

Canadian Securities Administrators Staff Notice 51-324**Glossary to
NI 51-101 *Standards of Disclosure
for Oil and Gas Activities***

December 30, 2010

Section 1.1 of National Instrument 51-101 *Standards of Disclosure for Oil and Gas Activities (NI 51-101)* defines a number of terms used in *NI 51-101*, *Form 51-101F1*, *Form 51-101F2*, *Form 51-101F3* and Companion Policy 51-101CP.¹ Section 1.2 of *NI 51-101* provides that terms used in the *Instrument* but not defined in the *Instrument*, National Instrument 14-101 *Definitions (NI 14-101)* or the securities statute in the *jurisdiction* have the meaning or interpretation, if any, set out in the *COGE Handbook*.

Part 1 of this Glossary explains much of the terminology used in *NI 51-101* and its accompanying documents. It is provided only as a convenience to users of *NI 51-101*, to assist them in better understanding the purpose and application of *NI 51-101*. Part 2 of the Glossary focuses on the definition of *reserves* and is derived from Section 5 of Volume 1 of the *COGE Handbook*.

The explanations in Part 1 of this Glossary are derived from a number of sources, including section 1.1 of *NI 51-101*, *NI 14-101* and the *COGE Handbook*. Where applicable, the source document for the explanation is indicated in square brackets after the explanation (even if the explanation is not verbatim to the source document). These explanations may change from time to time. Readers are cautioned to consult a current edition of the source document for updated explanations.

Background or further guidance may be found in the source documents:

- The *COGE Handbook* can be obtained from the Society of Petroleum Engineers, Calgary Section (Telephone 403-237-5112; email specal@spe.org; website www.speca.ca).
- *NI 14-101* can be viewed on the websites of a number of *securities regulatory authorities*.

Part 1 of this Glossary includes definitions of the various categories of *resources* that are identified and defined in the *COGE Handbook*. At the present time, these *resource* categories are as follows:

¹ Terms italicized in this notice are defined in Part 1 of the Glossary of this notice.

- *total petroleum initially-in-place* (equivalent to *total resources*);
- *discovered petroleum initially-in-place* (equivalent to *discovered resources*);
- *discovered unrecoverable petroleum initially-in-place* (equivalent to *discovered unrecoverable resources*);
- *contingent resources*;
- *undiscovered petroleum initially-in-place* (equivalent to *undiscovered resources*);
- *undiscovered unrecoverable petroleum initially-in-place* (equivalent to *undiscovered unrecoverable resources*); and
- *prospective resources*.

Readers are cautioned to consult a current edition of the *COGE Handbook* for updated *resource* categories and definitions.

PART 1 DEFINITIONS

The terms (and plural, singular or other grammatical variants thereof) set out in the left column below have the meanings respectively set out in the right column.

Defined Term	Meaning
<i>1934 Act</i>	The Securities Exchange Act of 1934 of the United States of America, as amended from time to time. [NI 14-101]
<i>Accumulation</i>	An individual body of <i>petroleum</i> in a <i>reservoir</i> . [COGE Handbook]
<i>Annual information form</i>	A completed Form 51-102F2 <i>Annual Information Form</i> , or in the case of an <i>SEC</i> issuer (as defined in National Instrument 51-102 Continuous Disclosure Obligations) a completed Form 51-102F2 or an annual report or transition report under the 1934 Act on Form 10-K, Form 10-KSB or Form 20-F. [NI 51-102]
<i>Analogous information</i>	Information about an area outside the area the <i>reporting issuer</i> has an interest or intends to acquire an interest, which is referenced by the <i>reporting issuer</i> for the purpose of drawing a comparison or conclusion to an area in which the <i>reporting issuer</i> has an interest or intends to acquire an interest, which comparison or conclusion is reasonable, and includes without limitation: <ul style="list-style-type: none">• historical information concerning reserves;• estimates of the volume or value of reserves;• historical information concerning resources;• estimates of the volume or value of resources;• historical production amounts;• production estimates; or• information concerning a field, well, basin or reservoir. [NI 51-101]
<i>Anticipated results</i>	Information which may, in the opinion of a reasonable person, indicate the potential value or quantities of <i>resources</i> in respect of the <i>reporting issuer's resources</i> or a portion of its <i>resources</i> and includes without limitation: <ul style="list-style-type: none">• estimates of volume;• estimates of value;• areal extent;• pay thickness;• flow rates; or• hydrocarbon content.

[NI 51-101]

Associated gas

The *gas* cap overlying a *crude oil accumulation* in a *reservoir*.

Audit

In relation to *reserves data*, the process whereby an *independent* qualified *reserves* auditor carries out procedures designed to allow the *independent* qualified *reserves* auditor to provide reasonable assurance, in the form of an opinion that the *reporting issuer's reserves data* (or specific parts thereof) have, in all *material* respects, been determined and presented in accordance with the *COGE Handbook* and are, therefore, free of *material* misstatement.

