

▲ MAY 2017

Evaluation of Oil and Gas Reserves and Resources for Public Disclosure



DOCUMENT HISTORY

Date	Version	Revision Description
April 2003	1.0	Initial issue for membership use.
May 2017	2.0	Updated current practices and address changes to the securities legislation and governing practices. Issued for membership use.

CONTENTS

Preface **1**

Practice Standards Committee **1**

1.0 Overview **2**

 1.1 Purpose 2

 1.2 Scope 2

 1.3 Definitions 4

2.0 Evaluation And Classification Process **5**

3.0 Standards For Preparing Evaluations **6**

 3.1 Professional Work 6

 3.2 Quality Management 6

 3.3 Technical Standards 7

 3.4 Accountability 7

 3.5 Information Gathering 7

 3.6 Third-Party Evaluation 8

 3.7 Information Analysis 8

 3.8 Documentation 8

 3.9 Professional Objectivity 9

 3.10 Professional Competence 9

 3.11 False Precision 10

 3.12 Related Documents 10

PREFACE

An APEGA professional practice standard presents a level of performance expected of APEGA Professional Members. Although practice standards are not specifically legislated, Part 8 (General) of the General Regulation under Sections 58 and 59 permits APEGA to publish guides that define for clients the scope of professional services to be expected and allows Council to issue publications for promoting high standards of professional services. Professional Members are expected to conform to practice standards, which direct what is deemed to be acceptable practice.

Practice standards use the words **must**, **should**, and **may** to indicate three types of actions.

Must indicates that requirements must be followed to conform to the professional practice standard (*must equals is required to*).

Should indicates that among several possibilities one is recommended as particularly suitable without mentioning or excluding others, or that a certain course of action is preferred but not necessarily required, or that (in the negative form) a certain course of action is disapproved of but not prohibited (*should equals is recommended that*).

May indicates that a course of action is permissible within the limits of the standard (*may equals is permitted*).

PRACTICE STANDARDS COMMITTEE

APEGA's Practice Standards Committee (PSC) publishes professional practice standards, bulletins, and guidelines to promote high levels of professional service. A subcommittee of the PSC prepared this version of the practice standard. At the time the standard was completed, the subcommittee had the following members:

Charles Welsh, P.Geo., Chair

John Etherington, P.Geol.

David Elliott, P.Geol.

Jim Jenkins, P.Eng.

Jim Gouveia, P.Eng.

The participants recognize the diligence and rigour provided by the team of the previous version.

Send comments to improve this document to:

Director, Professional Practice

APEGA

1500 Scotia One, 10060 Jasper Avenue

Edmonton, Alberta T5J 4A2

1.0 OVERVIEW

This document is a standard of practice for the evaluation of oil and gas reserves and resources for the purpose of public disclosure such as:

- mandated disclosure by securities regulators
- disclosure through other regulatory bodies (e.g., National Energy Board, Alberta Energy Regulator)
- voluntary disclosure through publications (e.g., news releases, technical papers)

Publicly disclosed evaluations of oil and gas reserves and resources are used to make investment, regulatory, and other decisions. Conducting resource and reserve evaluations is professional practice as defined by the *Engineering and Geoscience Professions Act*. One of APEGA's roles as the regulator of the engineering and geoscience professions is to maintain appropriate standards of professional practice.

Evaluators and auditors **may** be required to publish their reports in other jurisdictions and be subject to the technical or public disclosure standards of those jurisdictions. The same or better ethical principles and standards of practice than those required by evaluators and auditors are to be used in preparing the reports.

1.1 Purpose

This professional practice standard defines APEGA's expectations for the preparation of oil and gas reserve and resource evaluations. APEGA's committees and boards **may** use this practice standard to assess the professional practice of a Professional Member or Permit Holder.

1.2 Scope

The Canadian Oil and Gas Evaluation (COGE) Handbook is the technical standard for the professional practice of evaluating and classifying oil and gas reserves and resources in Alberta.

