

CSA Staff Notice 51-324 (Revised)

Glossary to *Regulation 51-101 respecting Standards of Disclosure for Oil and Gas Activities*

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Section 1.1 of *Regulation 51-101 respecting Standards of Disclosure for Oil and Gas Activities* (Regulation 51-101 or the Regulation) defines a number of terms used in *Regulation 51-101*, Form 51-101F1 *Statement of Reserves Data and Other Oil and Gas Information* (Form 51-101F1), Form 51-101F2 *Report on [Reserves Data][,][Contingent Resources Data][and][Prospective Resources Data] by Independent Qualified Reserves Evaluator or Auditor* (Form 51-101F2), Form 51-101F3 *Report of Management and Directors on Oil and Gas Disclosure* (Form 51-101F3), Form 51-101F5 *Notice of Ceasing to Engage in Oil and Gas Activities* (Form 51-101F5) and *Policy Statement to Regulation 51-101 respecting Standards of Disclosure for Oil and Gas Activities* (Policy Statement). Section 1.2 of *Regulation 51-101 respecting Definitions* (Regulation 14-101) or the securities statute in the jurisdiction have the meaning or interpretation, if any, set out in the Canadian Oil and Gas Evaluation Handbook (COGE Handbook).

Part 1 of this Glossary explains much of the terminology used in Regulation 51-101 and its forms and the Policy Statement. It is provided only as a convenience to users of Regulation 51-101, to assist them in better understanding the purpose and application of Regulation 51-101. Part 2 of the Glossary focuses on the reserves explanations 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 Regulation 51-101, Regulation 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 Evaluation Engineers, Calgary Section (email spee@speccanada.org; website <https://speccanada.org/>).
- Regulation 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 other than reserves that are identified and defined in the COGE Handbook. At the present time, these categories are as follows:

- 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
1934 Act	The Securities Exchange Act of 1934 of the United States of America, as amended from time to time. [Regulation 14-101]
Abandonment and reclamation costs	All costs associated with the process of restoring a reporting issuer's property that has been disturbed by oil and gas activities to a standard imposed by applicable government or regulatory authorities. [Regulation 51-101]
Accumulation	An individual body of petroleum in a reservoir. [COGE Handbook]
Adsorption	The adhesion of molecules to a surface. This may occur as physisorption, due to weak van der Waals forces, chemisorption, the result of covalent bonding, or to electrostatic attraction. [COGE Handbook]
Alternate reference point	A location at which quantities and values of a product type are measured before the first point of sale. [Regulation 51-101]
Amenable volumes	<p>A subsurface stratigraphic interval containing a certain minimum thickness of continuous, predominantly bitumen-saturated sand, net of non-reservoir, with porosity and mass bitumen content (ratio of bitumen to water and mineral matter) meeting specific criteria (typically, a minimum of 27 and 7-8 percent, respectively).</p> <p>This is the volume of bitumen that it is estimated could be physically extracted from an accumulation being evaluated after the application of reservoir cut-offs and project technical considerations, but before consideration of regulatory aspects, and surface limitations such as access. [COGE Handbook]</p>
Annual information form	A completed Form 51-102F2 Annual Information Form, or in the case of an SEC issuer (as defined in <i>Regulation 51-102 respecting Continuous Disclosure Obligations</i>) 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. [Regulation 51-102]

Analogous fields

Fields having similar properties that are at a more advanced stage of development or production history than the field of specific interest; may provide concepts or patterns to assist in the interpretation of more limited data. [COGE Handbook]

Analogous information

Information about an area outside the area in which the reporting issuer has an interest or intends to acquire an interest, which is referenced by the reporting issuer for the purpose of drawing a comparison or conclusion to an area in which the reporting issuer has an interest or intends to acquire an interest, which comparison or conclusion is reasonable, and includes:

- 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.