Because of

- (a) the nature of the subject matter (estimates of future results with many uncertainties);
- (b) the fact that the *independent* qualified *reserves* auditor assesses the qualifications and experience of the *reporting issuer's* staff, assesses the *reporting issuer's* systems, procedures and controls and relies on the competence of the *reporting issuer's* staff and the appropriateness of the *reporting issuer's* systems, procedures and controls; and
- (c) the fact that tests and samples (involving examination of underlying documentation supporting the determination of the *reserves* and *future net revenue*) as opposed to complete *evaluations*, are involved;

the level of assurance is designed to be high, though not absolute.

The level of assurance cannot be described with numeric precision. It will usually be less than, but reasonably close to, that of an *independent evaluation* and considerably higher than that of a review.

[*COGE Handbook*]

Bbl

Barrel. [*COGE Handbook*]

Bitumen

A naturally occurring viscous mixture consisting mainly of pentanes and heavier *hydrocarbons*. Its viscosity is greater than 10,000 mPa-s (cp) measured at original temperature in the *reservoir* and atmospheric pressure, on a gas-free basis. Crude *bitumen* may contain sulphur and other non-hydrocarbon compounds. [*COGE Handbook*]

<i>BOEs</i>	Barrels of <i>oil</i> equivalent. [<i>NI 51-101</i> and <i>COGE Handbook</i>]
<i>COGE Handbook</i>	The "Canadian Oil and Gas <i>Evaluation Handbook</i> " prepared jointly by The Society of Petroleum <i>Evaluation</i> Engineers (Calgary Chapter) and the Canadian Institute of Mining, Metallurgy & Petroleum (Petroleum Society) as amended from time to time.
<i>Commercial</i>	<p>When a project is commercial this implies that the essential social, environmental, and economic conditions are met, including political, legal, regulatory, and contractual conditions. Considerations with regard to determining commerciality include</p> <ul style="list-style-type: none">• economic viability of the related development project;• a reasonable expectation that there will be a market for the expected sales quantities of production required to justify development;• evidence that the necessary production and transportation facilities are available or can be made available;• evidence that legal, contractual, environmental, governmental, and other social and economic concerns will allow for the actual implementation of the recovery project being evaluated;• a reasonable expectation that all required internal and external approvals will be forthcoming. Evidence of this may include items such as signed contracts, budget approvals, and approvals for expenditures, etc.• evidence to support a reasonable timetable for development. A reasonable time frame for the initiation of development depends on the specific circumstances and varies according to the scope of the project. Although five years is recommended as a maximum time frame for classification of a project as commercial, a longer time frame could be applied where, for example, development of economic projects are deferred at the option of the producer for, among other things, market-related reasons or to meet contractual or strategic objectives. <p>[<i>COGE Handbook</i>]</p>
<i>Contingent resources</i>	<p>Those quantities of <i>petroleum</i> estimated, as of a given date, to be potentially recoverable from <i>known accumulations</i> using established technology or technology under development, but which are not currently considered to be <i>commercially</i> recoverable due to one or more contingencies.</p> <p>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 <i>contingent resources</i> the estimated discovered recoverable quantities associated with a project in the early</p>

evaluation stage. [*COGE Handbook*]

Crude oil (or Oil)

A mixture consisting mainly of pentanes and heavier *hydrocarbons* that exists in the liquid phase in *reservoirs* and remains liquid at atmospheric pressure and temperature. *Crude oil* may contain small amounts of sulphur and other non-hydrocarbons but does not include liquids obtained from the processing of *natural gas*. Refer to the *COGE Handbook* for a more complete definition. [*COGE Handbook*]

CSA

The Canadian Securities Administrators, an association consisting of the thirteen *securities regulatory authorities* in Canada.

Developed non-producing reserves

See Part 2 of this Glossary. [*COGE Handbook*]

Developed producing reserves

See Part 2 of this Glossary. [*COGE Handbook*]

Developed reserves

See Part 2 of this Glossary. [*COGE Handbook*]

Development costs

Costs incurred to obtain access to *reserves* and to provide facilities for extracting, treating, gathering and storing the *oil* and *gas* from the *reserves*.

More specifically, *development costs*, including applicable *operating costs* of *support equipment and facilities* and other costs of development activities, are costs incurred to:

- (a) gain access to and prepare well locations for drilling, including surveying well locations for the purpose of determining specific development drilling sites, clearing ground, draining, road building, and relocating public roads, *gas* lines and power lines, to the extent necessary in developing the *reserves*;
- (b) drill and equip *development wells*, development type *stratigraphic test wells* and *service wells*, including the costs of platforms and of well equipment such as casing, tubing, pumping equipment and the wellhead assembly;
- (c) acquire, construct and install *production* facilities such as flow lines, separators, treaters, heaters, manifolds, measuring devices and *production* storage tanks, *natural gas* cycling and processing plants, and central utility and waste disposal systems; and

- (d) provide improved recovery systems.