The Evaluation of Oil and Gas Reserves and Resources for Public Disclosure practice standard provides the professional and ethical standards to which Alberta evaluators and auditors are required to adhere. This standard applies to evaluations and audits that will, or can reasonably be expected to, become public (e.g., regulatory submissions, court documents). It **should** also apply to evaluations of oil and gas reserves and resources prepared for a company's internal purposes. This practice standard includes the recovered product types defined in National Instrument 51-101:

- bitumen
- coalbed methane
- conventional natural gas

- gas hydrates
- heavy crude oil
- light crude oil and medium crude oil combined
- natural gas liquids
- shale gas
- synthetic crude oil
- synthetic gas
- tight oil
- tight gas

The relationship between this practice standard and Alberta securities administration is described in Appendix E to Volume 1, section 3.3 in the COGE Handbook as follows:

“The Canadian Securities Administrator provides Standards of Disclosure for Oil and Gas Activities for Canadian issuers under National Instrument 51-101. NI 51-101 refers to the Canadian Oil and Gas Evaluation (COGE) Handbook to provide additional guidance to evaluators regarding assessment and reporting of petroleum reserves and resources and their associated future net revenue. By this reference, the COGE Handbook guidelines have the force of NI 51-101 disclosure regulations unless specifically added or amended in NI 51-101.

Under Volume 1 Section 3.3, the COGE Handbook contains guidance on Qualifications of Evaluators and Auditors, Enforcement, and Discipline. Overseeing professional conduct of individual evaluators and permit holding organizations in Canada falls under the responsibility of provincial professional organizations that regulate the practice of engineering, geology and geophysics. Included in the COGE Handbook under Appendix E is the Practice Standard for Evaluation of Oil and Gas Reserves and Resources for Public Disclosure published by The Association of Professional Engineers and Geoscientists of Alberta (APEGA). All engineers and geoscientists practicing within the Province of Alberta are required to register with APEGA and those engaged in oil and gas reserves and resource evaluations are subject to the guidance in Appendix E.

It is recognized that, while NI 51-101 and the COGE Handbook provide Canadian federal regulations regards reserves and resources public disclosures, the professional oversight is administered by the jurisdiction in which individual members and permit holders are registered. Thus each province or territory or foreign jurisdiction may issue and enforce guidance similar to that promulgated by APEGA. Optionally, they can refer to the APEGA guidance as a minimum requirement.”

The principles of this practice standard regulate the conduct of evaluators and auditors regardless of the report scope or audience. Although this practice standard refers to the COGE Handbook, the principles also apply to disclosures under regulations and guidance provided by jurisdictions outside of Canada that do not fall under NI 51-101 or the COGE Handbook. Evaluators and auditors **should** define and follow the regulations and guidelines applicable to the jurisdiction of their report.

The professional obligations contained in this practice standard apply to all work performed by the registrants in the areas of oil and gas evaluation, classification, and reporting and **may** exceed mandated public disclosure regulations.

1.3 Definitions

For the purposes of this professional practice standard, the following terms and definitions apply.

Act

The *Engineering and Geoscience Professions Act*

Audit

A third-party assessment of an estimate and classification of an oil and gas reserve and resource quantities and their economic value to an organization.

Auditor

A third-party *Qualified Reserves Auditor*, as defined in the Canadian Oil and Gas Evaluation Handbook, is a Professional Member with sufficient educational background, training, and experience to exercise reasonable and prudent judgement when advising a company whether its resources and reserves are presented according to standards prescribed by the technical and financial regulators for the jurisdiction in which they are reported.

Authentication

Application of a Professional Member's stamp, signature, and date as prescribed by APEGA's *Authenticating Professional Documents* practice standard. Such authentication can include a Permit Number.

Canadian Oil and Gas Evaluation Handbook

The technical standard for the professional practice of evaluating and classifying oil and gas reserves and resources in Alberta.

Evaluation

The estimation and classification of oil and gas reserve and resource quantities and their economic value

Evaluator

A *Qualified Reserves Evaluator*, as defined in the Canadian Oil and Gas Evaluation Handbook, is a Professional Member with sufficient educational background, training, and experience to exercise prudent judgement when classifying and estimating resources and reserves and when preparing and analyzing cash flows. The evaluator **may** be employed by a third-party Permit Holder or by the company owning the resources being classified and evaluated.