[Regulation 51-101]

Analogy

The process of transferring information on a subject accumulation or reservoir (the analogue or source) to another accumulation or reservoir (the target or subject). (See also reservoir analogue and recovery process analogue.) [COGE Handbook]

Anticipated results

Information that may, in the opinion of a reasonable person, indicate the potential value or quantities of resources in respect of the reporting issuer's resources or a portion of its resources and includes:

- estimates of volume;
- estimates of value;
- areal extent;
- pay thickness;
- flow rates; or
- hydrocarbon content. [Regulation 51-101]

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	<p>A naturally occurring solid or semi-solid hydrocarbon</p> <p>(a) consisting mainly of heavier hydrocarbons, with a viscosity greater than 10,000 millipascal-seconds (mPa·s) or 10,000 centipoise (cP) measured at the hydrocarbons' original temperature in the reservoir and at atmospheric pressure on a gas-free basis, and</p> <p>(b) that is not primarily recoverable at economic rates through a well without the implementation of enhanced recovery methods.</p> <p>[Regulation 51-101]</p>
BOE	<p>Barrel of oil equivalent. [Regulation 51-101 and COGE Handbook]</p>
By-product	<p>A substance that is recovered as a consequence of producing a product type. [Regulation 51-101]</p>
Chance of commerciality	<p>The product of the chance of discovery and the chance of development. [COGE Handbook]</p>
Chance of development	<p>The estimated probability that, once discovered, a known accumulation will be commercially developed. [COGE Handbook]</p>
Chance of discovery	<p>The estimated probability that exploration activities will confirm the existence of a significant accumulation of potentially recoverable petroleum. [COGE Handbook]</p>
Coal bed methane	<p>Natural gas that</p> <p>(a) primarily consists of methane, and</p> <p>(b) is contained in a coal deposit. [Regulation 51-101]</p>
COGE Handbook	<p>The "Canadian Oil and Gas Evaluation Handbook" maintained by the Society of Petroleum Evaluation Engineers (Calgary Chapter), as amended from time to time. [Regulation 51-101]</p>

Commercial

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

- 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. [COGE Handbook]

Conceptual (scoping) study

The initial stage of the development of a project scenario, with limited detail and typically based on limited information. [COGE Handbook]

Contingency

A condition that must be satisfied for a portion of contingent resources to be classified as reserves that is: (a) specific to the project being evaluated; and (b) expected to be resolved within a reasonable timeframe.

For additional information, see section 2.5 of the ROTR Guidelines. Note that the Petroleum Resources Management System equates contingency with conditions, which are defined as follows: “the economic, marketing, legal, environmental, social, and governmental factors forecast to exist and impact the project during the time period being evaluated.” Contingency was not defined in the COGE Handbook before the ROTR Guidelines was published, although a similar list is provided. The term “condition” is purely descriptive and does not imply that that any action is required, whereas a “contingency” is a factor that must be resolved in order to reclassify a resource. The Petroleum Resources Management System Guidelines use the term “critical contingency” and, although some contingencies may be more easily resolved than others, they are all go/no-go decision gates that must be resolved. (See also technical contingency.) [COGE Handbook]

Contingent resources

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. (See also economic contingent resources, and sub-economic contingent resources.) [COGE Handbook]

Contingent resources data

Means

- (a) an estimate of the volume of contingent resources, and
- (b) the risked net present value of future net revenue of contingent resources. [Regulation 51-101]

Conventional natural gas

Natural gas that has been generated elsewhere and has migrated as a result of hydrodynamic forces and is trapped in discrete accumulations by seals that may be formed by localized structural, depositional or erosional geological features. [Regulation 51-101]

Crude 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. [COGE Handbook]
CSA	The Canadian Securities Administrators, an association consisting of the thirteen securities regulatory authorities in Canada.
Cut-off	A limiting value of a reservoir parameter that removes non-contributing intervals from resource calculations. The petroleum contained in the reservoir below a cut-off is classified as unrecoverable. [COGE Handbook]
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.

