REPORTING OF RESERVES AND RESOURCES IN CANADA

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DISCLAIMER

The views presented here are not necessarily the views of the Alberta Securities Commission.
OUTLINE

• Introduction
• The Evaluation Process
• Definitions and Guidelines
• Reporting:
  – Internal
  – Public (“Disclosure”)
• The ASC Review Program

SOME HISTORY

• 1994 CIM Reserves Definitions
• 1994 CIM Monograph No. 1 (blue book)
• Sept 2003 National Instrument 51-101 (Disclosure Legislation)
HISTORY CONT.

• 2005 COGEH Volume 2. Detailed Guidelines for Estimation and Classification of Oil and Gas Resources and Reserves
• 2007 CIM Reserves Definitions Revised
• 2007 COGEH Volumes 1 & 2 Revisions
• 2007 COGEH Volume 3:
  – Coal Bed Methane
  – International Property Evaluation (PSCs)
  – Bitumen (In Preparation)

CANADIAN GOVERNMENT ORGANISATIONS

• National Energy Board (NEB):
  – Canadian Energy Supplies and Policies
• Alberta Energy and Utilities Board (EUB):
  – Alberta’s Energy Supplies and Policies
  – Similar Bodies in Other Provinces
• Canadian Securities Administrators (CSA):
  – Umbrella Group for Canadian Securities Market Regulation
• Alberta Securities Commission (ASC):
  – Also Advises Other Provinces On Oil & Gas Issues
CANADIAN PROFESSIONAL ORGANISATIONS

• Petroleum Society of Canadian Institute of Mining, Metallurgy, and Petroleum (CIM):
  – Resource Definitions

• Society of Petroleum Evaluation Engineers (Calgary Chapter) (SPEE):
  – Evaluation Guidelines (COGEH)

• Association of Professional Engineers, Geologists and Geophysicists of Alberta (APEGGA):
  – Legislated Professional body with disciplinary powers
  – Practice Standard for the Evaluation of Oil and Gas Reserves for Public Disclosure

OIL AND GAS MARKET IN CANADA

• About 50% of the World’s Public Oil and Gas Companies are Listed on TSX/TSXV, more than anywhere else.

• Number of Listed Oil and Gas Companies (2006):
  Canadian TSX/TSXV 432
  US (ASX, NYSE, AMEX, NasDaq) 357
  LSE-AIM 131

• Activity (US$ Billion):
  – Capitalization 532
  – Trades 347
THE CHANGING ENVIRONMENT

- Full Spectrum Evaluation: All Resource Classes
- Unconventional Resources
- International Activities: UNECE (UNFCS), PRMS, IASB

“CONVENTIONAL” VS. “UNCONVENTIONAL”

- Conventional:
  - Hydrodynamic Emplacement and Trapping
  - Controlled by Local Structure, Stratigraphy
  ⇒ Limited (Constrained) Size

- Unconventional:
  - Emplacement May Not Involve Hydrodynamic Forces
  - Trapping Not Controlled by Hydrodynamic Forces:
    - Oil sands Viscosity
    - CBM Intra-Molecular
    - Shale oil Solid (kerogen)
    - Shale gas Adsorbed in kerogen, clays
    - Methane hydrates Clathrate structure
  ⇒ Controlled by Regional Stratigraphy
  ⇒ Widespread Distribution
IDEALISED PROCESS

MEASUREMENT (EVALUATION)

- Based on Limited Data:
  - Inherent Uncertainty
  - Requires Statistical Concepts

- It's Science, Not Art

  “Although this may seem a paradox, all science is dominated by the idea of approximation” Bertrand Russell

It is Not About Being “Right”, But About Knowing How Wrong You Might Be!
UNCERTAINTY