May

A course of action permissible within the limits of the professional practice standard (*may equals is permitted*)

Must

Requirements that must be followed to conform to the professional practice standard (*must equals is required to*)

Permit Holder

A company that engages in the practice of engineering and/or geoscience in Alberta as part of its business

Professional Member

A Professional Engineer or Professional Geoscientist authorized to practise engineering and/or geoscience under the Act

Public Disclosure

Any information released outside of an originating office intended as advice or background that would be useful to decision makers or the public

Reasonableness

Within context, a reasoned confidence of a Professional Member in his or her interpretation, exercising good practice

Responsible Member

A Professional Member who provides overall direction and is responsible for the quality management program under which Professional Members practise the professions of engineering and geoscience

Should

Among several possibilities one is recommended as particularly suitable without mentioning or excluding others, or that a certain course of action is preferred but not necessarily required, or that (in the negative form) a certain course of action is disapproved of but not prohibited (*should equals is recommended that*)

2.0 EVALUATION AND CLASSIFICATION PROCESS

Evaluation of oil and gas reserves and resources is technical work prepared to provide estimates of the quantities, qualities, and values of known or potential hydrocarbon resources considered to be prospective or known accumulations. Recoverability is based on technical feasibility, economic factors, and other factors relevant to commerciality. The public, regulators, and others use and rely on these estimates while making investment, regulatory, and other decisions.

The evaluation process requires a multidisciplinary approach, often involving a variety of geoscience and engineering practices, followed by economic analyses. The evaluation report **must** be fit for its intended purpose.

First, physical parameters are gathered and analysed to provide an estimate of the quantities of hydrocarbons that could be technically recovered from the accumulation. Second, economic analysis determines the quantities that could be economically recovered. The resulting estimate of quantities and values is a forecast of future outcomes.

Best practice is to assess and report the full range of potential outcomes. All available data, such as seismic data and pressures for decline analyses and its effects on reservoir characterization, **should** be used or considered to assist in the evaluation process. However, all reasonable efforts to verify these data **must** be made.

3.0 STANDARDS FOR PREPARING EVALUATIONS

3.1 Professional Work

The evaluation of oil and gas reserves and resources for public disclosure is professional practice as defined in the Act.

Evaluators and auditors **must** apply their expertise to the gathering, analysis, and documentation of their work.

Evaluators and auditors **must** engage appropriate expertise from others on matters outside their areas of expertise.

Evaluators and auditors **must** use all available technology to assist in the evaluation.

3.2 Quality Management

Quality management for this practice standard is defined as a formal process to create and maintain systems described in ISO 9001/1201 or a similar process.

Evaluators, auditors and Permit Holders conducting reserve and resource evaluations **must** develop, maintain, and apply a quality management program to ensure the ongoing integrity of the evaluation work. This program **should** list:

- management's role and responsibilities as defined in APEGA's *Professional Practice Management Plans* professional guideline
- evaluators' and auditors' roles and responsibilities
- evaluators' and auditors' qualifications
- how to access all relevant and verifiable data

- how data, documents, and records will be managed
- how professional documents will be authenticated per APEGA's *Practice Standard for Authenticating Professional Documents*
- how conflicts between data and outcomes will be resolved

3.3 Technical Standards

In preparing evaluations for Canadian disclosure, evaluators and auditors **must** follow, at minimum, the technical standards of the COGE Handbook prepared and maintained by the Calgary Chapter of the Society of Petroleum Evaluation Engineers, unless another relevant standard is required by another jurisdiction, such as the United States Securities Exchange Commission, the Inter-Provincial Advisory Committee on Energy Petroleum Resources Management System, or the United Nations Framework Classification for Fossil Energy and Mineral Reserves and Resources.

Members of APEGA's Practice Standards Committee have reviewed the COGE Handbook and are satisfied that the technical elements of the handbook are appropriate, evaluators and auditors **must** use improved technical methods to validate and interpret the data. Evaluators and auditors **must** consider all relevant engineering, geology, geophysics, and economic data, and other factors relating to commerciality.

In preparing evaluations for non-Canadian disclosure, evaluators and auditors **must** clearly identify the specific standard to which the evaluations were prepared. The standard selected **must** be publicly available.

3.4 Accountability

Evaluators and auditors are accountable for the quality and integrity of reserve and resource evaluations conducted under their direction and guidance. Inappropriate influence **must** not affect the results of evaluations prepared under their direction.

Responsible Members supervising the evaluators and auditors involved in the evaluation **must** authenticate (sign, date, and stamp) all final evaluation documents. Evaluators and auditors **should** refer to APEGA's *Authenticating Professional Documents* professional practice standard and *Relying on Work Prepared by Others* professional guideline for clarification of authentication requirements.

