

CSA Staff Notice 51-327

Revised Guidance on Oil and Gas Disclosure

First published February 27, 2009, revised December 30, 2010, December 29, 2011 and December 4, 2014

December 4, 2014

1. Introduction

This revised Canadian Securities Administrators (CSA or we) 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 revenues. 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 was again revised as of 29 December 2011 to discuss observations by CSA staff in reviewing disclosure in light of amendments to NI 51-101 in 2010 and to re-emphasize or expand guidance on some issues discussed in previous versions of this Notice.

This Notice is now being revised in connection with the publication of amendments to NI 51-101 on December 4, 2014, the adoption of the detailed guidelines for estimation and classification of bitumen resources (Bitumen Guidelines) into volume 3 of the Canadian Oil and Gas Evaluation Handbook (COGE Handbook) on April 1, 2014, and the adoption of the guidelines for estimation and classification of resources other than reserves (ROTR Guidelines) into section 2 of volume 2 of the COGE Handbook on July 17, 2014.

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.

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 1³ titled “*Definitions of Resources and Reserves*”, notably Figure 5-1, and section 2 of volume 2 of the COGE Handbook; and
- CSA Staff Notice 51-324 *Glossary to NI 51-101 Standards of Disclosure for Oil and Gas Activities* (the CSA Glossary).

Specific Terms – The classification and categorization of resources is a vital 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 Terms in this Notice, unless otherwise defined, have the meaning as set out in NI 51-101, which incorporates defined terms from the COGE Handbook (including the latest additions of the Bitumen Guidelines and the ROTR Guidelines). For clarity, NI 51-101 and this Notice use terminology as follows:

category – In colloquial usage, the term “category” includes both “class” and “category”. As a result, volume 1 (2nd Edition 2007) and volume 2 (2005) of the COGE Handbook use the terms “class” and “category” interchangeably. The ROTR

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.

Guidelines (July 17, 2014) have adopted the usage in the SPE-PRMS (see Figure 2-1 Resources Classification Framework) as follows:

“Class” describes the chance of commerciality (reserves, contingent resources, etc.) as expressed on the vertical axis of the SPE-PRMS matrix.

“Category” describes the range of uncertainty within a class as expressed on the horizontal axis of the SPE-PRMS matrix. For example, within the class of “reserves” are the categories of “proved”, “probable” and “possible”, and for other classes the estimation categories of “low estimate”, “best estimate” and “high case”.

In view of the fact that the COGE Handbook (other than ROTR Guidelines) generally uses the term category to mean both “class” and “category”, for the purpose of NI 51-101, the term “category” includes, but is not limited to, both the concepts of “class” and “category” as described above.

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.

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 make 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;
- 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; and⁵

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 respecting the risked net present value of future net revenue of prospective resources or contingent resources that are not in the development pending project maturity sub-class without including an explanation about the factors considered respecting the chance of commerciality, which includes both chance of discovery and chance of development in the case of prospective resources and chance of development in the case of contingent resources.

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

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

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 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.

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.

Volume 1 (2nd edition, 2007) and volume 2 (2005) of the COGE Handbook contains general guidance on the evaluation and classification of resources, but the focus is on the evaluation of conventional reserves. For this reason, it has been necessary to supplement this guidance with material on the evaluation of “non-conventional” reserves and resources other than reserves.

The recent addition of the Bitumen Guidelines to volume 3 (2007) of the COGE Handbook addresses the evaluation and classification of the volumes of heavy oil or bitumen existing in, and recoverable from, formations that are suitable for exploitation using in-situ or mining recovery methods. An objective of these guidelines is to ensure that, regardless of the recovery method, the estimate satisfies a single set of classification criteria.

The further addition of the ROTR Guidelines in section 2 of volume 2 of the COGE Handbook address other resources classes. The ROTR Guidelines progress from the estimation of petroleum initially in place, through classification as discovered/undiscovered, identification and characterization of recovery technologies and projects, and to the estimation and economic status of recoverable volumes and description of contingencies and project maturity.

The ROTR Guidelines cover topics that are already addressed to some extent in other sections of the COGE Handbook. There are some differences between the ROTR Guidelines and the guidance in other volumes and sections of the COGE Handbook. Where there is a conflict between the ROTR Guidelines and other parts of the COGE Handbook, the ROTR Guidelines take precedence with respect to the evaluation of resources other than reserves. Those differences may be addressed in future revisions to the COGE Handbook.

(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; 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 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],[Contingent Resources Data][and][Prospective Resources 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.

(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 and resources data (if disclosed) 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 section 1.1 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 above⁸ 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 expenditures and revenues. 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.

(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

⁷ An example of such a professional organisation is the Association of Professional Engineers and Geoscientists of Alberta (APEGA), 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 APEGA 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.

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 prepared in accordance with 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.

3. Specific Disclosure Topics

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 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(s) for which test results are being disclosed;
- the type of test (examples include wireline, drillstem testing (DST), or production test);

¹⁰ See the definitions of "qualified reserves auditor" and "qualified reserves evaluator" in section 1.1 of NI 51-101

¹¹ For example, Rule 2 of the Guideline for Ethical Practice of APEGA states, "Professional engineers and geoscientists shall undertake only work that they are competent to perform by virtue of their training and experience."

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

- 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 results are 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.

(b) Classification to Most Specific Class and Category of Reserves and of Resources Other than Reserves

Section 5.3 of Companion Policy 51-101 *Standards of Disclosure for Oil and Gas Activities* (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 sub-categories 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 project¹³ 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

¹³ 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.

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.¹⁴

(c) 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:

- 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.

¹⁴ See subparagraph 5.9(2)(d)(iii) of NI 51-101.

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.

(d) 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 sections 5.5.3, 9.6 of volume 1 and in section 4.4 of volume 2 of the COGE Handbook. 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). Section 2.8 of volume 2 of the COGE Handbook provides specific guidance on the aggregation of estimates of contingent resources and of estimates of prospective resources. Below we provide additional guidance on the public 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. Although section 2.8.1 of volume 2 of the COGE Handbook discourages aggregating probabilistically above the field or property level, the authors suggest that where “aggregations are externally disclosed there must be an explanation of the methods and assumptions employed.”

(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 estimate¹⁵ and, as such, their

¹⁵ 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.

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:

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.

(e) 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”).

Questions

Please refer questions to any of the following:

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