<i>Development well</i>	A well drilled inside the established limits of an <i>oil</i> or <i>gas reservoir</i> , or in close proximity to the edge of the <i>reservoir</i> , to the depth of a stratigraphic horizon known to be productive.
<i>Discovered petroleum initially-in-place</i>	<p>That quantity of <i>petroleum</i> that is estimated, as of a given date, to be contained in <i>known accumulations</i> prior to <i>production</i>.</p> <p>The recoverable portion of <i>discovered petroleum initially-in-place</i> includes <i>production</i>, <i>reserves</i> and <i>contingent resources</i>; the remainder is unrecoverable. [COGE Handbook]</p>
<i>Discovered resources</i>	Refer to <i>discovered petroleum initially-in-place</i> as both terms are equivalent. [COGE Handbook]
<i>Discovered unrecoverable petroleum initially-in-place</i>	<p>That portion of <i>discovered petroleum initially-in-place</i> which is estimated, as of a given date, not to be recoverable by future development projects.</p> <p>A portion of these quantities may become recoverable in the future as <i>commercial</i> circumstances change or technological developments occur; the remaining portion may never be recovered due to the physical/chemical constraints represented by subsurface interaction of fluids and <i>reservoir</i> rocks. [COGE Handbook]</p>
<i>Discovered unrecoverable resources</i>	Refer to <i>discovered unrecoverable petroleum initially-in-place</i> as both terms are equivalent.
<i>Effective date</i>	In respect of information, the date as at which, or for the period ended on which, the information is provided. [NI 51-101]
<i>Evaluation</i>	In relation to <i>reserves data</i> , the process whereby an economic analysis is made of a <i>property</i> to arrive at an estimate of a range of <i>net</i> present values of the estimated <i>future net revenue</i> resulting from the <i>production</i> of the <i>reserves</i> associated with the <i>property</i> . [COGE Handbook]
<i>Exploration costs</i>	Costs incurred in identifying areas that may warrant examination and in examining specific areas that are considered to have <i>prospects</i> that may contain <i>oil</i> and <i>gas reserves</i> , including costs of drilling <i>exploratory wells</i> and exploratory type <i>stratigraphic test wells</i> .

Exploration costs may be incurred both before acquiring the related *property* (sometimes referred to in part as "prospecting costs") and after acquiring the *property*. *Exploration costs*, which include applicable *operating costs* of *support equipment and facilities* and other costs of exploration activities, are:

- (a) costs of topographical, geochemical, geological and geophysical studies, rights of access to *properties* to conduct those studies, and salaries and other expenses of geologists, geophysical crews and others conducting those studies (collectively sometimes referred to as "geological and geophysical costs");
- (b) costs of carrying and retaining unproved *properties*, such as delay rentals, taxes (other than income and capital taxes) on *properties*, legal costs for title defence, and the maintenance of land and *lease* records;
- (c) dry hole contributions and bottom hole contributions;
- (d) costs of drilling and equipping *exploratory wells*; and
- (e) costs of drilling exploratory type *stratigraphic test wells*.

Exploratory well

A well that is not a *development well*, a *service well* or a *stratigraphic test well*.

Field

A defined geographical area consisting of one or more pools. [*COGE Handbook*]

Forecast prices and costs

Future prices and costs that are:

- (a) generally accepted as being a reasonable outlook of the future;
- (b) if, and only to the extent that, there are fixed or presently determinable future prices or costs to which the *reporting issuer* is legally bound by a contractual or other obligation to supply a physical product, including those for an extension period of a contract that is likely to be extended, those prices or costs rather than the prices and costs referred to in paragraph (a). [*NI 51-101*]

Foreign geographic area

A geographic area outside North America within one country or including all or portions of a number of countries.

<i>Form 51-101F1</i>	Form 51-101F1 <i>Statement of Reserves Data and Other Oil and Gas Information.</i>
<i>Form 51-101F2</i>	Form 51-101F2 <i>Report on Reserves Data by Independent Qualified Reserves Evaluator or Auditor.</i>
<i>Form 51-101F3</i>	Form 51-101F3 <i>Report of Management and Directors on Oil and Gas Disclosure.</i>
<i>Form 51-101F4</i>	Form 51-101F4 <i>Notice of Filing of 51-101F1 Information.</i>
<i>Future income tax expenses</i>	<p><i>Future income tax expenses</i> estimated (generally, year-by-year):</p> <ol style="list-style-type: none">(a) making appropriate allocations of estimated unclaimed costs and losses carried forward for tax purposes, between <i>oil and gas activities</i> and other business activities;(b) without deducting estimated future costs (for example, Crown royalties) that are not deductible in computing taxable income;(c) taking into account estimated tax credits and allowances (for example, royalty tax credits); and(d) applying to the future pre-tax net cash flows relating to the <i>reporting issuer's oil and gas activities</i> the appropriate year-end statutory tax rates, taking into account future tax rates already legislated.
<i>Future net revenue</i>	<p>The estimated <i>net</i> amount to be received with respect to the development and <i>production of reserves</i> (including <i>synthetic oil</i>, coal bed methane and other non-conventional <i>reserves</i>) estimated using:</p> <ol style="list-style-type: none">(a) <i>forecast prices and costs</i>; and(b) at the option of the <i>reporting issuer</i>, <i>constant prices and costs</i>. <p>This <i>net</i> amount is computed by deducting, from estimated future revenues:</p> <ul style="list-style-type: none">• estimated amounts of future royalty obligations;• costs related to the development and <i>production of reserves</i>;• abandonment and reclamation costs; and• <i>future income tax expenses</i>, unless otherwise specified in <i>NI 51-101</i>, <i>Form 51-101F1</i> or <i>Form 51-101F2</i>. <p>Corporate general and administrative expenses and financing costs are not deducted. <i>Net</i> present values of <i>future net revenue</i> may be calculated using a discount rate or without discount.</p>