Estimated Reserves = Actual Reserves ± Measurement Error ± Model Error ± Bias

• Actual Reserves
  Never Known

• Measurement Error
  Unavoidable but Manageable

• Model Error
  Depends on Situation

• Bias:
  – Not Always Intentional
  – Largely Avoidable but Not Always Avoided

CLASSIFICATION

• Provides a Common Language

• Key Information:
  – Best Estimate Volume:
    • Mean, P50, Proved + Probable
  – Associated Uncertainty:
    • High (P10, Proved + Probable + Possible)
    • Low (P90, Proved)

• Various Systems (CIM, PRMS, US FASB, Etc.)
RESERVES DEFINITIONS
COGEH (NI 51-101)

- 2007 Revision aligns with PRMS, but:
  - Quantitative targets for Reported (aggregated) reserves
  - Some minor differences

REPORTED RESERVES

- **PROVED.** At least a 90% probability of getting more.

- **PROVED + PROBABLE.** At least a 50% probability of getting more.

- **PROVED + PROBABLE + POSSIBLE.** At least a 10% probability of getting more.
CANADIAN OIL AND GAS EVALUATION HANDBOOK COGEH

Provides Guidance on Reserves and Resources Evaluation.

• Principle Based

• Prime Requirement is GOOD ENGINEERING AND GEOLOGICAL PRACTICE

• Prepared by Volunteers:
  – CIM Reserves Definitions (revised 2007)
  – Remainder by SPEE Calgary Chapter

COGEH VOLUME 1

• Reserves Definitions and Evaluation Practices and Procedures

• Issued 2003
• Revised 2007 (publication shortly)
COGEH VOLUME 2

• Detailed Guidelines for Estimation and Classification of Oil and Gas Resources and Reserves
• Deals Primarily With Conventional Reserves and Resources
• Revision Expected Late 2007

COGEH VOLUME 3

• Publication 2007:
  – Coal Bed Methane Reserves
  – Reserves Recognition for International Properties (PSCs)
• In preparation:
  – Bitumen:
    • In-situ Bitumen and Heavy Oil (inc. Synthetic Crude)
    • Mined Bitumen (inc. Synthetic Crude)
COGEH FUTURE ACTIVITY

• Revisions to Existing Volumes as Required

• Potential Topics:
  – Tight Gas
  – Shale oil and gas
  – Methane Hydrates
  – Other topics as identified

REPORTING

• May Be Internal (Not to the Public)

• Public Disclosure, Regulator:
  – Sets Disclosure Standards
  – Reviews and Audits for Compliance With:
    • Regulatory Disclosure Legislation
    • Industry Standards of Measurement and Classification
CANADIAN cf. US DISCLOSURE

- USA:
  - Mandatory:
    - Proved Reserves, Constant Price ONLY
    - Other Information

- CANADA:
  - Mandatory:
    - Proved Reserves, Constant Price
    - Proved and Probable Reserves, Forecast Price
    - Other Information, inc. Reconciliation of Reserves
    - Includes Bitumen (in-situ mined), Synthetic Crude Oil
  - Optional:
    - Other Categories

NATIONAL INSTRUMENT 51-101 (NI 51-101)

- Regulates the Disclosure of Oil and Gas Information to the Public with Respect to Securities.

- Designation as NI (National Instrument) Means that it is in Force in all Provinces and Territories in Canada.
SECURITIES REGULATION

• Protect the Integrity of the Capital Market:
  – Ability to Raise Funds
  – Ability to Trade Securities

• Balance Conflicting Goals:
  – Investor Protection: Relevant, Timely, and Reliable Information
  – Access to Capital: Compliance Costs Not Too Burdensome

SECURITIES REGULATORS: ADMINISTRATION

• Develop, Implement, Maintain Securities Laws and Policies

• Regulate Trading

• Enforce Securities Laws

• Education
BASIC PRINCIPLES OF SECURITIES DISCLOSURE

- Full
- True
- Plain

- Materiality
- Continuous Disclosure

MATERIALITY

- Information that Significantly Affects, or Could Reasonably be Expected to Affect the Market Price or Value of the Issuer’s Securities:
  - Quantitative, Accounting Handbook (CICA) Uses a 5% Criterion
  - Qualitative

- Trading on Undisclosed Material Information is INSIDER TRADING.

