1.1.3 CSA Staff Notice 51-327 (Revised) – Guidance on Oil and Gas Disclosure (First published February 27, 2009, revised December 30, 2010 and December 29, 2011)

REVISED CSA STAFF NOTICE 51-327
GUIDANCE ON OIL AND GAS DISCLOSURE
First published February 27, 2009, revised December 30, 2010 and December 29, 2011

December 29, 2011

1. Introduction

This revised Canadian Securities Administrators (**CSA**) Staff Notice (**Notice**) provides guidance on compliance with aspects of National Instrument 51-101 *Standards of Disclosure for Oil and Gas Activities* (**NI 51-101**).

NI 51-101 applies to reporting issuers that are directly or indirectly engaged in oil and gas activities (**Oil and Gas Issuers**). Central to the NI 51-101 disclosure regime is mandatory disclosure of prescribed reserves data, which includes estimates of proved reserves and probable reserves and related future net revenue. NI 51-101 also establishes standards for certain non-mandatory disclosure that Oil and Gas Issuers may choose to make regarding oil and gas activities.[1]

When first issued on 27 February 2009 under the title *Oil and Gas Disclosure: Resources Other Than Reserves Data*, this Notice was designed to address observations by CSA staff of issues arising as a result of an increase in non-mandatory disclosure of possible reserves and other resource classes, especially for unconventional resources. This Notice was revised as of 30 December 2010 to address additional issues relating to oil and gas disclosure and to remove guidance on certain issues that we addressed by amendments to NI 51-101.[2] This Notice is now further updated (the **2011 Revisions**) to discuss observations by CSA Staff in reviewing disclosure in light of recent amendments to NI 51-101 and to re-emphasize or expand guidance on some issues discussed in previous versions of this Notice.

As indicated by the new title, the 2011 Revisions broaden the scope of this Notice. The 2011 Revisions include the following:

- new guidance on the general responsibilities of Oil and Gas Issuers and the experts on whom they rely in formulating disclosure of oil and gas information
- new guidance on the following disclosure topics:
  - disclosure of after-tax net present value of future net revenue
  - use of BOEs
  - disclosure of well-flow test results
- expanded guidance on the following disclosure topics:
  - evaluation, classification and disclosure of unconventional hydrocarbons, including revised guidance on disclosure of contingent resources
  - classification to the most specific class and category of resource
- guidance carried forward from the original version of this Notice with little or no change on the following disclosure topics:
  - stand-alone possible reserves
  - aggregation of resource estimates for several properties

[1] See NI 51-101, section 5.9.

[2] See CSA Notice of Amendments to National Instrument 51-101 *Standards of Disclosure for Oil and Gas Activities* and related and consequential amendments, published 15 October 2010.

- use of the term “best estimate”
- prospective resources

Context and Cautions

- *Suggested Wording* – We recommend, at various points in this Notice, that non-mandatory disclosure be accompanied by cautionary statements, and we suggest wording that may be helpful. We recommend cautionary statements based on our view that disclosure of resources other than proved and probable reserves may mislead if the disclosure lacks context; we intend the cautionary statements to provide appropriate context. Adequate disclosure will provide explanation and, where appropriate, cautionary information. An Oil and Gas Issuer may use cautionary wording other than what we recommend by this Notice where necessary to provide complete and accurate disclosure.

- *General Guidance with Examples* – We have chosen specific disclosure topics for discussion in this Notice as examples of how general principles apply to specific situations, the topics chosen reflecting recurring concerns arising from observations of CSA Staff in reviewing disclosure. This Notice is not a checklist – we intend that Oil and Gas Issuers, and their evaluators and auditors, will use this Notice to guide them in preparing oil and gas disclosure. The themes illustrated in that discussion – of professional responsibility and careful choices in formulating disclosure – apply also to other topics not mentioned here.

Notes on Terminology

- *Terminology References* – Clarity and consistency in the use of terminology is essential to good disclosure by Oil and Gas Issuers. Important terminological sources include:
  - COGE Handbook – refer to section 5 of Volume 1[3] of the Canadian Oil and Gas Evaluation Handbook (the **COGE Handbook**), titled “*Definitions of Resources and Reserves*”, notably Figure 5-1; and
  - CSA Staff Notice 51-324 *Glossary to NI 51-101 Standards of Disclosure for Oil and Gas Activities* (the **CSA Glossary**).
- *Specific Terms* – Classification and categorization of resources is an important aspect of disclosure under NI 51-101. Although there is now broad alignment between the COGE Handbook and the Society for Petroleum Engineers – Petroleum Resource Management System (**SPE-PRMS**), some differences remain.[4] For clarity, this Notice adopts terminology as follows:
  - “Class” – we refer to “class” in the same manner as used by the SPE- PRMS to describe the chance of commerciality (reserves, contingent resources, etc.).
  - “Category” – we refer to “category” in the same manner as used by the SPE-PRMS to describe the range of uncertainty within a class. (Thus, for example, within the class of "reserves" are the categories of "proved", "probable" and "possible", and for other classes the estimation categories of "low case", "best case" and "high case".)
  - “Resources” – in colloquial usage, the term “resources” may or may not include reserves volumes. We refer to “resources”, consistent with the CSA Glossary, as a general term that may refer to all or a portion of total resources, with “total resources” as equivalent to “total petroleum initially-in-place” as defined in the COGE Handbook.
  - “Reserves data” – we refer to “reserves data” as defined in NI 51-101 as an estimate of proved reserves and probable reserves and related future net revenue. The phrase “resources other than proved or probable reserves” refers to all other classes of resources as classified in the COGE Handbook, including possible reserves.

[3] Available on the Alberta Securities Commission website at: http://www.albertasecurities.com/securitiesLaw/Regulatory%20Instruments/5/2232/COGEHs.5DefinitionsofOilandGasResourcesandReserves.pdf

[4] See section 5.1.1 of Volume 1 of the COGE Handbook.

2. Responsibility for Disclosure of Oil and Gas Information

All who are involved in Oil and Gas Issuers' disclosure – the issuers themselves, their management and directors, and those individuals or firms who provide professional services to them – should be mindful of both (i) the fundamental objectives of Canadian securities legislation, and (ii) the various sources of requirements, restrictions and standards that may apply to formulating disclosure. To protect investors and foster fair and efficient capital markets, Canadian securities legislation is designed to provide the investing public with timely, useful and reliable information from reporting issuers. Those involved in providing such information should give thought to those key objectives. Such individuals must also take note of applicable rules and requirements of relevant professional associations and applicable requirements and restrictions of Canadian securities legislation, which include but are not entirely limited to NI 51-101, which mandates compliance with the COGE Handbook.