<i>Gas (or Natural Gas)</i>	A mixture of lighter <i>hydrocarbons</i> that exist either in the gaseous phase or in solution in <i>crude oil</i> in <i>reservoirs</i> but are gaseous at atmospheric conditions. <i>Natural gas</i> may contain sulphur or other non-hydrocarbon compounds. [<i>COGE Handbook</i>]
<i>Gross</i>	<ul style="list-style-type: none">(a) In relation to a <i>reporting issuer's</i> interest in <i>production</i> or <i>reserves</i>, its "company <i>gross reserves</i>", which are the <i>reporting issuer's</i> working interest (operating or non-operating) share before deduction of royalties and without including any royalty interests of the <i>reporting issuer</i>.(b) In relation to wells, the total number of wells in which a <i>reporting issuer</i> has an interest.(c) In relation to <i>properties</i>, the total area of <i>properties</i> in which a <i>reporting issuer</i> has an interest.
<i>Heavy oil</i>	<p>In respect of <i>reserves</i> or <i>production</i>:</p> <ul style="list-style-type: none">(a) in a <i>jurisdiction</i> that has a royalty regime specific to <i>heavy oil</i>, "<i>heavy oil</i>" is oil that qualifies for royalties specific to <i>heavy oil</i>; or(b) in a <i>jurisdiction</i> that has no royalty regime specific to <i>heavy oil</i>, "<i>heavy oil</i>" is oil with a density between 10 to 22.3 degrees API (as that term is defined by the American Petroleum Institute). [<i>COGE Handbook</i>]
<i>Hydrocarbons</i>	<p>Solid, liquid, or <i>gas</i> made up of compounds of carbon and hydrogen in varying proportions. [<i>COGE Handbook</i>]</p> <p>Includes <i>oil</i> and <i>gas</i>.</p>
<i>Instrument (or NI 51-101)</i>	National Instrument 51-101 <i>Standards of Disclosure for Oil and Gas Activities</i> .
<i>Jurisdiction</i>	For the purposes of <i>NI 51-101</i> , a province or territory of Canada. [<i>NI 14-101</i>]
<i>Known accumulation</i>	An <i>accumulation</i> that has been penetrated by a well. In general, the well must have demonstrated the existence of <i>hydrocarbons</i> by flow testing in order for the <i>accumulation</i> to be classified as "known". However, where log and/or core data exist and there is a good analogy to a nearby and geologically comparable <i>known accumulation</i> , this may suffice. [<i>COGE Handbook</i>]

<i>Lease</i>	An agreement granting to the lessee rights to explore, develop and exploit a <i>property</i> .
<i>Marketable</i>	In respect of <i>reserves</i> or sales of <i>oil, gas</i> or associated by-products, the volume of <i>oil, gas</i> or associated by-products measured at the point of sale to a third party, or of transfer to another division of the issuer for treatment prior to sale to a third party. For <i>gas</i> , this may occur either before or after removal of <i>natural gas</i> liquids. For heavy <i>oil</i> or <i>bitumen</i> , this is before the addition of diluent.
<i>Material (or materiality)</i>	<p>For the purposes of <i>NI 51-101</i>, information is <i>material</i>, in respect of a <i>reporting issuer</i>, if it would be likely to influence a decision by a reasonable investor to buy, hold or sell a security of the <i>reporting issuer</i>.</p> <p>This meaning differs from the definitions of "material change" and "material fact" in <i>securities legislation</i>. [<i>NI 51-101</i>]</p>
<i>Mcf</i>	Thousand cubic feet. [<i>COGE Handbook</i>]
<i>McfGE</i>	Thousand cubic feet of <i>gas</i> equivalent. [<i>NI 51-101</i> and <i>COGE Handbook</i>]
<i>Natural gas</i>	<i>Gas</i> . [<i>COGE Handbook</i>]
<i>Natural gas liquids</i>	<p>Those hydrocarbon components that can be recovered from <i>natural gas</i> as liquids including, but not limited to, ethane, propane, butanes, pentanes plus, condensate and small quantities of non-hydrocarbons.</p> <p>[<i>COGE Handbook</i>]</p>
<i>Net</i>	<p>(a) In relation to a <i>reporting issuer's</i> interest in <i>production</i> or <i>reserves</i>, the <i>reporting issuer's</i> working interest (operating or non-operating) share after deduction of royalty obligations, plus the <i>reporting issuer's</i> royalty interests in <i>production</i> or <i>reserves</i>.</p> <p>(b) In relation to a <i>reporting issuer's</i> interest in wells, the number of wells obtained by aggregating the <i>reporting issuer's</i> working interest in each of its <i>gross</i> wells.</p> <p>(c) In relation to a <i>reporting issuer's</i> interest in a <i>property</i>, the total area in which the <i>reporting issuer</i> has an interest multiplied by the working interest owned by the <i>reporting issuer</i>.</p>
<i>NI 14-101</i>	National Instrument 14-101 <i>Definitions</i> .