Development not viable

Where no further data acquisition or evaluation is currently planned and hence there is a low chance of development. [COGE Handbook]

Development on hold

Where there is a reasonable chance of development, but there are major non-technical contingencies to be resolved that are usually beyond the control of the operator. [COGE Handbook]

Development pending

Where resolution of the final conditions for development is being actively pursued (high chance of development). [COGE Handbook]

Development study	The most detailed step in the development of a project evaluation scenario. It is based on detailed geological and engineering study and economic analysis of information on the specific project, and provides sufficient information for the creation of a development plan, from which a development decision can be made. [COGE Handbook]
Development unclarified	When the evaluation is incomplete and there is ongoing activity to resolve any risks or uncertainties. [COGE Handbook]
Development well	A well drilled inside the established limits of an oil or gas reservoir, or in close proximity to the edge of the reservoir, to the depth of a stratigraphic horizon known to be productive.
Discovered petroleum initially-in-place	<p>That quantity of petroleum that is estimated, as of a given date, to be contained in known accumulations prior to production.</p> <p>The recoverable portion of discovered petroleum initially-in-place includes production, reserves and contingent resources; the remainder is unrecoverable. [COGE Handbook]</p>
Discovered resources	Refer to discovered petroleum initially-in-place as both terms are equivalent. [COGE Handbook]
Discovered unrecoverable petroleum initially-in-place	<p>That portion of discovered petroleum initially-in-place 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 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]</p>
Discovered unrecoverable resources	Refer to discovered unrecoverable petroleum initially-in-place as both terms are equivalent.
Discovery	The confirmation of the existence of an accumulation of a significant quantity of potentially recoverable petroleum. For additional information, see section 2.2.2 of the COGE Handbook, vol. 2 Definitions. [COGE Handbook]

Economic contingent resources	Those contingent resources that are currently economically recoverable. [COGE Handbook]
Effective date	In respect of information, the date as at which, or for the period ended on which, the information is provided. [Regulation 51-101]
Established technology	Methods that have been proven to be successful in commercial applications. [COGE Handbook]
Evaluation	In relation to reserves data or resources other than reserves, the process whereby an economic analysis is made of a property to arrive at an estimate of a range of net present values of the estimated future net revenue resulting from the production of the reserves or resources other than reserves associated with the property. [COGE Handbook]
Experimental technology	A technology that is being field tested to determine the technical viability of applying a recovery process to unrecoverable discovered petroleum initially-in-place in a subject reservoir. It cannot be used to assign any class of recoverable resources (i.e., reserves, contingent resources, prospective resources). [COGE Handbook]
Exploitable bitumen in-place (EBIP)	This is the volume of accessible bitumen that is estimated could be extracted from a volume considered to be amenable to exploitation, after the application of regulatory factors and surface limitations. [COGE Handbook]

Exploration costs

Costs incurred in identifying areas that may warrant examination and in examining specific areas that are considered to have prospects that may contain oil and gas reserves, including costs of drilling exploratory wells and exploratory type stratigraphic test wells.

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.

First point of sale

The first point after initial production at which there is a transfer of ownership of a product type. [Regulation 51-101]

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).
[Regulation 51-101]

Foreign geographic area

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

Form 51-101F1

Form 51-101F1 *Statement of Reserves Data and Other Oil and Gas Information.*

Form 51-101F2

Form 51-101F2 *Report on [Reserves Data][,][Contingent Resources Data][and][Prospective Resources Data] by Independent Qualified Reserves Evaluator or Auditor.*

Form 51-101F3

Form 51-101F3 *Report of Management and Directors on Oil and Gas Disclosure.*

Form 51-101F4

Form 51-101F4 *Notice of Filing of 51-101F1 Information.*

Form 51-101F5

Form 51-101F5 *Notice of Ceasing to Engage in Oil and Gas Activities*

Future income tax expenses

Expenses estimated (generally, year-by-year):

- (a) making appropriate allocations of estimated unclaimed costs and losses carried forward for tax purposes, between oil and gas activities 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 reporting issuer's oil and gas activities the appropriate year-end statutory tax rates, taking into account future tax rates already legislated.

Future net revenue

A forecast of revenue, estimated using forecast prices and costs or constant prices and costs, arising from the anticipated development and production of resources, net of the associated royalties, operating costs, development costs, and abandonment and reclamation costs. [Regulation 51-101]

Gas

Includes natural gas, conventional natural gas, coal bed methane, gas hydrates, shale gas, and synthetic gas.

Gas hydrate

A naturally occurring crystalline substance composed of water and gas in an ice-lattice structure. [Regulation 51-101]

Gross

- (a) In relation to a reporting issuer's interest in production or reserves, its "company gross reserves", which are the reporting issuer's working interest (operating or non-operating) share before deduction of royalties and without including any royalty interests of the reporting issuer.
- (b) In relation to wells, the total number of wells in which a reporting issuer has an interest.
- (c) In relation to properties, the total area of properties in which a reporting issuer has an interest.