- NI 51-101 Requires Disclosure of “Material Change”, Not of “Material Fact”.
CONTINUOUS DISCLOSURE REGIME

• NI 51-102 Continuous Disclosure Obligations:
  – NI 51-101
  – Annual Financial Statements
  – Management Discussion and Analysis
  – Material Changes
  – Etc.

SCOPE OF NI 51-101

• Applies Across Canada to Reporting Issuers:
  – Exchange Listings: CNQ, TSXV, TSX
  – Non-Listed Trades in Canada

• Does Not Apply to:
  – OTC, Pink & Green Sheets, Unless Trading in Canada
  – Some de minimus Issuers (< 5% Number or Values of Shares in Canada)
NATIONAL INSTRUMENT 51-101 APPLIES TO

- “Oil and Gas Activities”:
  - Exploration (Inc. Land Purchases, Seismic, etc.)
  - Acquisition
  - Drilling, Completion, Production, Construction

- Conventional and Unconventional Hydrocarbons:
  - Coal Bed Methane
  - Bitumen (In-situ, Mined)
  - Synthetic Crude
  - Shale Gas and Oil

- All Disclosure:
  - Regulatory (Annual) Filings
  - Other Disclosure: News Releases, Webcasts, etc.

NI 51-101

- Requires Annual Independent Evaluation:
  - Some Exemption Available

- Refers to Canadian Oil and Gas Evaluation Handbook (COGEH) for Standards:

- Annual Filings:
  - F1 Statement of Reserves & Resources
  - F2 Evaluators or Auditors Report
  - F3 Management & Directors Report
Reserves and Resources Volumes and Values:
  – Mandatory:
    • Proved Constant Price
    • Proved and Probable Forecast Price
  – Voluntary: Possible, Other Resource Categories
    • E.g., Contingent, Prospective Resources

Additional Information:
  – Reconciliation of Reserves
  – Undeveloped Reserves
  – Exploration Activities
  – Etc.

Signed by Evaluator or Auditor

Evaluate or Audit at least 75% of NPV 10%, Review the Balance

To the Board of Directors

Expresses an Opinion on the Validity of Reserves Evaluation, but:

“Reserves Data Are the Responsibility of the Management”
NI 51-101 F3
REPORT OF MANAGEMENT AND DIRECTORS ON OIL AND GAS DISCLOSURE

- Signed by:
  - CEO
  - Another Senior Officer
  - Two Directors

- Approves the Reserves Data and Reserves Report

PROPOSED CHANGES TO NI 51-101

- Optional Proved Reserves, Constant Price Case
- Reconciliation of Future Net Revenue Not Required
- Reserves Reconciliation on Company Gross, Not Net Reserves
- Revised Disclosure for Optional Resource Categories
- Implementation Planned for End-2007 Evaluations
THE ASC REVIEW PROGRAM

- Statutory Filing Review
- Compliance Review:
  - Annual Filings
  - News Releases, Webcasts, etc.
- Technical Audits of Reserves and Resources:
  - Prospectuses
  - Continuous Disclosure
  - Monitoring
  - Miscellaneous
- Communication:
  - Annual Report, Papers, Talks

AUDIT/REVIEW NEEDS

- Standards:
  - Evaluation
  - Classification
  - Disclosure
- Concepts
- Audits and Review Procedures:
  - Procedural Tests
  - Substantive Tests
- Communication of Results
COMPLIANCE REVIEWS

• NI 51-101 Annual Filings
• News Releases
• Action Depends on Materiality
• Major Deficiencies ⇒ Refiling
  – E.g., Missing F3 Signatures
• Minor Deficiencies ⇒ Notification