<i>NI 51-101 or the Instrument</i>	National Instrument 51-101 <i>Standards of Disclosure for Oil and Gas Activities</i> .
<i>NI 51-102</i>	National Instrument 51-102 <i>Continuous Disclosure Obligations</i> .
<i>Non-associated gas</i>	An <i>accumulation</i> of <i>natural gas</i> in a <i>reservoir</i> where there is no <i>crude oil</i> .
<i>Oil</i>	<i>Crude oil</i> or <i>synthetic oil</i> . [<i>COGE Handbook</i>]
<i>Oil and gas activities</i>	" <i>Oil and gas activities</i> ": (a) include: (i) the search for <i>crude oil</i> or <i>natural gas</i> in their natural states and original locations; (ii) the acquisition of <i>property</i> rights or <i>properties</i> for the purpose of exploring for or removing <i>oil</i> or <i>gas</i> from their natural locations; (iii) the construction, drilling and <i>production</i> activities necessary to retrieve <i>oil</i> and <i>gas</i> from their natural locations and the acquisition, construction, installation and maintenance of <i>field</i> gathering and storage systems including lifting the <i>oil</i> and <i>gas</i> to the surface and gathering, treating, <i>field</i> processing and <i>field</i> storage; and (iv) the extraction of <i>hydrocarbons</i> from <i>oil</i> sands, shale, coal or other non-conventional sources and activities similar to those referred to in clauses (i), (ii) and (iii) undertaken with a view to such extraction; but (b) do not include: (i) transporting, refining or marketing <i>oil</i> or <i>gas</i> ; (ii) activities relating to the extraction of natural <i>resources</i> other than <i>oil</i> and <i>gas</i> and their by-products; or (iii) the extraction of geothermal steam or of <i>hydrocarbons</i> as a by-product of the extraction of geothermal steam or associated geothermal <i>resources</i> . [<i>NI 51-101</i>]
<i>Operating costs</i>	<i>Production costs</i> .

<i>Petroleum</i>	A naturally occurring mixture consisting predominantly of <i>hydrocarbons</i> in the gaseous, liquid, or solid phase. [<i>COGE Handbook</i>]
<i>Possible reserves</i>	See Part 2 of this Glossary. [<i>COGE Handbook</i>]
<i>Preparation date</i>	In respect of written disclosure, the most recent date to which information relating to the period ending on the <i>effective date</i> was considered in the preparation of the disclosure.
<i>Probable reserves</i>	See Part 2 of this Glossary. [<i>COGE Handbook</i>]
<i>Production</i>	<p>The cumulative quantity of <i>petroleum</i> that has been recovered at a given date. [<i>COGE Handbook</i>]</p> <p>Recovering, gathering, treating, <i>field</i> or plant processing (for example, processing <i>gas</i> to extract <i>natural gas</i> liquids) and <i>field</i> storage of <i>oil</i> and <i>gas</i>.</p> <p>The <i>oil production</i> function is usually regarded as terminating at the outlet valve on the <i>lease</i> or <i>field production</i> storage tank. The <i>gas production</i> function is usually regarded as terminating at the plant gate. In some circumstances, it may be more appropriate to regard the <i>production</i> function as terminating at the first point at which <i>oil</i>, <i>gas</i> or their by-products are delivered to a main pipeline, a common carrier, a refinery or a marine terminal.</p>
<i>Production costs (or Operating costs)</i>	<p>Costs incurred to operate and maintain wells and related equipment and facilities, including applicable <i>operating costs of support equipment and facilities</i> and other costs of operating and maintaining those wells and related equipment and facilities.</p> <p>Lifting costs become part of the cost of <i>oil</i> and <i>gas</i> produced.</p> <p>Examples of <i>production costs</i> are:</p> <ul style="list-style-type: none">(a) costs of labour to operate the wells and related equipment and facilities;(b) costs of repairs and maintenance;(c) costs of materials, supplies and fuel consumed, and supplies utilized, in operating the wells and related equipment and facilities;(d) costs of workovers;

- (e) *property* taxes and insurance costs applicable to *properties* and wells and related equipment and facilities; and
- (f) taxes, other than income and capital taxes.