Heavy crude oil

Crude oil with a relative density greater than 10 degrees API gravity and less than or equal to 22.3 degrees API gravity. [Regulation 51-101]

Hydrocarbon	A compound consisting of hydrogen and carbon, which, when naturally occurring, may also contain other elements such as sulphur. [Regulation 51-101]
Independent	In respect of the relationship between a reporting issuer and a person, the relationship between the reporting issuer and that person in which there is no circumstance that could, in the opinion of a reasonable person aware of all relevant facts, interfere with that person's exercise of judgment regarding the preparation of information which is used by the reporting issuer. [Regulation 51-101]
Jurisdiction	For the purposes of Regulation 51-101, a province or territory of Canada. [Regulation 14-101]
Kerogen	A solid organic substance, insoluble in organic solvents, that results from the degradation of algae and woody plant material. [COGE Handbook]
Kerogenous shale (oil shale)	Shale that contains the solid hydrocarbon kerogen, which can sometimes be burned without processing or can be converted to liquid petroleum by a pyrolysis process, either in situ or at surface after mining. [COGE Handbook]
Known accumulation	An accumulation that has been penetrated by a well that has demonstrated the existence of a significant quantity of potentially recoverable petroleum, preferably by flow testing that demonstrates that the petroleum is moveable. If there is no flow test, log and/or core data may suffice, provided a good commercial analogue is available to justify the assumption that the petroleum is moveable. Where log and/or core data demonstrate the existence of an accumulation but recovery potential can only be justified through extensive testing or experimental technology, the associated petroleum initially-in-place must be classified as discovered unrecoverable until a technically viable recovery technology can be demonstrated. [COGE Handbook]
Lead	A potential accumulation within a play that requires more data acquisition and/or evaluation in order to be classified as a prospect. [COGE Handbook]

Lease	An agreement granting to the lessee rights to explore, develop and exploit a property.
Light crude oil	Crude oil with a relative density greater than 31.1 degrees API gravity. [Regulation 51-101]
Marketable	In respect of reserves or sales of oil, gas or associated by-products, the volume of oil, gas 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 gas, this may occur either before or after the removal of natural gas liquids. For heavy crude oil or bitumen, this is before the addition of diluent.
Material (or materiality)	<p>For the purposes of Regulation 51-101, information is material, in respect of a reporting issuer, if it would be likely to influence a decision by a reasonable investor to buy, hold or sell a security of the reporting issuer.</p> <p>This meaning differs from the definitions of “material change” and “material fact” in securities legislation. [Regulation 51-101]</p>
Mcf	Thousand cubic feet. [COGE Handbook]
McfGE	Thousand cubic feet of gas equivalent. [Regulation 51-101 and COGE Handbook]
Medium crude oil	Crude oil with a relative density that is greater than 22.3 degrees API gravity and less than or equal to 31.1 degrees API gravity. [Regulation 51-101]
Natural gas	A naturally occurring mixture of hydrocarbon gases and other gases. [Regulation 51-101]
Natural gas liquids (or NGLs)	Those hydrocarbon components that can be recovered from natural gas as a liquid including, but not limited to, ethane, propane, butanes, pentanes plus, and condensates. [Regulation 51-101]

Net

- (a) In relation to a reporting issuer's interest in production or reserves, the reporting issuer's working interest (operating or non-operating) share after deduction of royalty obligations, plus the reporting issuer's royalty interests in production or reserves.
- (b) In relation to a reporting issuer's interest in wells, the number of wells obtained by aggregating the reporting issuer's working interest in each of its gross wells.
- (c) In relation to a reporting issuer's interest in a property, the total area in which the reporting issuer has an interest multiplied by the working interest owned by the reporting issuer.

Net pay

That portion of the thickness of a reservoir from which petroleum can be produced or extracted. [COGE Handbook]

Oil

Includes crude oil, bitumen, tight oil and synthetic crude oil.