(a) Oil and Gas Issuers – General Standards and Responsibilities

Disclosure relating to oil and gas activities of an Oil and Gas Issuer is subject to the specific requirements and restrictions of NI 51-101, but disclosure requirements are not limited to NI 51-101. Oil and Gas Issuers must make their disclosure within the larger context of Canadian securities legislation and appropriate use of instructional guides in developing and reporting disclosure.

(i) Canadian Securities Legislation, Generally

Disclosure relating to oil and gas activities is subject not only to the specific requirements and restrictions of NI 51-101 but also to applicable requirements and prohibitions of other elements of Canadian securities legislation. Not every topic of disclosure is discussed specifically in NI 51-101 or elsewhere in Canadian securities legislation. Oil and Gas Issuers must also give attention to the broader purposes, principles and prohibitions of Canadian securities legislation. Following are discussions of a few examples.

A. Misrepresentations or Misleading Statements

Among the broad prohibitions of Canadian securities legislation is the ban on misrepresentations – that is (broadly speaking), false, untrue or misleading statements (or omissions from statements) of facts that are material in the sense of being reasonably likely to significantly affect the market price or value of a security. Such materially misleading disclosure is improper and illegal. All responsible for an Oil and Gas Issuer's disclosure should, therefore, give close attention to its quality, ensuring that it does not – expressly, or by omission – mislead. In assessing the quality and sufficiency of disclosure or proposed disclosure, they should bear in mind not only specific disclosure requirements (if applicable) but also, more broadly, the key purposes of Canadian securities legislation, mentioned above.

The following are examples of disclosure that, in the view of CSA staff, could be materially misleading or untrue:

- disclosure of a contingent resource for which there is no flow test or good analog;
- the results of an evaluation for a reservoir based on a production process that has never been used in that type of reservoir;
- inappropriate analog – that is, use of information that is not truly analogous to the reported reserves; and
- disclosure of unconventional resources using a project scenario that is not reasonable with regard to timing or cost and may result in misleading disclosure with respect to the value of a project.[5]

Similarly, the following are examples of disclosure that CSA staff consider could be materially misleading or untrue by reason of omissions – failures to state facts that may be required or necessary to be stated to avoid what is stated being misleading:

- disclosure of petroleum initially-in-place (**PIIP**) without clarifying whether it is discovered or undiscovered;

[5] Further, it may be misleading for an Oil and Gas Issuer to disclose the result of an evaluation for a project that the Oil and Gas Issuer may not be able, or does not intend, to carry out without disclosing this fact and providing a discussion of how the disclosed value of the project could be realized.

- disclosure of a contingent resource without providing information as to its economic viability;

- disclosure of a resource of any class or category without adequate disclosure of the associated significant economic factors or significant uncertainties that are specific to the Oil and Gas Issuer that may affect any associated project;

- disclosure of a contingent resource with only general or vague mention of the contingencies – for example, using wording commonly used by other Oil and Gas Issuers that may not fully or accurately describe the contingencies that apply in the particular circumstances; and

- disclosure of a short-term peak rate for a well test without providing additional disclosure on the test, including that the reported rate is a short-term peak rate.

B. Material Changes

As one example of a specific disclosure requirement arising outside NI 51-101, Canadian securities legislation requires prompt public disclosure of any "material change".[6] A reporting issuer satisfies this important disclosure obligation by issuing and filing a news release and filing a material change report; it is not satisfied merely by including information in an Oil and Gas Issuer's annual statement of reserves data filed under NI 51-101 or issuing a news release alone.

C. Requirements Applicable to Disclosure of Oil and Gas Activities

NI 51-101 imposes standards and restrictions that apply to disclosure of oil and gas activities, whether or not such disclosure is restricted to proved and probable reserves and related future net revenue. That is, an Oil and Gas Issuer must consider whether disclosure of oil and gas activities, in any form, and whether made voluntarily or in response to any specific provision of NI 51-101, adheres to applicable provisions of Part 5 of NI 51-101.

It is not possible to identify in advance for all issuers all potentially sound – or improper – disclosure. Oil and Gas Issuers and those involved in preparing, authorizing and disseminating their disclosure must assess their particular facts and circumstances and make judgements on such matters as materiality, taking into account express legal requirements and restrictions, as well as broader principles and prohibitions. That said, CSA staff believe that the observations and recommendations in this Notice will assist Oil and Gas Issuers and those involved in preparing, authorizing and disseminating their disclosure.

(ii) COGE Handbook and Other Guides

The COGE Handbook is a useful reference resource for preparing and issuing disclosure required by Canadian securities legislation. It is not, however, an exhaustive guide. Oil and Gas Issuers should bear in mind relevant general principles when formulating disclosure.

As an example, the COGE Handbook currently provides only limited guidance in respect of the evaluation of resources other than reserves, especially for unconventional resources. When using the COGE Handbook in the preparation and review of information for securities disclosure, Oil and Gas Issuers must interpret it in a manner that is consistent with all applicable Canadian securities legislation including, but not limited to, the principles and specific requirements and restrictions of NI 51-101.

(iii) Specific Description Rather than Commonly-used Wording

To avoid misleading disclosure, Oil and Gas Issuers should tailor their disclosure to their particular circumstances. We have observed the use, verbatim, of wording that appears in other issuers' disclosure. Boilerplate disclosure is unhelpful for an investor reader; it may also be misleading.

As an example, the long standing requirement found in item 5.2 of Form 51-101F1 *Statement of Reserves Data and Other Oil and Gas Information* (**Form 51-101F1**) that requires an Oil and Gas Issuer to discuss company-applicable significant factors or uncertainties with respect to reserves data has been extended to other resource categories. Section 5.9 of NI 51-101 and item 6.2.1 of Form 51-101F1 detail these

[6] See National Instrument 51-102 *Continuous Disclosure Obligations* (**NI 51-102**), section 7.1.

requirements. In order to comply with NI 51-101, the disclosure should clearly address the factors and uncertainties that are specific to the Oil and Gas Issuer's properties and not simply repeat boilerplate discussion or repeat other Oil and Gas Issuers' disclosure.

(iv) Use of NI 51-101 Forms for Other Purposes

Forms 51-101F1, 51-101F2 *Report on Reserves Data by Independent Qualified Reserves Evaluator or Auditor* (**Form 51-101F2**) and 51-101F3 *Report of Management and Directors on Oil and Gas Disclosure* (**Form 51-101F3**) are intended to be used for annual disclosure of reserves data and other specific information. An Oil and Gas Issuer may use such forms as templates for other disclosure purposes, but those documents that offer additional disclosure should not be identified as "*Form 51-101F1*", "*Form 51-101F2*" or "*Form 51-101F3*", and the headings should be modified to describe the actual contents of the disclosure.