Production group

One of the following together, in each case, with associated by-products:

- (a) light and medium *crude oil* (combined);
- (b) heavy *oil*;
- (c) *associated gas* and *non-associated gas* (combined); and
- (d) *bitumen, synthetic oil* or other products from non-conventional *oil and gas activities*.

[NI 51-101]

Product type

One of the following:

- (a) in respect of conventional *oil and gas activities*:
 - (i) light and medium *crude oil* (combined);
 - (ii) heavy *oil*;
 - (iii) *natural gas* excluding *natural gas* liquids; or
 - (iv) *natural gas* liquids; and
- (b) in respect of non-conventional *oil and gas activities*:
 - (i) *synthetic oil*;
 - (ii) *bitumen*;
 - (iii) coal bed methane;
 - (iv) hydrates;
 - (v) shale oil; or
 - (vi) shale gas.

[NI 51-101]

Professional organization

A self-regulatory organization of engineers, geologists, other geoscientists or other professionals whose professional practice includes *reserves evaluations* or *reserves audits*, that:

- (a) admits members primarily on the basis of their educational qualifications;
- (b) requires its members to comply with the professional standards of competence and ethics prescribed by the organization that are relevant to the estimation, *evaluation*, review or *audit* of *reserves data*;
- (c) has disciplinary powers, including the power to suspend or expel a member; and
- (d) is either:
 - (i) given authority or recognition by statute in a Canadian *jurisdiction*; or
 - (ii) accepted for this purpose by the *securities regulatory authority* or the *regulator*.

[NI 51-101]

Property

A *property* includes:

- (a) fee ownership or a *lease*, concession, agreement, permit, licence or other interest representing the right to extract *oil* or *gas* subject to such terms as may be imposed by the conveyance of that interest;
- (b) royalty interests, *production* payments payable in *oil* or *gas*, and other non-operating interests in *properties* operated by others; and
- (c) an agreement with a foreign government or authority under which a *reporting issuer* participates in the operation of *properties* or otherwise serves as "producer" of the underlying *reserves* (in contrast to being an *independent purchaser*, broker, dealer or importer).

A *property* does not include supply agreements, or contracts that represent a right to purchase, rather than extract, *oil* or *gas*.

<i>Property acquisition costs</i>	<p>Costs incurred to acquire a <i>property</i> (directly by purchase or <i>lease</i>, or indirectly by acquiring another corporate entity with an interest in the <i>property</i>), including:</p> <ul style="list-style-type: none">(a) costs of <i>lease</i> bonuses and options to purchase or <i>lease</i> a <i>property</i>;(b) the portion of the costs applicable to <i>hydrocarbons</i> when land including rights to hydrocarbons is purchased in fee;(c) brokers' fees, recording and registration fees, legal costs and other costs incurred in acquiring <i>properties</i>.
<i>Prospect</i>	<p>A geographic or stratigraphic area, in which the <i>reporting issuer</i> owns or intends to own one or more <i>oil</i> and <i>gas</i> interests, which is geographically defined on the basis of geological data and which is reasonably anticipated to contain at least one <i>reservoir</i> or part of a <i>reservoir</i> of <i>oil</i> and <i>gas</i>.</p>
<i>Prospective resources</i>	<p>Those quantities of <i>petroleum</i> estimated, as of a given date, to be potentially recoverable from undiscovered <i>accumulations</i> by application of future development projects.</p> <p><i>Prospective resources</i> have both an associated chance of discovery and a chance of development. [COGE Handbook]</p>
<i>Proved property</i>	<p>A <i>property</i> or part of a <i>property</i> to which <i>reserves</i> have been specifically attributed.</p>
<i>Proved reserves</i>	<p>See Part 2 of this Glossary. [COGE Handbook]</p>
<i>Qualified reserves auditor</i>	<p>An individual who:</p> <ul style="list-style-type: none">(a) in respect of particular <i>reserves data</i> or related information, possesses professional qualifications and experience appropriate for the estimation, <i>evaluation</i>, review and <i>audit</i> of the <i>reserves data</i> and related information; and(b) is a member in good standing of a <i>professional organization</i>. <p>[NI 51-101]</p>
<i>Qualified reserves evaluator</i>	<p>An individual who:</p> <ul style="list-style-type: none">(a) in respect of particular <i>reserves data</i> or related information, possesses professional qualifications and experience appropriate for the estimation, <i>evaluation</i> and review of the

reserves data and related information; and

(b) is a member in good standing of a *professional organization*.

[NI 51-101]

Qualified reserves evaluator or auditor

A qualified *reserves* auditor or a *qualified reserves evaluator*.

[NI 51-101]

Regulator

The *securities regulatory authority* or a person who holds a specified position with the *securities regulatory authority* (in several instances, its Executive Director or Director) in each *jurisdiction*.

[NI 14-101]

Reporting issuer

(a) A "*reporting issuer*" as defined in *securities legislation*; or

(b) in a *jurisdiction* in which the term is not defined in *securities legislation*, an issuer of securities that is required to file financial statements with the *securities regulatory authority*.

