reporting Task Force, consisting of 27 representatives from companies, industry and professional associations, and the technical (engineering and geology), financial, and legal communities. The Task Force presented a report in 2001 that was circulated for comment followed by public hearings and consultations with other Canadian Provincial Securities Commissions. The final legislation was implemented, as National Instrument 51-101, *Standards of Disclosure for Oil and Gas Activities*, for reports issued on and following 31 December 2003. The legislation is accompanied by a Companion Policy, which provides guidance on the interpretation of the legislation.

Based on experience and developments in the industry, amendments to both the legislation and the Companion Policy were made, and took effect on 31 December 2006. Continued evolution of industry activity has occurred, especially on unconventional resources, and further changes are being considered.

The full text of NI 51-101 and associated documents, including the Companion Policy, can be found on the Alberta Securities Commission website (www.albertasecurities.com under "For Companies/Oil and Gas"). The main features are summarised below and the annual filing requirements are summarised in Appendix A. General feature are:

- It applies to all reporting issuers[7] carrying out oil and gas activities in Canada. The definition of oil and gas activities is broad, and includes land acquisition, exploration, production, and associated activities.

[7] A simple explanation of a reporting issuer is one that sells or trades securities in a Canadian jurisdiction. A company becomes a reporting issuer in a number of ways, including the issue of a prospectus, through acquisition, or being deemed a reporting issuer by a securities commission.

- It applies to conventional and unconventional oil and gas, including in-situ and mined bitumen recovery, synthetic crude from bitumen upgrading, shale gas and oil. It would also apply to methane hydrates should there be any such activity

- It refers to the Canadian Oil and Gas Evaluation Handbook (COGEH) for the resource classification system. The terminology is the same as PRMS and the evaluation standards are very similar, the major difference probably being that COGEH prescribes an explicit probabilistic target[8] for reported reserves whatever the method of estimation whereas PRMS describes the targets for probabilistic and deterministic evaluations differently.

- It refers to the Canadian Oil and Gas Evaluation Handbook (COGEH) for standards of evaluation practice. The COGEH was written by volunteers from industry professional associations as a practice standard that was subsequently adopted in NI 51-101. It continues to evolve and be updated.

- Product type. Specific product types are identified for reporting: light & medium oil, heavy oil, natural gas excluding gas liquids, natural gas liquids, synthetic oil, bitumen, coal bed methane, hydrates, shale oil, and shale gas. This is not the same as the recently amended SEC rules which, for instance, combines light, medium, and heavy oil into one category.

- Geographic split. There are specific requirements for reporting resources by geographic area, usually by country.

- Point of Sale. Reporting refers to the product type that is sold at the "point of sale", that is at the point of custody transfer. Production from a well or field constitutes a "production group" that may be separated into different product type (e.g., oil, natural gas, natural gas liquids). To put it in simple terms, "production group" is what is produced; "product type" is what is sold, and there are reporting requirements for both production groups and product types. There are issues with the "point of sale" concept for companies that send their production to their own refineries that have not been fully resolved.

- It is part of a "continuous disclosure" regime in which a company is required to provide other information (e.g., financial updates, reports on material changes, etc.) on a regular basis over the year. It applies, therefore to any public disclosure, including annual filings, press releases, and presentations in a public arena. This is unlike the US securities oil and gas disclosure regime, which applies only to regulatory filings.

- Availability of Funding. Current Canadian evaluation practice requires that an evaluation be carried out without regard to the availability of funding, but that there must be some discussion of the availability of funding. This differs from

[8] Proved reserves, P90; Proved + Probable, P50; Proved + Probable + Possible, P10.

US SEC requirements that reserves cannot be assigned unless the operating entity has funds available. The recently issued US oil and gas disclosure rule requires that there be a "reasonable expectation" that funding will be available.

- There are basic mandatory reporting requirements of reserves data (defined as proved and probable reserves), but it allows "full spectrum disclosure" of all other classes of resources. This covers the full range of oil and gas activity, from exploration (prospective resources) through to production.

- Analogous information is defined as information outside the area of interest for a reporting issuer that is used to draw a comparison with the reporting issuer's properties. Disclosure of analogous information is permitted but must be accompanied by a disclosure of its source and relevance.