The disclosure prescribed by Forms 51-101F1 and 51-101F3 is required for all annual filings under NI 51-101. A report in Form 51-101F2 is required only if the Oil and Gas Issuer is disclosing reserves data (i.e., proved and/or probable reserves) and is not required if the annual filing includes only resources other than reserves. If an Oil and Gas Issuer wishes to do so, a report similar to that prescribed by Form 51-101F2 may be filed reporting resources other than reserves, but should not be identified as "*Form 51-101F2*" and the heading should be suitably modified.

(b) Evaluators and Auditors – General Standards and Responsibilities

An independent qualified reserves evaluator or auditor who signs a report in Form 51-101F2 is representing that the disclosed information is not misleading and that the reserves data are free of material misstatement. Therefore, by signing those forms, qualified reserves evaluators and auditors are taking on a professional responsibility that reflects on their individual professionalism and the integrity of their profession. This section provides guidance using, as an example, representations about the net present value of future net revenue of an Oil and Gas Issuer's estimated proved and probable reserves.

(i) Professional Responsibility

One of the requirements of NI 51-101 is that a qualified reserves evaluator or auditor must be a member of a professional organisation as defined in paragraph 1.1(w) of NI 51-101.[7]

Oil and Gas Issuers and evaluators must be aware of section 4.8 of
Volume 1 of the COGE Handbook, titled "Independence, Objectivity and Confidentiality". It may, for instance, be inappropriate for an evaluator to provide an evaluation of a project on which the evaluator has also provided significant engineering advice.

(ii) Misrepresentations or Misleading Statements

The guidance regarding misrepresentations or misleading statements discussed above[8] applies equally to a qualified reserves evaluator or auditor who signs a statement in Form 51-102F2. In particular, professionals must represent that evaluated projects of the Oil and Gas Issuer provide a net present value of future net revenue that is not misleading.

The evaluation of oil and gas resources is based on a defined scenario or project.[9] Many unconventional resources are developed through large projects, often with long timelines and a net present value that captures the time-discounted value of expenditure and revenue. A project scenario that is not reasonable with regard to timing or cost could result in misleading disclosure with respect to the value of a project.

An evaluation scenario, whether provided to the evaluator for review by the Oil and Gas Issuer or developed by the evaluator, should be reasonable with regard to timing and cost. Oil and Gas Issuers may consider providing a description of key factors in a major project scenario in order to avoid misleading disclosure.

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7 An example of such a professional organisation is the Association of Professional Engineers, Geologists and Geophysicists of Alberta (**APEGGA**), which recognises the COGE Handbook as the practice standard for oil and gas evaluation. Each evaluator, whether independent or an employee of an Oil and Gas Issuer, must be mindful at all times of obligations imposed on them as an individual member of a professional organization. A particular example of such professional obligation is the adherence to the APEGGA Guideline for Ethical Practice. Another example of such a professional organisation is the Association of Professional Engineers and Geoscientists of British Columbia.

8 See clause 2(a)(i)(A) of this Notice.

9 See section 5.3.3 of Volume 1 of the COGE Handbook.

(iii) Use of COGE Handbook and Other Guides

The guidance provided above in subparagraph 2(a)(ii) of this Notice similarly applies to activities of qualified reserves evaluators and auditors in reviewing Oil and Gas Issuers' disclosure. Technical manuals and reference materials are valuable tools, and in some cases required, to aid in developing disclosure. They should be used appropriately in the exercise of fulfilling the general, as well as specific, obligations of Canadian securities legislation.

(iv) Expertise Required to Perform Evaluation

When evaluators or auditors sign a report in Form 51-101F2 they are representing that they possess the expertise to carry out the evaluation that is being reported. NI 51-101 requires that such professionals possess the professional qualifications and experience appropriate to carry out the required review.[10] In addition to the NI 51-101 requirements that evaluators and auditors be qualified professionals, obligations and standards of their profession will apply.[11]

As an example, where an evaluator assigns a net present value or confirms a net present value that has been assigned on the basis of such things as a novel recovery technology or upgrading, the evaluator must be certain as a professional that they possess adequate qualifications and experience to make that professional judgement.

(v) Consent to Disclose Information from Report

Section 4.4 of Volume 1 of the COGE Handbook recommends the preparation of an engagement letter that specifies a "project description confirming the scope and objective of the [evaluation] project". An evaluation report is typically prepared for a particular purpose. A good practice would be for an Oil and Gas Issuer to seek the consent of the evaluator for disclosure of information from a report for a purpose other than which it was prepared, or for selective disclosure from any report. A requirement for the evaluator's consent to disclose part or all of an evaluation is often part of this engagement letter.

An evaluator who consents to disclosure of information from a report that he has prepared should be aware of the potential for civil liability (see, for example, secondary-market disclosure liability provisions of provincial and territorial securities legislation), request confirmation from the Oil and Gas Issuer of the purpose for which an evaluation is being prepared and ensure the report is appropriate for the intended disclosure purpose. Following are some examples where qualified evaluators and auditors should be cautious:

- disclosure of the results of an evaluation of a project that does not allow time for regulatory approval or the successful execution of which is clearly beyond the ability of the Oil and Gas Issuer to carry out, and consequently presents a misleading estimate of the net present value of the project; or
- an evaluation predicated on the availability of technology that is not fully developed for the specific reservoir being evaluated, unless accompanied by appropriate cautionary statements.

3. Specific Disclosure Topics

The 2011 Revisions provide guidance to Oil and Gas Issuers and those involved in preparing, authorizing and disseminating their disclosure about general requirements and responsibilities under Canadian securities legislation, professional ethics and other obligations applicable to the formulation of oil and gas disclosure. In expanding this Notice, we have carried forward guidance relating to specific disclosure topics from previous versions of this Notice and, in some cases, have expanded or added new guidance based on experience in reviewing oil and gas disclosure. The following discussion topics should not be viewed or treated as an exhaustive list of potential issues related to oil and gas disclosure. The following serve as examples that incorporate some of the general concepts discussed in section 2 above.

(a) Disclosure of After-Tax Net Present Values of Future Net Revenue (After-Tax NPV)

NI 51-101 (i.e. Form 51-101F1) requires Oil and Gas Issuers to disclose estimates of After-Tax NPV of proved and probable reserves in the annual statement. Oil and Gas Issuers may also disclose volumes and estimates of After-Tax

[10] NI 51-101, paragraphs 1.1(x) and (y).