Reservation

In relation to a report on *reserves data*, a modification of the standard report of an *independent qualified reserves evaluator or auditor* on *reserves data* set out in *Form 51-101F2*, caused by a departure from the *COGE Handbook* or by a limitation in the scope of work that the *independent qualified reserves evaluator or auditor* considers necessary. A modification may take the form of a qualified or adverse opinion or a denial of opinion.

Reserves

See Part 2 of this Glossary. [*COGE Handbook*]

Reserves data

Estimates of proved reserves and probable reserves and related future net revenue estimated using forecast prices and costs. [NI 51-101]

Reservoir

A porous and permeable subsurface rock formation that contains a separate *accumulation of petroleum* that is confined by impermeable rock or water barriers and is characterized by a single pressure system. [*COGE Handbook*]

Resources

A general term that may refer to all or a portion of *total resources*.

Review

In relation to the role of a *qualified reserves evaluator or auditor* in respect of *reserves data*, steps carried out by the *qualified reserves evaluator or auditor*, consisting primarily of enquiry, analytical procedures, analysis, review of historical *reserves* performance and discussion with *reserves* management staff related to a *reporting issuer's reserves data*, with the limited objective of assessing whether

the *reserves data* is "plausible" in the sense of appearing to be worthy of belief based on the information obtained by the *qualified reserves evaluator or auditor* as a result of carrying out such steps.

Examination of documentation is not required unless the information does not appear to be plausible.

A *reserves* review, due to the limited nature of the investigation involved, does not provide the level of assurance provided by a *reserves audit*. Although *reserves* reviews can be done for specific applications, they are not a substitute for an *audit*. [*COGE Handbook*]

SEC

The Securities and Exchange Commission of the United States of America. [*NI 14-101*]

Securities legislation

The statute (in most cases entitled the "Securities Act") and subordinate legislation (in most cases including regulations or rules) specified, for each *jurisdiction*, in *NI 14-101*.

References in *NI 51-101* to *securities legislation* are to be read as references to *securities legislation* in the particular *jurisdiction*.

Securities regulatory authority

The securities commission or comparable body specified, for each *jurisdiction*, in *NI 14-101*.

References in *NI 51-101* to the *securities regulatory authority* are to be read as references to the *securities regulatory authority* in the particular *jurisdiction*.

SEDAR

The System for Electronic Document Analysis and Retrieval referred to in National Instrument 13-101 System for Electronic Document Analysis and Retrieval (*SEDAR*).

Service well

A well drilled or completed for the purpose of supporting *production* in an existing *field*. Wells in this class are drilled for the following specific purposes: *gas* injection (*natural gas*, propane, butane or flue *gas*), water injection, steam injection, air injection, salt-water disposal, water supply for injection, observation, or injection for combustion.

Solution gas

Gas dissolved in *crude oil*. See *gas*.

Stratigraphic test well

A drilling effort, geologically directed, to obtain information pertaining to a specific geologic condition. Ordinarily, such wells are drilled without the intention of being completed for hydrocarbon *production*. They include wells for the purpose of core tests and all types of expendable holes related to hydrocarbon exploration.

Stratigraphic test wells are classified as

- (a) "exploratory type" if not drilled into a proved *property*; or
- (b) "development type", if drilled into a proved *property*.
Development type stratigraphic wells are also referred to as "*evaluation wells*".

Support equipment and facilities Equipment and facilities used in *oil and gas activities*, including seismic equipment, drilling equipment, construction and grading equipment, vehicles, repair shops, warehouses, supply points, camps, and division, district or *field* offices.

Supporting filing A document filed by a *reporting issuer* with a *securities regulatory authority*. [NI 51-101]

Synthetic (crude) oil A mixture of *hydrocarbons* derived by upgrading crude *bitumen* from *oil* sands and kerogen from *oil* shales or other substances such as coal; may contain sulphur or other non-hydrocarbon compounds and has many similarities to crude *oil*.
[COGE Handbook]

Total petroleum initially-in-place That quantity of *petroleum* that is estimated to exist originally in naturally occurring *accumulations*.

It includes that quantity of *petroleum* that is estimated, as of a given date, to be contained in *known accumulations*, prior to *production*, plus those estimated quantities in *accumulations* yet to be discovered.
[COGE Handbook]

Total resources Refer to *total petroleum initially-in-place* as both terms are equivalent. [COGE Handbook]

Undeveloped reserves See Part 2 of this Glossary. [COGE Handbook]

Undiscovered petroleum initially-in-place That quantity of *petroleum* that is estimated, on a given date, to be contained in *accumulations* yet to be discovered.

The recoverable portion of *undiscovered petroleum initially-in-place* is referred to as *prospective resources*; the remainder is unrecoverable. [COGE Handbook]

Undiscovered resources Refer to *undiscovered petroleum initially-in-place* as both terms are equivalent. [COGE Handbook]

***Undiscovered
unrecoverable
petroleum initially-in-
place***

That portion of *undiscovered petroleum initially-in-place* which is estimated, as of a given date, not to be recoverable by future development projects.