- An evaluation is not considered to provide a "fair value". It reports on a limited part of a company's activities and on a "blow down" basis. That is, it assumes depletion of currently held assets and ignores reinvestment.

- The results of evaluations of reserves data (defined as proved and probable reserves) must be reported in annual filings based on the result of independent evaluation or audit (see Forms F2 and F3 in Appendix A). A small number of large companies have exemptions that allow the use of internal evaluators or auditors but only one of these is known to rely wholly on internal staff.

- Although the annual filing of prescribed information is required, as part of a continuous disclosure regime, a reporting issuer must disclose any material changes[9] or facts in its business outside the annual filing date.

- Specific responsibility is assigned to directors and officers of the reporting issuer by the requirement to certify filings (see Form NI 51-101 F3 in Appendix A).

- Although not mandatory, the establishment of reserves committees is encouraged. Most companies appear to have established such committees with a significant positive effect on the quality of reserves estimates.

c. Canadian National Instrument 43-101, Standards of Disclosure for Minerals Projects

Canadian National Instrument 43-101 has many similarities with NI 51-101, including a requirement that evaluations must usually be prepared by an independent Qualified Person. There are a number of differences that reflect differences between the oil and gas and mining industries, including:

[9] The definitions of "material changes" (required by NI 51-101) and "material facts" (required by general securities law but not by NI 51-101) is an esoteric area of securities law. Suffice it to say, trading on material changes or facts that have not been disclosed constitutes insider trading, with significant penalties.

- There is no requirement for an annual evaluation to be carried out and reported on (although there are general annual filing requirements other than under NI 43-101). Instead, the requirement for a "technical report" is triggered by certain events, such as the issued of a prospectus, some news releases, or a material change.

- It applies to all issuers, not only to reporting issuers.

- Although some disclosure on exploration activity is permitted, the result of an economic evaluation of Inferred mineral resources may not be disclosed.

- The information that is disclosed on a specific mineral resource is considerably more detailed than is required for an oil and gas resource. This is probably because the number of reported individual mineral resources is usually small compared to the number of oil and individual oil and gas resources, which may be in the thousands.

- The reporting code or classification system is that of the Canadian Institute of Mining, Metallurgy and Petroleum (CIMM), the CIM *Definition Standards on Mineral Resource and Mineral Reserves*. Under certain circumstances, reporting may be carried out according to other defined codes.

- An evaluator is required to carry out a personal inspection as part of the preparation of a technical report. This is not a requirement, and is rarely carried out for an oil and gas evaluation.

NI 43-101 was implemented in 2001 with one set of minor revisions. Consideration is being given as to whether to initiate a review that may lead to further revisions.

REFERENCES

AICPA Task Force Entities with Producing Activities Industry Gas Guide.
Chapter 3, Full Cost Method of Accounting for Oil and Gas Activities.
Chapter 4, Successful Efforts Method and General Accounting for Oil and Gas Activities.
American Institute of Public Accountants. Revised 2008.

Alberta Securities Commission. The following documents can be found on the website, www.albertasecurities.com

Canadian National Instrument 51-101, *Standards of Disclosure for Oil and Gas Activities* and supplementary material such as the Companion Policy and the forms required for annual filings.

Canadian National Instrument NI 43-101, *Standards of Disclosure for Minerals Projects*

Canadian National Energy Board. http://www.neb.gc.ca/

Energy Resources Conservation Board of Alberta. http://www.ercb.ca

Pincock Perspectives Issue 70, Sept. 2005, Minimum Engineering Study Requirements.
http://www.pincock.com/perspectives/Issue70-Enginee%C9equirements.pdf
Text and accompanying table that describe the contents of a conceptual (scoping) study, a pre-feasibility study, and feasibility study.

The Canadian Oil and Gas Evaluation Handbook (COGEH), Volumes 1, 2, 3.
www.petsoc.org

US Securities Exchange Commission
The recently updated oil and gas disclosure rule at:
http://www.sec.gov/rules/final/2008/33-8995.pdf

Roadmap for the Potential Use of Financial Statements Prepared in Accordance with International Financial Reporting Standards by U.S. Issuers at:

APPENDIX A: CANADIAN NATIONAL INSTRUMENT 51-101, STANDARDS OF DISCLOSURE FOR OIL AND GAS ACTIVITIES: ANNUAL FILING REQUIREMENTS

A reporting issuer must file three forms on its reserves and other oil and gas activities annually, with an effective date on the last day of its financial year. They must be filed within three or four months of the financial year end depending on whether the company is on a senior or junior stock exchange.