[11] For example, Rule 2 of the Guideline for Ethical Practice of APEGGA states, "professional engineers, geologists and geophysicists shall undertake only work that they are competent to perform by virtue of their training and experience."

NPV of other resources. A reporting issuer may also choose to disclose its reserves or other information of a type that is specified in Form 51-101F1, which may include estimates of future net revenue attributable to reserves, whether for the issuer in the aggregate or for a portion of its activities. This type of disclosure would be in addition to the annual filing disclosure and included in a separate document, such as a news release. Section 5.2 of NI 51-101 specifies that all such disclosure must satisfy certain requirements including subparagraph 5.2(a)(iii) and paragraph 5.2(c) of NI 51-101.

Estimates of After-Tax NPV are dependent on a number of factors including, but not limited to, one or more of the following:

- forecast future capital expenditure required to achieve the forecast production;
- interaction with, or deductibility of, government royalties or other proportionate sharing rights;
- inclusion of existing tax pool balances of the issuer (inclusion is prescribed for issuer-aggregate estimates according to section 7 of Volume 1 of COGE Handbook);
- tax pool write-off rates;
- sequence in which tax pools are utilized;
- applicability of special tax incentives; and
- forecast production revenue and expenses.

Each of these can have a significant impact on the outcome, which could mislead investors if not properly considered in the evaluation or if the Oil and Gas Issuer's disclosure does not provide sufficient accompanying information to enable a reader to make an informed decision.

The fundamental objective of disclosure is to provide information to an investor that can be used to make investment decisions. To assist investors, Oil and Gas Issuers may footnote the disclosure of an After-Tax NPV with information appropriate to their circumstances. If an Oil and Gas Issuer makes this disclosure, it should generally include, as appropriate, one or more of the following:

- a general explanation of the method and assumptions used in an Oil and Gas Issuer's calculation, worded to reflect its specific circumstance and the approach taken. This need not be detailed, but major aspects should be addressed, such as whether tax pools have been included in the evaluation;
- an explanatory statement to the following effect:

  > The after-tax net present value of [the business entity]'s oil and gas properties here reflects the tax burden on the properties on a stand-alone basis. It does not consider the business-entity-level tax situation, or tax planning. It does not provide an estimate of the value at the level of the business entity, which may be significantly different. The financial statements and the management's discussion & analysis (MD&A) of [the business entity] should be consulted for information at the level of the business entity.

(b) Use of Barrels of Oil Equivalent (BOEs)

Section 5.14 of NI 51-101 describes the disclosure requirements for the use of BOEs. It requires the conversion to be carried out using a ratio 6 Mcf of Gas to 1 Bbl of Oil (6:1). A cautionary statement is also required to the following effect:

> BOEs [or 'McfGEs' or other applicable units of equivalency] may be misleading, particularly if used in isolation. A BOE conversion ratio of 6 Mcf: 1 Bbl [or "An McfGE conversion ratio of 1 Bbl: 6 Mcf"] is based on an energy equivalency conversion method primarily applicable at the burner tip and does not represent a value equivalency at the wellhead.

When the value ratio is significantly different from the energy equivalency of 6:1, Oil and Gas Issuers may be required to provide additional disclosure in order to avoid being misleading. For example, a value ratio of 20:1 at the time the disclosure is made would require an explicit statement to the effect that a conversion using a 6:1 ratio would be misleading as an indication of value.

The results of using conversion ratios other than 6:1 may be disclosed, provided an explanation is given.

(c) Disclosure of Well-Flow Test Results

Disclosure of well-flow test results can have a significant effect on the market price or value of an Oil and Gas Issuer. Additional information is often necessary in order to avoid misleading readers with such disclosure.[12] Disclosing the results of short-term tests, "rates up to", or short-term peak rates as daily rates, for example, would be misleading without additional explanation.

Oil and Gas Issuers should include information about all of the following when disclosing well-flow test results:

- the geological formation for which test results are being disclosed;
- the type of test (examples include wireline, drillstem testing (DST), or production test);
- duration of the test;
- average rate of oil- or gas-flow during the test;
- recovered fluid types and volumes (reporting the recovery of load fluid without stating that it is load fluid would be regarded as misleading);
- significant production or pressure decline during the test;
- if a pressure transient analysis or well-test interpretation has not been carried out, a cautionary statement should be made to the effect that the data should be considered to be preliminary until such analysis or interpretation has been done; and
- a cautionary statement that the test result is not necessarily indicative of long-term performance or of ultimate recovery.

In addition to the disclosure of the above information on a well-flow test, further disclosure may be necessary to avoid being misleading to readers, especially when high initial decline rates or a short production life are anticipated. Such additional disclosure could include expected duration of production.

Canadian securities legislation requires an Oil and Gas Issuer to make timely disclosure – notably when the result of a test and its implications could amount to a material change.

(d) Evaluation, Classification and Disclosure of Unconventional Hydrocarbons

(i) Introduction

The COGE Handbook guidance for the classification of a hydrocarbon volume as discovered PIIP mainly addresses conventional hydrocarbons that exhibit primary flow. In this section, we provide additional guidance primarily for disclosure of unconventional hydrocarbons. Technology developed for unconventional resources is increasingly being applied by Oil and Gas Issuers to poor-quality conventional reservoirs; this additional guidance applies to these reservoirs.

(ii) Known Accumulation Criterion

One of the criteria for classification of a volume of hydrocarbons as discovered PIIP is that the volume is in a "known accumulation", which Appendix A of Volume 1 of the COGE Handbook defines as follows:

> An accumulation that has been penetrated by a well. In general the well must have demonstrated the existence of hydrocarbons by flow testing in order for the accumulation to be classified as 'known'. However, where log and/or core data exist, and there is good analogy to a nearby and geologically comparable known accumulation, this may suffice.

Penetration by a well – This is a prerequisite for classification as discovered PIIP, and of any of the sub-classes of discovered PIIP. Extrapolation from an existing well on the basis of analogy is discussed below.

[12] See subparagraph 2(a)(i)(A) of this Notice.

Demonstration of the existence of hydrocarbons by flow testing – This may be problematic because many unconventional hydrocarbons cannot be tested by primary flow and can require extensive stimulation and pilot testing before flow may be demonstrated. When this is the case, it may be possible to use log and core data and analogs to satisfy the known accumulation criterion.