A portion of these quantities may become recoverable in the future as commercial circumstances change or technological developments occur; the remaining portion may never be recovered due to the physical/chemical constraints represented by subsurface interaction of fluids and *reservoir* rocks. [*COGE Handbook*]

***Undiscovered
unrecoverable
resources***

Refer to *undiscovered unrecoverable petroleum initially-in-place* as both terms are equivalent.

Unproved property

A *property* or part of a *property* to which no *reserves* have been specifically attributed.

***Well abandonment
costs***

Costs of abandoning a well (*net* of salvage value) and of disconnecting the well from the surface gathering system. They do not include costs of abandoning the gathering system or reclaiming the wellsite.

PART 2 DEFINITIONS OF *RESERVES*

This Part is derived from Section 5 of Volume 1 of the *COGE Handbook* (First Edition, June 30, 2002). Consult a current edition of the *COGE Handbook* for updates and for additional explanation and guidance.

The following *reserves* definitions and guidelines are designed to assist evaluators in making *reserves* estimates on a reasonably consistent basis, and assist users of evaluation reports in understanding what such reports contain and, if necessary, in judging whether evaluators have followed generally accepted standards.

The guidelines outline

- general criteria for classifying *reserves*,
- procedures and methods for estimating *reserves*,
- confidence levels of individual entity and aggregate *reserves* estimates,
- verification and testing of *reserves* estimates.

The determination of *oil* and *gas reserves* involves the preparation of estimates that have an inherent degree of associated uncertainty. Categories of *proved*, *probable*, and *possible reserves* have been established to reflect the level of these uncertainties and to provide an indication of the probability of recovery.

The estimation and classification of *reserves* requires the application of professional judgement combined with geological and engineering knowledge to assess whether or not specific *reserves* classification criteria have been satisfied. Knowledge of concepts including uncertainty and risk, probability and statistics, and deterministic and probabilistic estimation methods is required to properly use and apply *reserves* definitions. These concepts are presented and discussed in greater detail within the guidelines in Section 5.5 [of the *COGE Handbook*].

The following definitions apply to both estimates of individual *reserves* entities and the aggregate of *reserves* for multiple entities.

Reserves Categories

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

- analysis of drilling, geological, geophysical and engineering data;
- the use of established technology;
- specified economic conditions, which are generally accepted as being reasonable, and shall be disclosed.

Reserves are classified according to the degree of certainty associated with the estimates.

- (a) **Proved reserves** are those *reserves* that can be estimated with a high degree of certainty to be recoverable. It is likely that the actual remaining quantities recovered will exceed the estimated *proved reserves*.
- (b) **Probable reserves** are those additional *reserves* that are less certain to be recovered than *proved reserves*. It is equally likely that the actual remaining quantities recovered will be greater or less than the sum of the estimated *proved* plus *probable reserves*.
- (c) **Possible reserves** are those additional *reserves* that are less certain to be recovered than *probable reserves*. It is unlikely that the actual remaining quantities recovered will exceed the sum of the estimated *proved* plus *probable* plus *possible reserves*.

Other criteria that must also be met for the classification of *reserves* are provided in [Section 5.5.4 of the *COGE Handbook*].

Development and Production Status

Each of the *reserves* categories (*proved*, *probable* and *possible*) may be divided into *developed* and *undeveloped* categories:

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

¹ For the purposes of NI 51-101, the key economic assumptions will be the prices and costs used in the estimate, namely:

- (a) **forecast prices and costs, and**
- (b) **at the option of the reporting issuer, constant prices and costs as at the last day of a reporting issuer's financial year.**

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

Developed non-producing reserves are those *reserves* that either have not been on *production*, or have previously been on *production* but are shut-in and the date of resumption of *production* is unknown.

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

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

Levels of Certainty for Reported Reserves

The qualitative certainty levels referred to in the definitions above are applicable to “individual *reserves* entities”, which refers to the lowest level at which *reserves* calculations are performed, and to “reported *reserves*”, which refers to the highest level sum of individual entity estimates for which *reserves* estimates are presented. Reported *reserves* should target the following levels of certainty under a specific set of economic conditions:

- at least a 90 percent probability that the quantities actually recovered will equal or exceed the estimated *proved reserves*;
- at least a 50 percent probability that the quantities actually recovered will equal or exceed the sum of the estimated *proved plus probable reserves*; and
- at least a 10 percent probability that the quantities actually recovered will equal or exceed the sum of the estimated *proved plus probable plus possible reserves*.

A quantitative measure of the certainty levels pertaining to estimates prepared for the various *reserves* categories is desirable to provide a clearer understanding of the associated risks and uncertainties. However, the majority of *reserves* estimates are prepared using deterministic methods that do not provide a mathematically derived quantitative measure of probability. In principle, there should be no difference between estimates prepared using probabilistic or deterministic methods.

Additional clarification of certainty levels associated with *reserves* estimates and the effect of aggregation is provided in Section 5 [of the *COGE Handbook*].

Questions

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