Oil and gas activities

Includes the following:

- (a) searching for a product type in its natural location;
- (b) acquiring property rights or a property for the purpose of exploring for or removing product types from their natural locations;
- (c) any activity necessary to remove product types from their natural locations, including construction, drilling, mining and production, and the acquisition, construction, installation and maintenance of field gathering and storage systems including treating, field processing and field storage;
- (d) producing or manufacturing of synthetic crude oil or synthetic gas;

but does not include any of the following:

- (e) any activity that occurs after the first point of sale;
- (f) any activity relating to the extraction of a substance other than a product type and their by-products;
- (g) extracting hydrocarbons as a consequence of the extraction of geothermal steam. [Regulation 51-101]

Oil and gas metric

A numerical measure of a reporting issuer's oil and gas activities.

Operating costs

Production costs.

Ore

Ore is a mining term describing oil sand with a minimum thickness that can be technically removed with current mining equipment and contains a minimum bitumen content required for anticipated extraction technology. [COGE Handbook]

Petroleum

A naturally occurring mixture consisting predominantly of hydrocarbons in the gaseous, liquid, or solid phase. [COGE Handbook]

Play

A family of geologically similar fields, discoveries, prospects, and leads. [COGE Handbook]

Possible reserves

See Part 2 of this Glossary. [COGE Handbook]

Pre-development study

An intermediate step in the development of a project evaluation scenario. The amount of information that is available for the reservoir of interest is greater than for a conceptual study. In particular, the petroleum initially-in-place has been reasonably well defined and the remaining uncertainty lies largely in the recovery factor and the economic viability. The level of economic analysis is sufficient to assess development options and overall project viability, but is insufficient for a final investment decision or for seeking outside major financing. [COGE Handbook]

Preparation date

In respect of written disclosure, the most recent date to which information relating to the period ending on the effective date was considered in the preparation of the disclosure. [Regulation 51-101]

Probable reserves

See Part 2 of this Glossary. [COGE Handbook]

Product type

Any of the following:

- (a) bitumen;
- (b) coal bed methane;
- (c) conventional natural gas;
- (d) gas hydrates;
- (e) heavy crude oil;
- (f) light crude oil and medium crude oil combined;
- (g) natural gas liquids;
- (h) shale gas;
- (i) synthetic crude oil;
- (j) synthetic gas; or
- (k) tight oil. [Regulation 51-101]

Production

The cumulative quantity of petroleum that has been recovered at a given date. [COGE Handbook]

Recovering, gathering, treating, field or plant processing (for example, processing gas to extract natural gas liquids) and field storage of oil and gas.

The oil production function is usually regarded as terminating at the outlet valve on the lease or field production storage tank. The gas production function is usually regarded as terminating at the plant gate. In some circumstances, it may be more appropriate to regard the production function as terminating at the first point at which oil, gas or their by-products are delivered to a main pipeline, a common carrier, a refinery or a marine terminal.

**Production costs (or
Operating costs)**

Costs incurred to operate and maintain wells and related equipment and facilities, including applicable operating costs of support equipment and facilities and other costs of operating and maintaining those wells and related equipment and facilities.

Lifting costs become part of the cost of oil and gas produced.

Examples of production costs are:

- (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.

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 jurisdiction of Canada; or
 - (ii) accepted for this purpose by the securities regulatory authority or the regulator. [Regulation 51-101]

Project

A defined activity, or set of activities, that provides the basis for the assessment and classification of resources. [COGE Handbook]

Project Evaluation Scenario Status

The degree to which the project scenario has been developed. Three levels of development are identified - conceptual, pre-development, and development. For additional information, see section 2.4.7 Recovery Project Evaluation Scenario Status in section 2 of volume 2 of the COGE Handbook. (See also conceptual (scoping) study, pre-development study, and development study.) [COGE Handbook]

Project Maturity
Sub-Classes for Contingent Resources

See also development unclarified, development pending, development on hold, and development not viable. [COGE Handbook]

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.

Property acquisition costs

Costs incurred to acquire a property (directly by purchase or lease, or indirectly by acquiring another corporate entity with an interest in the property), including:

- (a) costs of lease bonuses and options to purchase or lease a property;
- (b) the portion of the costs applicable to hydrocarbons 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 properties.