Log and Core Data – Unconventional hydrocarbon accumulations often have log and core data available from many, sometimes hundreds, of stratigraphic test wells before flow has been demonstrated by pilot testing. On its own, such data may demonstrate the presence of hydrocarbons; but, in the absence of flow information, such data would not satisfy the known accumulation criterion. Laboratory tests of cores that provide convincing evidence of the presence of significant (not trace or minimal) moveable oil would generally be sufficient to satisfy the known accumulation criterion and to assign discovered PIIP to an area around a well from which the core had been taken. In the absence of further evidence, an Oil and Gas Issuer must classify such a volume as unrecoverable and not as contingent resources or reserves.

Analogous Information – An Oil and Gas Issuer may satisfy the known accumulation criterion by a "good analogy to a nearby and geologically comparable known accumulation". Because in this case the analogy is a replacement for a flow test, it is not sufficient for individual reservoir parameters such as porosity or saturation to be comparable, but all aspects of the analog in combination should support the expectation that the target reservoir will be able to flow in a similar manner, using the same recovery process. We discuss this in more detail below.

Flow from temporary stimulation – The criterion for flow testing for classification as discovered PIIP may be satisfied by a stimulation process, which results in temporary flow (e.g., stimulation by hot water or cold solvent). In the absence of further evidence, an Oil and Gas Issuer must classify such a volume as unrecoverable and not as contingent resources or reserves.

We think that events that would not usually be considered to provide adequate evidence of flow for classification as discovered PIIP include desorption from cores, gas kicks, gas or oil cutting of the mud or minimal recovery (e.g., oil film) on tests.

(iii) Use of Analogous Information

There is limited guidance on what constitutes a "good analogy", or what "geologically comparable" or "nearby" mean, and the demonstration of an ability to flow by "a good analogy to a nearby and geologically comparable *known accumulation*" seems to be interpreted more generously for unconventional resources than for conventional resources. The use of analogs for assigning reserves is discussed in section 6.2 of Volume 2 of the COGE Handbook, which is generally applicable to resources other than reserves. Papers by Hodgin and Harrell[13] and Sidle and Lee[14] describe the use of analogs for assigning reserves for oil and gas filings with the U.S. Securities and Exchange Commission (SEC). Although the details of the approach described in these two papers would not necessarily meet specific requirements for regulatory disclosure, they provide a useful discussion on good practices on the use of analogous information.

We think that, in order for this disclosure not to be misleading to readers, analog information that supports classification as a contingent resource (or as a reserve) must demonstrate all of the following:

- the presence of a geological unit with comparable geological properties;
- the presence of hydrocarbons;
- that the hydrocarbons are potentially producible.

Further assessment may be required by an Oil and Gas Issuer in order to determine if a contingent resource using analog information is economic or sub-economic.

The criterion that the analogy is "nearby" may be of general relevance as an indicator that the analog reservoir has been deposited in the same depositional environment and subject to the same diagenetic and structural processes as the subject reservoir. However, the Oil and Gas Issuer may question the applicability of the

[13] Hodgin, J. E. and Harrell, D. R., 2006, "*The Selection, Application, and Misapplication of Reservoir Analogs for the Estimation of Petroleum Reserves*," SPE Paper 102505-MS.

[14] Sidle, R. E. and Lee, W. J., 2010, "*An Update on the Use of Reservoir Analogs for the Estimation of Oil and Gas Reserves*," SPE paper 129688.

criterion, as geological processes can vary over very short distances and geographic proximity is often not a reliable indicator of the validity of an analogy.

When evaluating unconventional resources, the following requires careful consideration:

- *Limited analogous information* – In comparison to the amount and quality of analogous information on conventional oil and gas, the analogous information available on unconventional resources is extremely limited. For example, few steam assisted gravity drainage (**SAGD**) well pairs have produced for a significant period of time.

- *Relevance of analogous information* – Initial activity in any development tends to be in the best quality reservoir and its use as an analog for later activity can present an overly optimistic picture.

- *Analogs provide a best estimate* – Analogs provide information on proved + probable reserves or best case estimate outcomes for resource classes other than reserves. Oil and Gas Issuers should adjust estimates of proved reserves or low case estimates accordingly.

- *Simulation* – Simulation can provide an important insight into reservoir performance, but only if the Oil and Gas Issuer can demonstrate that it is an appropriate analog in the construction of the simulation model.

In order to avoid misleading disclosure, an Oil and Gas Issuer may be required to provide more information on the technical analysis that supports the use of a particular analog as being "a good analogy to a nearby and geologically comparable *known accumulation*" and its relevance to supporting the expectation of flow in a subject reservoir, when failure to disclose this information may be misleading. Additional information could include details of one or more of the following:

- the specific reservoir analog or analogs with relevant information, including properties of the analog and the subject reservoir; and

- the specific process analogy, which is of particular importance when an Enhanced Oil Recovery (EOR) technique (e.g., thermal stimulation, SAGD or fracturing) is required to recover the hydrocarbon.

The strength of an analog should be one of the factors in determining the categories (high, best and low estimates) within a contingent resource.

(iv) Extrapolation from Existing Data

We are concerned about the distance to which the information on a data point, such as a well, can be reasonably extrapolated. In the evaluation of contingent resources, we have seen a tendency for the reservoir in any new accumulation, conventional or unconventional, to be considered to be homogeneous over a very large area, with extrapolation from limited data over this large area. This tends to be more extreme for unconventional accumulations for which the presence of a geological unit, but not necessarily its productivity, may be extrapolated much further than would be considered reasonable for conventional accumulations. We have seen extreme examples of extrapolation, in particular for shale gas, where little is generally known about the reservoir complexities that control productivity.

For an extrapolation to be valid, it must be possible to demonstrate, over the area of extrapolation, with the level of certainty appropriate for the estimate (low, best, and high) all of the following:

- the presence of the geological unit of interest;

- that it contains hydrocarbons;

- that the reservoir properties over the area of extrapolation are analogous to those at the data point from which the extrapolation is being made and that these hydrocarbons are, therefore:

    - moveable, for classification as discovered PIIP; and

    - potentially recoverable, for classification as a contingent resource.

In our review of Oil and Gas Issuers' filings, we see insufficient weight often being placed on these criteria, especially the third one, by making lengthy extrapolations from a tested well based on a default assumption of homogeneity throughout the formation. There is overwhelming evidence that the geological formations from which hydrocarbons are produced are almost invariably heterogeneous, and the default assumption should be that a reservoir is not homogenous. Extrapolation from beyond the immediate vicinity of a data point should be limited unless there is clear evidence to show otherwise.

A specific example is the assignment of proved undeveloped (**PUD**) reserves offsetting a horizontal well. The extent to which this type of assignment is done is a function of the information that is available to support this assignment, in particular the understanding of the reservoir properties. We expect there to be substantial technical support for the assignment of more than one PUD location on either side, or beyond the toe or heel, of an existing horizontal well.