FORM F1. STATEMENT OF *RESERVES DATA* AND OTHER INFORMATION
This form contains a substantial amount of detailed information on the activities of the reporting issuer. Major features of the reporting requirements are:

Evaluation Date. The information is a statement of the situation on the last day of the reporting issuer's financial year, usually 31 December. Subsequent information may not be incorporated in the annual filings, although there is a process for disclosure of the effect of subsequent material changes.

Reserves Data is defined as Proved and Probable reserves, and must target[10] a probabilistic criterion, whatever method is used:

Reported Proved reserves should satisfy a P90 criterion
Reported Proved + Probable reserves should satisfy a P50 criterion

- Mandatory disclosure of "Reserves Data" based on an economic evaluation using forecast prices and costs by an independent evaluator.

- Voluntary, supplementary, disclosure of reserves data, based on an evaluation at a Constant price. This is intended to provide comparability to US SEC disclosure requirements and should be done using the conditions prescribed by the US Securities Exchange Commission[11].

Other Resource Classes. Voluntary disclosure of other resource classes (Discovered and Undiscovered Petroleum Initially-In-Place, Contingent Resources, Prospective Resources) is permitted, but must be done in a prescribed manner. This type of disclosure has increased significantly since NI 51-101 was first implemented, especially on unconventional resources, which form an increasingly large portion of many company's assets, often with a long life span. Although often done by an independent evaluator or auditor, this is not a requirement. Issues arising from this disclosure led to the amendments that took effect at the end of 2006, and other guidance is under consideration.

[10] In assessing the results of evaluations, it is recognised that this is an estimation process. Measurement error is intrinsic and the major concern is bias.
[11] Currently a reference spot price, such as WTI, at the financial year end with transport and quality adjustments. From 31 Dec, 2009, the constant price will be an average for the previous year.

Disclosure of Prices. Disclosure of both the forecast and constant prices used for evaluations is required. The price forecast must be that of the independent evaluator and there are conditions governing the price forecast that can be used.

The constant price case in Canadian disclosure is intended to mirror US SEC constant price conditions to allow a comparison to the US market. This became voluntary in the amendments made at the end of 2006, but hardly any Canadian reporting issuers availed themselves of this option.

Reconciliation of Changes in Reserves. A reconciliation of changes in reserves data is required, essentially equivalent to a financial balance sheet between the start and the end of the year. An important part of this reconciliation is the category of Technical Revisions, that is, changes in properties owned at the start and the end of a year due to new technical information, such as production performance. Analysis of this information provides a measure of the quality of evaluations (statistical complexities of this that are not discussed here), with the following criteria:

- Proved reserves Technical Revisions should be positive, since this is a low estimate. For a series of estimates, the probability of a negative revision approaches zero as the number of estimates increases.
- Proved + Probable reserve Technical Revisions should be close to zero, since this is an estimate of what will actually be produced. For a series of estimates, the probability of a negative revision approaches zero as the number of estimates increases.

Undeveloped Reserves. Historically, a significant factor in reserves revisions is the booking of Undeveloped reserves that sit on the books of a reporting issuer for many years, and are eventually written off without any attempt being made to develop them.

Disclosure is required in the F1 Form, when an undeveloped reserve is first booked so that an investor can track how long it remains undeveloped, for three years, and a discussion of development plans is also required.

Significant Factors or Uncertainties. Disclosure is required on any significant factors or uncertainties associated with the exploitation of a reporting issuer's oil and gas assets.

Future Development Costs. Must be disclosed.

Other Oil and Gas Information (Part 6 of the form) requires some limited reporting on a number of issues.