Prospect

A geographic or stratigraphic area, in which the reporting issuer owns or intends to own one or more oil and gas interests, which is geographically defined on the basis of geological data and which is reasonably anticipated to contain at least one reservoir or part of a reservoir of oil and gas.

Prospective resources

Those quantities of petroleum estimated, as of a given date, to be potentially recoverable from undiscovered accumulations by application of future development projects.

Prospective resources have both an associated chance of discovery and a chance of development. [COGE Handbook]

Prospective resources data

Means

- (a) an estimate of the volume of prospective resources, and
- (b) the risked net present value of future net revenue of prospective resources; [Regulation 51-101]

Proved property

A property or part of a property to which reserves have been specifically attributed.

Proved reserves

See Part 2 of this Glossary. [COGE Handbook]

Qualified reserves auditor

An individual who:

- (a) in respect of particular reserves data, resources or related information, possesses professional qualifications and experience appropriate for the estimation, evaluation, review and audit of the reserves data, resources and related information; and
- (b) is a member in good standing of a professional organization.
[Regulation 51-101]

Qualified reserves evaluator

An individual who:

- (a) in respect of particular reserves data, resources or related information, possesses professional qualifications and experience appropriate for the estimation, evaluation and review of the reserves data, resources and related information; and
- (b) is a member in good standing of a professional organization.
[Regulation 51-101]

Qualified reserves evaluator or auditor

A qualified reserves evaluator or a qualified reserves auditor.
[Regulation 51-101]

Recovery process analogue

A recovery process that is an established technology or technology under development in the analogue reservoir that can be applied to the subject reservoir being evaluated. [COGE Handbook]

Recovery technology status

See established technology, technology under development, and experimental technology. [COGE Handbook]

Refinery	A refinery (depending on the processes in the facility) can use different crude oils, conventional (unprocessed) or synthetic (already upgraded once) including heavy crude oil and bitumen, to make final products for the market or specialized products for further processing, like petrochemicals. [COGE Handbook]
Regulation (or Regulation 51-101)	<i>Regulation 51-101 respecting Standards of Disclosure for Oil and Gas Activities.</i>
Regulation 14-101	<i>Regulation 14-101 respecting Definitions.</i>
Regulation 51-101 or the Regulation	<i>Regulation 51-101 respecting Standards of Disclosure for Oil and Gas Activities.</i>
Regulation 51-102	<i>Regulation 51-102 respecting Continuous Disclosure Obligations.</i>
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. [Regulation 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 or resources (if applicable), a modification of the standard report of an independent qualified reserves evaluator or auditor on reserves data or resources 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. [Regulation 51-101]

Reservoir	A subsurface rock unit that contains an accumulation of petroleum. [COGE Handbook]
Reservoir Analogue	A reservoir with similar rock properties (lithological, depositional, diagenetic, and structural), fluid properties (hydrocarbon type, composition, density, and viscosity), reservoir conditions (depth, temperature, and pressure) and drive mechanisms that can be used as a model for the subject reservoir being evaluated. [COGE Handbook]
Resource Type	Describes the accumulation and is determined by the combination of the type of hydrocarbon and the rock in which it occurs. For additional information, see section 2.1.3 Resource Types of section 2 of volume 2 of the COGE Handbook. [COGE Handbook]
Resources	Petroleum quantities that originally existed on or within the earth's crust in naturally occurring accumulations, including discovered and undiscovered (recoverable and unrecoverable) plus quantities already produced. Total resources is equivalent to total petroleum initially-in-place. [COGE Handbook]
Review	<p>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.</p> <p>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]</p>
Risked	Adjusted for the probability of loss or failure in accordance with the COGE Handbook. [Regulation 51-101]