(v) Project Maturity

Oil and Gas Issuers evaluate recoverable resources (reserves, contingent and prospective resources) based on a development plan that may consist of one or more projects[15] at different levels of maturity. The COGE Handbook refers to section 2.1.3.1 of the SPE-PRMS for a classification of these levels of maturity.[16]

Oil and Gas Issuers disclosing resources other than reserves are required to discuss "the significant positive and negative factors relevant to the estimate"[17]. As part of this discussion, Oil and Gas Issuers may wish to use this classification as an aid to satisfying the disclosure requirement. Additional description of a project may also be necessary to provide satisfactory disclosure.

(vi) Contingencies

Subparagraph 5.9(2)(d)(iv) of NI 51-101 requires Oil and Gas Issuers disclosing contingent resources to provide information on the "specific contingencies which prevent the classification of the resources as reserves." Based on our review of Oil and Gas Issuers' filings, this disclosure is often poor. Oil and Gas Issuers should note the following definition of "contingent resources", in section 5.2 of Volume 1 of the COGE Handbook:

> Contingent Resources are those quantities of petroleum estimated, as of a given date, to be potentially recoverable from known accumulations using established technology or technology under development, but which are not currently considered to be commercially recoverable due to one or more contingencies. Contingencies may include factors such as economic, legal, environmental, political, and regulatory matters, or a lack of markets. It is also appropriate to classify as contingent resources the estimated discovered recoverable quantities associated with a project in the early evaluation stage. Contingent Resources are further classified in accordance with the level of certainty associated with the estimates and may be subclassified based on project maturity and/or characterized by their economic status.

The subparagraphs that follow discuss these contingencies. Any drilling or testing that is required to confirm the presence of a known accumulation beyond reasonable distances of extrapolation from an existing data point are not contingencies but prerequisites.

Some Oil and Gas Issuers are of the view that the statement, "[i]t is also appropriate to classify as contingent resources the estimated discovered recoverable quantities associated with a project in the early evaluation stage"[18] contained within the above-noted definition of "contingent resources" is the only criterion for the assignment of contingent resources. What constitutes "early evaluation stage" is unclear and, by itself, inadequate as a classification criterion. To avoid misleading disclosure, the Oil and Gas Issuer must satisfy the specific requirements for classification as a contingent resource.

Contingencies can be economic, other non-technical, or technical.

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15 See section 5.3.3 of Volume 1 of the COGE Handbook, titled "Commercial Risk".

16 A link for the SPE-PRMS can be found at http://www.spe.org/industry/reserves/prms.php.

17 See subparagraph 5.9(2)(d)(iii) of NI 51-101.

18 See section 5.2 of Volume 1 of the COGE Handbook.

A. Economic Contingency

Economic contingency is dealt with by sub-classifying a contingent resource, as described in subsection 5.3.4.a of Volume 1 of the COGE Handbook as an economic or sub-economic contingent resource. A contingent resource is an estimate of recoverable volumes from a defined project under specified economic conditions. We would likely consider it to be misleading to disclose a contingent resource without also disclosing whether it is currently economic or sub-economic. The same subsection of the COGE Handbook also states the following:

> When evaluations are incomplete such that it is premature to identify the economic viability of a project, it is acceptable to note that project economic status is 'undetermined' (i.e., 'contingent resources – economic status undetermined').

We do not consider it is reasonable to continue to classify a project as "economic status undetermined" beyond a limited period without providing a clear and specific explanation and meaningful disclosure about the time for completion of an economic evaluation. If the Oil and Gas Issuer makes no attempt to determine economic viability, it would be appropriate to reclassify the resources associated with a project as sub-commercial contingent resources with a discussion of what would be required to achieve commerciality.

Disclosure of any class of resource is at a point in time, the "Effective Date", with the information available at that time. Information to be acquired in the future may be incorporated in subsequent evaluations, but is not a contingency that justifies classification as "economic status undetermined". In particular, classification as "economic status undetermined" is not appropriate for areas in which drilling and/or testing is still required to satisfy the "known accumulation" criterion.

If the classification is as a sub-economic contingent resource, it may be misleading to fail to disclose the changes in economic conditions that are required for the achievement of economic viability.

B. Non-Technical Contingency

Non-technical contingencies identified in the COGE Handbook are legal, environmental, political, and regulatory matters, or a lack of markets. In order to not be misleading, additional disclosure on these, or other relevant non-technical contingencies, may be required.

C. Technical Contingency

A prerequisite for the evaluation of a contingent resource requires the application of a development project using technology that is established or is under development.

(1) Established Technology

Established technology is technology that is in use in one or more of the following:

- in the reservoir of interest; or
- in a reservoir that is a good analogy.

By definition, a technology is not a contingency if it is an established technology for the subject reservoir. However, it is not sufficient that technology is applicable to a reservoir of any type; to be an established technology, it must be applicable in the reservoir of interest.

(2) Technology Under Development

When an Oil and Gas Issuer cannot conduct an evaluation on the basis of established technology, contingent resources may be assigned on the basis of "technology under development". Section 5.3.3 of Volume 1 of the COGE Handbook, titled "Commercial Risk" defines "technology under development" as "technology that has been developed and verified by testing as feasible for future commercial applications to the subject reservoir".

The COGE Handbook indicates that technology under development may only be used where all conditions of the above definition have been met, including:

- *technology that has been developed* – This condition effectively limits the technology to existing technology that has been developed in analogous reservoirs.

- *verified by testing as feasible for future commercial applications* – This condition implies that there has been a successful pilot project in the reservoir of interest or a good, relevant analog. A lower level of evidence may not meet this condition. For example, laboratory tests on cores alone, temporary stimulation (e.g., by hot water, cold solvent) of short term flow, or simulation alone, would not be adequate evidence for classification as a contingent resource.

- *to the subject reservoir* – This condition requires careful examination and comparative analysis of the reservoir characteristics to confirm that the technology is specifically applicable to that reservoir. Completion technology that has been successfully applied, for example, in one shale gas area, may not be applied to other shale gas areas without careful consideration of the specific relevant factors.

Technology that may be described generally as being "under development" including experimental technology but that does not satisfy the requirements specified above, cannot be used to justify a classification as contingent resources.

The term "under development" implies that there is active pursuit of the technology, although this need not be by the Oil and Gas Issuer provided that the technology will become available to the Oil and Gas Issuer. In addition to the guidelines specified in the COGE Handbook, for disclosure to be consistent with the requirements of NI 51-101 the technology should be expected to be available within a reasonable period of time. In respect of reserves, the timelines set forth in subsection 5.5.4.f of Volume 1 of the COGE Handbook, titled "Timing of Production and Development," also provide appropriate guidance on the timelines that should be considered regarding "technology under development" in relation to decisions on the classification of resources.