COMPLIANCE REVIEWS: ANNUAL FILINGS DEFICIENCIES

• Filing Only the Reserves Report - Does Not Contain All the Required Information
• Missing Information:
  – E.g., No Reserves Reconciliation, No After Tax
• Combining Product Types:
  – E.g., Light & Medium with Heavy Oil
• Reporting in BOEs
• Missing Signatures on F3
• Editing, Arithmetic Errors, Incorrect Unit Abbreviations
COMPLIANCE REVIEWS:
NEWS RELEASES DEFICIENCIES

• Misuse of Terminology:
  – “Undiscovered Reserves In Place”
  – “Recoverable Resources” Incorrectly Used
  – “In-place” Without Category

• Only Disclosing the Upside:
  – High Contingent Or Prospective Resource Estimate Only

• Adding Across Categories:
  – 3P Reserves + High Contingent Resource Estimate

TECHNICAL REVIEWS
163 in 2006

• Long Form Prospectus (Inc. IPOs):
  – Reserve Reports Always Reviewed

• Short Form Prospectus:
  – Intent to Qualify Applications ⇒ Compliance Review
  – Prospectus ⇒ Reserve Reports Often Reviewed

• Continuous Disclosure Reviews

• Monitoring Reviews

• Miscellaneous Reviews
TECHNICAL DEFICIENCIES

- Improvement But Still Some Issues:
  - Optimistic Project Timetables:
    • Wells Drilled Much Later or Not Drilled (PUDs)
  - Analogs – Poor Selection and Analysis
  - Inadequate Explanation in Reports
  - Drainage Areas Larger Than Reasonable:
    • EUB Study
  - Optimistic Production Decline Extrapolation:
    • High Initial Rates, Low Declines

RESERVES RECONCILIATION

- OPENING BALANCE
- ADDITIONS:
  - Discoveries
  - Improved Recovery
  - Infill Drilling
  - Acquisitions
- REDUCTIONS:
  - Dispositions
  - Production
- FLUCTUATIONS:
  - Economic Factors
  - Technical Revisions
- CLOSING BALANCE
TECHNICAL REVISIONS

• For Properties Owned:
  – At the Start, and
  – At the End of the Reconciliation Period

• As the Result of New Information:
  – E.g., Production Data

• Indicator of Quality of the Estimation

TECHNICAL REVISIONS

• Proved Reserves:
  – Revisions Should Be Mostly Positive
  – Probability of Negative Revision Approaches Zero as the Number of Entities Increases

• Proved + Probable Reserves:
  – Revisions Should Be Close to Zero
  – Probability of Positive or Negative Revisions Approaches Zero As the Number of Entities Increases
LIGHT & MEDIUM OIL

Light and Medium Oil Proved Reserves
Technical Revisions

Proved Reserves, Mbbl

Technical Revisions, Percent

-100 0 100 200 300 400

0 20000 40000 60000 80000 100000 120000 140000

Light and Medium Oil Proved + Probable Reserves
Technical Revisions

Proved + Probable Reserves, Mbbl

Technical Revisions, Percent

-100 0 100 200 300 400

0 20000 40000 60000 80000 100000 120000 140000

HEAVY OIL

Heavy Oil Proved Reserves
Technical Revisions

Proved Reserves, Mbbl

Technical Revisions, Percent

-100 0 100 200 300 400

0 20000 40000 60000 80000 100000 120000 140000

Heavy Oil Proved + Probable Reserves
Technical Revisions

Proved + Probable Reserves, Mbbl

Technical Revisions, Percent

-100 0 100 200 300 400

0 20000 40000 60000 80000 100000 120000 140000
NATURAL GAS

REFERENCE MATERIAL

- ASC http://www.albertasecurities.com/
  - For Companies
  - Oil and Gas
    Legislation, Forms, Explanatory Companion Policy, Definitions, Annual Oil and Gas Reports, Material, etc.

- CIM http://www.petsoc.org
  - Canadian Oil and Gas Evaluation Handbook (COGEH), Volumes 1, 2, 3

- EUB http://www.eub.ca/
  - Publications
  - ST98: Alberta's Energy Reserves and Supply/Demand Outlook
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