SEC	The Securities and Exchange Commission of the United States of America. [Regulation 14-101]
Securities legislation	<p>The statute (in most cases entitled the “Securities Act”) and subordinate legislation (in most cases including regulations or rules) specified, for each jurisdiction, in Regulation 14-101.</p> <p>References in Regulation 51-101 to securities legislation are to be read as references to securities legislation in the particular jurisdiction.</p>
Securities regulatory authority	<p>The securities commission or comparable body specified, for each jurisdiction, in Regulation 14-101.</p> <p>References in Regulation 51-101 to the securities regulatory authority are to be read as references to the securities regulatory authority in the particular jurisdiction.</p>
SEDAR+	The System for Electronic Data Analysis and Retrieval+ referred to in <i>Regulation 13-103 respecting System for Electronic Data Analysis and Retrieval+ (SEDAR+)</i> .
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.
Shale gas	<p>Natural gas:</p> <ul style="list-style-type: none">(a) contained in dense organic-rich rocks, including low-permeability shales, siltstones and carbonates, in which the natural gas is primarily adsorbed on the kerogen or clay minerals, and(b) that usually requires the use of hydraulic fracturing to achieve economic production rates. [Regulation 51-101]
Solution gas	Gas dissolved in crude oil.

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”.

Sub-economic contingent resources

Those contingent resources that are not currently economically recoverable. There should be a reasonable expectation of a change in economic conditions within the near future that will result in them becoming economically viable. [COGE Handbook]

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. [Regulation 51-101]

Synthetic crude oil

A mixture of liquid hydrocarbons derived by upgrading bitumen, kerogen or other substances such as coal, or derived from gas to liquid conversion and may contain sulphur or other compounds. [Regulation 51-101]

Synthetic gas

A gaseous fluid

- (a) generated as a result of the application of an in-situ transformation process to coal or other hydrocarbon-bearing rock; and
- (b) comprised of not less than 10% by volume of methane. [Regulation 51-101]

Technical contingency

A technical issue that must be resolved to allow the commercial application of a recovery process technology to a specific reservoir. [COGE Handbook]

Technology under development	A recovery process that has been determined to be technically viable via field test and is being field tested further to determine its economic viability in the subject reservoir. Contingent resources may be assigned if the project provides information that is sufficient and of a quality to meet the requirements for this resource class. (Note: this replaces the definition in the COGE Handbook volume 1, Appendix A - <i>Glossary</i> . [COGE Handbook]
Tight Oil	Crude oil <ul style="list-style-type: none">(a) contained in dense organic-rich rocks, including low-permeability shales, siltstones and carbonates, in which the crude oil is primarily contained in microscopic pore spaces that are poorly connected to one another, and(b) that typically requires the use of hydraulic fracturing to achieve economic production rates. [Regulation 51-101]
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]
Total volume (m³): bitumen in-place (m³) (TV:BIP)	The ratio of the total volume of material under consideration for mining to the total contained bitumen within the ore component of that volume. The in-place bitumen content is derived exclusively from the component model blocks or zones, which have been determined to be ore, through an ore-waste discrimination process. [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.

Unrecoverable

That portion of discovered or undiscovered petroleum initially-in-place quantities 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]

Upgrader

An upgrader is a facility that processes either heavy crude oil or bitumen into products that can either flow without diluent being added or other blends of crude with properties that are now desirable in a typical refinery. Many different blends can be made at an upgrader for the final user. One of the most common (sweet synthetic) is the premium crude, which is made from a blend of treated naphtha, kerosene (distillate) and gas oil. This product has been sold in the market place since the late 1960s. It is also possible to make untreated blends of upgraded crude oils and final products like diesel fuel. Typically, gasoline is not made at an upgrader. [COGE Handbook]

Upgrading

Upgrading is a term used to describe the process of changing the structure or improving the quality of a heavy crude oil or bitumen to allow either further use as a final product or feedstock to a refinery. Typically, heavy oils and bitumen contain large amounts of asphaltenes, metals, sulphur, and nitrogen components. Removal of these components or impurities will usually result in a higher price for the upgraded oil.

Constituents like asphaltenes are long chain aromatic ring type hydrocarbons that are prone to coking (a term which results in these long chain molecules breaking and then rejoining to form even longer chain molecules), which will plug or foul equipment and catalyst.
[COGE Handbook]

U.S. federal securities laws

The federal statutes of the United States of America concerning the regulation of securities markets and trading in securities and the regulations, rules, forms and schedules under those statutes, all as amended from time to time. [Regulation 14-101]

PART 2 DEFINITIONS OF RESERVES

This Part is derived from Section 5 of Volume 1 of the COGE Handbook (Second Edition, September 1, 2007). 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.

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

Please refer questions to any of the following:

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