(vii) Disclosure of Contingent Resources

There is limited guidance on contingent resources in the COGE Handbook. We are aware of the varied interpretations of the disclosure requirements relating to contingent resources by evaluators and Oil and Gas Issuers. As a result, we recommend the following:

A. Identification – Identify the contingencies under headings, which may include one or more of the following:

- ***Economic***. This is a contingency only for a sub-economic contingent resource, not for an economic contingent resource;

- ***Non-Technical***. Examples include, factors such as legal, environmental, political, and regulatory matters or a lack of markets; and

- ***Technical***. This is a contingency for the case of technology under development, not when there is established technology.

B. Itemize Contingencies – Under the headings identifying contingency factors (see above), itemize the relevant contingencies and provide a meaningful explanation of steps needed to remove the contingencies. Boilerplate disclosure is inadequate. Drilling to confirm the presence of a hydrocarbon bearing reservoir or testing to confirm its productivity (i.e., to satisfy the known accumulation criterion) are not contingencies;[19] if such drilling or testing is necessary then it does not reflect the information available at the evaluation date and the appropriate classification is likely to be as a prospective resource. Next, describe the technology, which may include one of the following:

[19] Once the known accumulation criterion has been satisfied, additional drilling that is within the area of the known accumulation required to design a recovery process could be a valid contingency.

- ***Established Technology***. Include a brief description of the technology and how it is applicable to the subject reservoir. This will not generally require extensive or detailed disclosure; or

- ***Technology Under Development***. Describe the technology in sufficient detail for an investor to understand the likelihood that it will become an established technology for that reservoir and when this is expected to happen. When doing so, consider the specific requirements of the definition of "technology under development," which states: "… technology *that has been developed* and *verified by testing* as feasible for future commercial applications *to the subject reservoir*" [emphasis added].

(e) Classification to Most Specific Class and Category of Reserve

Paragraph 5.9(2)(c) of NI 51-101 requires an estimate of resources other than reserves to "be classified in the most specific category of resources other than reserves". Where disclosure of total, discovered or undiscovered PIIP [20] is provided, subsection 5.16(2) of NI 51-101 requires the disclosure of each of the subcategories that make up total PIIP, discovered PIIP and undiscovered PIIP. These provisions in NI 51-101 address concerns about disclosure of volumes of discovered PIIP and undiscovered PIIP in circumstances where there has been no meaningful indication that commerciality could be attained.

Section 5.3 of Companion Policy 51-101CP *Companion Policy to National Instrument 51-101* (**51-101CP**) contemplates as "exceptional circumstances" a situation in which an Oil and Gas Issuer is unable to classify a discovered resource into one of the subcategories of discovered resources. The guidance in 51-101CP originally reflected established mining practice, which requires a pre-feasibility or a feasibility study before reserves are assigned to mining operations. In that case, the recovery technology is well established but commerciality requires confirmation. The applicability of "exceptional circumstances" for recovery of hydrocarbons by means other than mining would be limited to situations in which it is not possible to define a project[21] for the recovery of a resource from a petroleum accumulation. Subsection 5.16(3) of NI 51-101 provides for this by allowing the disclosure of discovered PIIP without disclosure of reserves or contingent resources. However, subsection 5.16(3) of NI 51-101 only applies when the Oil and Gas Issuer cannot disclose the more specific class, and is not an option that may be exercised to avoid disclosure of the most specific class and category, including the fact that the resources are currently unrecoverable, when the information is or can be made available.

If Oil and Gas Issuers can develop projects using several recovery processes but no decision has been made among them, one or more of such possible processes may be reflected in an evaluation as the basis of disclosure, and the results disclosed in an appropriate class (most likely contingent resources) with relevant discussion.

The definition of discovered PIIP includes the following statement: "the recoverable portion of discovered petroleum initially-in-place includes production, reserves, and contingent resources; the remainder is unrecoverable". Therefore, any volume for which a project cannot be defined and evaluated for classification of production, reserves, contingent resources or, in the case of undiscovered PIIP, prospective resources, at the evaluation date, is by definition, unrecoverable at the time of the evaluation.

Oil and Gas Issuers with volumes currently classified as unrecoverable but who are developing recovery projects, possibly at an experimental level, may describe their activities in the disclosure, provided it is accompanied by a discussion of significant positive and negative factors. [22]

(f) Stand-Alone Possible Reserves

Stand-alone possible reserves are possible reserves that are assigned to a property for which no proved or probable reserves volumes have been assigned. We think it is potentially misleading to disclose possible reserves on a stand-alone basis. Situations in which it might be appropriate to disclose possible reserves on a stand-alone basis are rare, but could include any one or more of the following:

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[20] PIIP is used here as a reference to resource classes (i.e., reserves, contingent resources, prospective resources or unrecoverable resources).

[21] For this purpose, a project is a program of work that can be evaluated to demonstrate its commercial viability using established technology or technology under development (refer to subparagraph 3(d)(vi)(C) of this Notice). The level of detail in a project and the sophistication of an evaluation will generally increase from prospective, to contingent resources, to reserves.

[22] See subparagraph 5.9(2)(d)(iii) of NI 51-101.

- project economics are such that no proved or probable reserves can be assigned, but on a proved + probable + possible reserves basis the project is economically viable, and a development decision has been made (e.g., adding compression, expanding facilities, offshore development of a structure delineated mainly with seismic with only limited well control);

- only minor expenditure is required to develop the possible reserves and development is likely to proceed in the near future (e.g., behind-pipe zones in a well which has proved or probable reserves in another interval);

- possible reserves may be assigned to that part of an accumulation for which an Oil and Gas Issuer has the rights when proved or probable reserves have been assigned to adjacent parts of the same accumulation for which the Oil and Gas Issuer does not have rights.

In all of these situations, there should be an intention to develop the stand-alone possible reserves within a reasonable time.

In these situations, an Oil and Gas Issuer that includes material stand-alone possible reserves in its disclosure should also disclose the fact that such reserves are classified as stand-alone possible reserves, provide a clear proximate explanation as to why the possible reserves have been disclosed on a stand-alone basis and also include the cautionary statement required by subparagraph 5.2(a)(v) of NI 51-101 regarding possible reserves.