3.5 Information Gathering

Evaluators and auditors **must** incorporate all available and relevant information up to the effective date when preparing a reserve and resource evaluation. Evaluators and auditors **must** verify all data and all work done to gather the data.

3.6 Third-Party Evaluation

Evaluators and auditors preparing third-party evaluations **must** obtain written assurance from their clients that all relevant data, as at the effective date, have been made available. Best practices suggest that evaluators and auditors **should** require that the clients obtain prior approval for the public disclosure of any excerpt from a third-party evaluation report.

3.7 Information Analysis

To write a proper evaluation, evaluators and auditors **should**, at a minimum:

- review and include all relevant and current data and mapping information
- explain any geological or seismic mapping disagreements
- reconcile conflicting data
- properly apply appropriate analytical techniques and check for alternative interpretations
- check for reasonableness
- document how they reconciled conflicting data (e.g., using multiple methods to determine resource and reserve estimates result in inevitable differences)
- properly apply appropriate analytical techniques and check for alternative interpretations to assess the uncertainty in the evaluation
- ensure that reasonable and objective data analysis and documentation have been performed, with clear reference to the reserve and resource definitions, analytical approaches, economic standards, and other factors that **must** be met before completing a reserve and resource evaluation
- consider the technically advanced processes that **may** be available
- consider appropriate environmental methods as per APEGA's *Environmental Practice* professional guideline
- assess the quality and completeness of all relevant information, identify gaps and inconsistencies, and ensure that the reserve and resource evaluation is founded on the best interpretation of the information, as at the effective date.

Reserve and resource evaluations rely on a broad spectrum of prior engineering and geoscience reports. Evaluators **should** carefully review prior work to assess its reliability and applicability (see APEGA's *Relying on Work Prepared by Others* professional guideline).

3.8 Documentation

Evaluators and auditors **must** document their work supporting the reserve and resource evaluation according to APEGA's *Authenticating Professional Documents* professional practice standard, and they **must** include the following information:

- quality and completeness of the information used to complete the evaluation
- rationale for dealing with any inconsistencies
- analysis techniques used
- any limitations or compromising factors affecting the reasonableness of the evaluation
- any data excluded from the analyses and an explanation of why the data were excluded
- reserve and resource definitions and other professional or regulatory standards used

Data and technical analyses **must** be retained to be available to qualified auditors, when required. Retention periods are not specified in NI51-101 or the COGE Handbook. However, the Alberta *Limitations Act* allows civil claims up to 10 years, representing the minimum retention period for data and information.

3.9 Professional Objectivity

Evaluators and auditors **must** not allow unsupported technical opinion or other inappropriate influences to affect the analysis or conclusions of the evaluation. Evaluators and auditors **should** consult the applicable professional and regulatory standards for guidance on independence in evaluations.

3.10 Professional Competence

The technical knowledge and judgement necessary for proficient reserve and resource evaluation requires a combination of academic training and work experience. Evaluators and auditors **should** use mentoring, continuing professional development, and career management to develop and maintain the necessary competency.

Technical, economic, environmental, and societal factors **must** be part of a professional evaluation, and this growing complexity lends itself to a team approach. Permit Holders **should** ensure that their evaluation staff develops and follows specific training and capability development plans.

The plans **should** include a team approach and an appropriate risk assessment.

APEGA's Code of Ethics emphasizes that Professional Members **must**:

- only undertake work that they are competent to perform by virtue of training and experience
- express opinions on professional matters only on the basis of best available knowledge and industry best practices

3.11 False Precision

Evaluators and auditors **must** ensure that the results of an evaluation are presented in a manner consistent with the certainty of the expected outcome. Evaluators and auditors **must** ensure that the accuracy of an estimate is not misrepresented by the manner of the documentation.

Evaluators and auditors **should** also include in the evaluation report a statement regarding the forward-looking nature of reserve and resource evaluations and the potential for future material change because of new information or changing economic, regulatory, or operating conditions.

3.12 Related Documents

This standard **must** be read in conjunction with the current versions of the following APEGA professional practice standards and guidelines available at www.apega.ca:

Authenticating Professional Documents

Relying on Work Prepared by Others

Environmental Practice

Determining the Need for Professional Involvement in Outsourced Engineering

Determining the Need for Professional Involvement in Outsourced Geoscience

Professional Practice Management Plans