- Oil and Gas Properties and Wells: general information on their location and status. Numbers of gross and net wells
- Properties With No Attributed Reserves
- Forward Contracts
- Additional Information Concerning Abandonment and Reclamation Costs

- Tax Horizon. Many companies have tax pools that make them non-taxable until such time as the tax pools are depleted.
- Costs Incurred. Acquisition, exploration, and development costs
- Exploration and Development Activities, of particular importance for companies that have little or no production.
- Production Estimates for the next year
- Production History for the previous year

FORM F2. REPORT OF INDEPENDENT QUALIFIED RESERVES EVALUATOR OR AUDITOR

This form requires an independent qualified reserves evaluator or auditor to provide an opinion on the reserves data. At least 75% of the assets (10% NPV of Proved + Probable reserves) must have been evaluated or audited and the balance must have been reviewed.

FORM F3. REPORT OF MANAGEMENT AND DIRECTORS

This important form requires two officers and two directors of the company to certify – that is, accept responsibility - that they have:

- Reviewed the evaluation procedures
- Met with the independent qualified reserves evaluator or auditor to discuss the procedures and resolve any issues
- Reviewed the reserves data

APPENDIX B: TERMINOLOGY

A "tyranny of language" bedevils the whole world of oil and gas resource evaluation and classification, for example, the phrase "Proved reserves" means different things to different people (P90, P60, …., ?). The UNFC has wisely avoided the straitjacket of language by adopting a numerical system that is applicable without any linguistic system, but this is not in common use.

Many of the words used in connection with mineral evaluation and classification have several meanings in English. For the purposes of this note, the usages described below have been followed (based on the Oxford English Dictionary, Wikipedia, Wiktionary, The Oxford Companion to the English Language, Fowler's Modern English Usage, and the Merriam Webster Dictionary). Hopefully, the ideas given here can be translated into other languages without too much difficulty.

Definition
The precise meaning or nature of something.

For UNFC and similar systems, there is little uncertainty about what is meant by "definition". However, it is worth noting that the more precise a definition is, the more useful it is. A clear example in the world of oil and gas reserves definitions is the obscurity of the meaning a qualitative phrase such as "reasonable certainty"[12] in a definition of proved reserves, compared to the clarity of a P90[13] criterion.

Guideline
A document that aims to streamline particular processes according to a set routine. By definition, following a guideline is never mandatory (protocol would be a better term for a mandatory procedure).

Specification
An explicit set of requirements. E.g., the requirement to carry out an evaluation using a specific price, or using specific technical cutoffs.

Rule
A prescriptive procedure to be followed for a specific purpose.

For the purposes of this note, although the terms "specification" and "rule" are similar, the latter is explicitly prescriptive with no latitude allowed in its application. For example, the "rule" that no hydrocarbon reserves can be assigned below the lowest point of penetration of a reservoir.

12 A survey at the AAPG/SPE Multidisciplinary Reserves Conference, held in Washington in June 2007, with responses from 81 presumably experts in the field showed that, on average, "reasonable certainty" was considered to be 74%, but with an interquartile range of 30%. That is 50% of responses fell between about 60% and 100%, the remainder outside that range.

13 I.e, there is a 90% probability that actual recovery will be greater than a particular volume.

Principle
A general guide to action, not prescriptive. For example, the principle that based on reliable supporting information such as pressure data, hydrocarbon reserves may be assigned below the lowest point of penetration of a reservoir.

Rule and Principle Based Systems
It is not uncommon for a set of definitions, specifications, and guidelines, to be described as "rule based", or "principle based". However, although there may be more emphasis on one or the other, any workable system on a complex issue must strike a balance between the two extremes

For example, prior to its recent revision, US SEC regulatory reporting system for oil and gas was often described as "rule based", whilst the Canadian system and PRMS are described as "principles based". Likewise the IASB accounting system is described as "principle based" and Canadian and US GAAP as "rule based". This is an oversimplification; any such system is a mixture of rules and principles, and the difference lies in the balance between them. The most useful system is one that is based on a judicious balance that uses rules when necessary, and principles to provide flexibility of application.

In general, rules are simpler to apply but rigid, often unable to accommodate the vagaries of nature, and may be a hindrance to improvement. Principles, stating what is to be achieved, and not how, are less of a hindrance to the introduction of improved practices, but are more difficult to apply and able to accommodate a wider scope of scenarios and unanticipated matters, but subject to interpretation and often, to bias.