(g) Aggregation of Resource Estimates for Several Properties

Oil and Gas Issuers may aggregate volumes of the same class, but not of different classes.
Current guidance on the aggregation of resource estimates is provided in subsection 5.2(4) of 51-101CP, titled "Probabilistic and Deterministic Evaluation Methods" and in section 9.6 of Volume 1 of the COGE Handbook, titled "Reserves Aggregation". Although the general principles discussed in those publications are relevant to the aggregation of all resource classes, the guidance in 51-101CP and the COGE Handbook was written primarily to address the aggregation of reserves data (i.e., of proved and of proved + probable reserves). Below we provide additional guidance on the disclosure of aggregated estimates that include resources other than reserves data.

(i) Probabilistic Aggregation of Resource Estimates for Several Properties

Guidance found in subsection 5.2(4) of 51-101CP on the probabilistic aggregation of reserves titled "Probabilistic and Deterministic Evaluation Methods" and in section 5.5.3 of Volume 1 of the COGE Handbook, titled "Aggregation of Reserves Estimates" is also applicable to disclosure of estimates of resources other than reserves data.

(ii) Arithmetic Aggregation of Resource Estimates for Several Properties

Proved, proved + probable and proved + probable + possible reserves estimates and high, best, and low estimates of other resource classes are measures of the probability that actual remaining recovered quantities will exceed the disclosed volumes. Disclosure of the arithmetic sum of low estimates or high estimates of multiple properties may be misleading.

Proved + probable reserves, and best estimates of other resource classes, are generally considered to be approximations to a mean estimate[23] and, as such, their summation provides meaningful information and may be disclosed without misleading readers.

However, when other estimates are aggregated (e.g., multiple estimates of proved + probable + possible reserves or multiple high estimates of other resource classes) statistical principles indicate that the resulting sums will lie beyond a reasonable range of expected actual outcomes and, therefore, will potentially mislead readers.

Accordingly, where an Oil and Gas Issuer discloses an arithmetic aggregation of several proved + probable + possible reserves estimates or of several high estimates of other resource classes, the Oil and Gas Issuer should consider (in addition to applying the guidance set out in subsection 5.2(4) of 51-101CP) accompanying the disclosure with a clear cautionary statement to the following effect:

[23] This will not always be the case, especially for estimates made for frontier areas or for unconventional hydrocarbons. The implications of this should be considered when adding estimates of this nature.

> This volume is an arithmetic sum of multiple estimates of [identify reserves or resource classes], which statistical principles indicate may be misleading as to volumes that may actually be recovered. Readers should give attention to the estimates of individual classes of [reserves or resources] and appreciate the differing probabilities of recovery associated with each class as explained [indicate where disclosed and explained].

Example: Arithmetic Aggregation

Reserves in Bcf	Proved (circa P90)	Proved + Probable (circa P50)	Proved + Probable + Possible (circa P10)
Property 1	10	20	50
Property 2	12	18	30
Property 3	5	12	25
Property 4	25	40	75
Property 5	32	50	80
Total	84	140	260

Probability of getting:

More than	84 Bcf	>> 90% (much greater than 90%)
About	140 Bcf	≈ 50% (equal likelihood of getting more or less)
More than	260 Bcf	<< 10% (much less than 10%)

That is, the probability that the combined production from all properties will exceed 260 Bcf is much lower (perhaps 1%) than the criterion for proved + probable + possible reserves (i.e., a 10% probability of recovering a greater volume). Conversely, the probability that actual production will exceed 84 Bcf is considerably greater (perhaps 98%).

This example uses P90, P50, and P10 criteria, but the same argument applies for any estimates that are greater or less than a mean, whether they have been determined using deterministic or probabilistic methods.

(h) Use of the Term "Best Estimate"

The term "best estimate" is defined in Appendix A of Volume 1 of the COGE Handbook with respect to entity-level estimates as follows:

> …the value derived by an evaluator using deterministic methods that best represents the expected outcome with no optimism or conservatism... If probabilistic methods are used, there should be at least a 50 percent probability (P_{50}) that the quantities actually recovered will equal or exceed the best estimate.

The term "best estimate" should not be used to describe the results of arithmetic or probabilistic aggregation of resource estimates, unless these are risked in the aggregation process in such a manner that the aggregated value is strictly in accord with the definition of "best estimate" (refer to section 5.3.5 of Volume 1 of the COGE Handbook, titled "Uncertainty Categories").

(i) Prospective Resources

When disclosing prospective resources, Oil and Gas Issuers should note the mandatory cautionary statement that is required proximate to the disclosure[24], "There is no certainty that any portion of the resources will be discovered. If discovered, there is no certainty that it will be commercially viable to produce any portion of the resources."

For a prospective resource, the chance of commerciality is the product of two factors, the chance of discovery and the chance of development[25] and in addition to the above cautionary statement, additional information on these factors

[24] See subparagraph 5.9(2)(d)(v)(B) of NI 51-101.

[25] See section 5.3.3 of Volume 1 of the COGE Handbook.

may be required in order to avoid misleading disclosure; including discussion of the likelihood of a successful discovery (which could be as a probability of success) and, in the case of a successful discovery, of the likelihood and timing of commercial development.

We have seen Oil and Gas Issuers disclose prospective resources that are risked for the chance of discovery but not for the chance of development, typically where there is an exploration program that includes several wells. We have seen calculation errors with this procedure. Oil and Gas Issuers that disclose the results of such calculations should accompany the disclosure with a proximate statement to the following effect:

> These are partially risked prospective resources that have been risked for chance of discovery, but have not been risked for chance of development. If a discovery is made, there is no certainty that it will be developed or, if it is developed, there is no certainty as to the timing of such development.

Any discussion by Oil and Gas Issuers about the chance of development should provide meaningful information on the risks, uncertainties, and timing of development if a discovery is made.

Questions

Please refer any questions you may have regarding this Notice to any of the following:

Blaine Young
Associate Director, Corporate Finance
Alberta Securities Commission
403-297-4220
blaine.young@asc.ca

Dr. David Elliott
Chief Petroleum Advisor
Alberta Securities Commission
403-297-4008
david.elliott@asc.ca

Jenny Kirkpatrick
Legal Counsel, Corporate Finance
Alberta Securities Commission
403-355-3880
jenny.kirkpatrick@asc.ca

Gordon Smith
Senior Legal Counsel, Corporate Finance
British Columbia Securities Commission
604-899-6656 or 800-373-6393 (toll free across Canada)
gsmith@bcsc.bc.ca

Robert Holland
Chief Mining Advisor, Corporate Finance
British Columbia Securities Commission
604-899-6719 or 800-373-6393 (toll free across Canada)
rholland@bcsc.bc.ca

Luc Arsenault
Géologue
Autorité des marchés financiers
514-395-0337 ext: 4373 or 877-525-0337 (toll free across Canada)
luc.arsenault@lautorite.qc.ca