

# REPORTING OF RESERVES AND RESOURCES IN CANADA



**Dr. David C. Elliott,  
Chief Petroleum Advisor  
Alberta Securities Commission,  
Canada**



## 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)
- 2002 Canadian Oil and Gas Evaluation Handbook (COGEH) Volume 1. Reserves Definitions and Evaluation Practices and Procedures. (CIM/Calgary SPEE)
- Sept 2003 National Instrument 51-101 (Disclosure Legislation)
- Dec. 2003 CIM Monograph No. 1. Second Edition





## 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

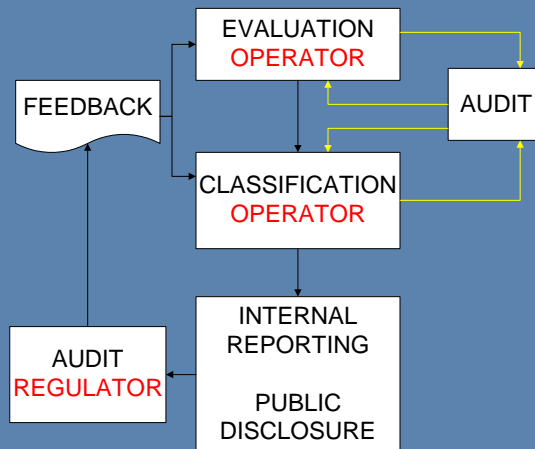


# “CONVENTIONAL” VS. “UNCONVENTIONAL”

- 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                     Adsorpted in kerogen, clays
    - Methane hydrates           Clathrate structure
  - Controlled by Regional Stratigraphy
  - ⇒ Widespread Distribution



## IDEALISED PROCESS



ASC  
Alberta Securities Commission

## 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!

ASC  
Alberta Securities Commission



# UNCERTAINTY

$$\text{Estimated Reserves} = \text{Actual Reserves} \pm \text{Measurement Error} \pm \text{Model Error} \pm \text{Bias}$$

- 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







## NI 51-101F1 STATEMENT OF RESERVES DATA AND OTHER OIL AND GAS INFORMATION

- 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.



## NI 51-101 F2 REPORT ON RESERVES DATA BY INDEPENDENT QUALIFIED RESERVES EVALUATOR OR AUDITOR

- 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



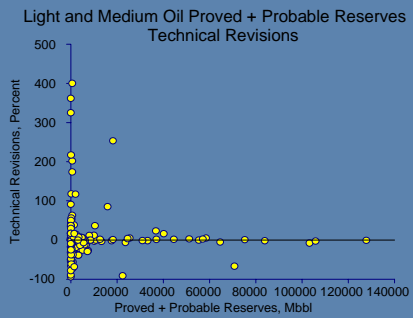
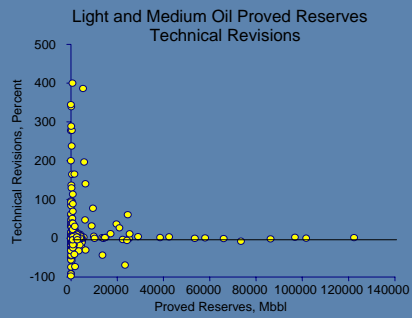
## TECHNICAL REVISIONS

- 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





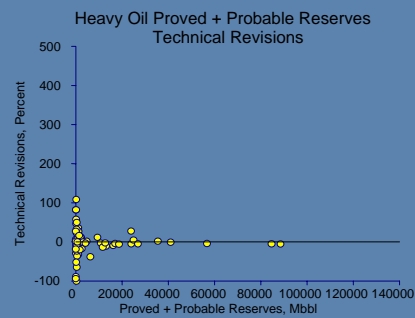
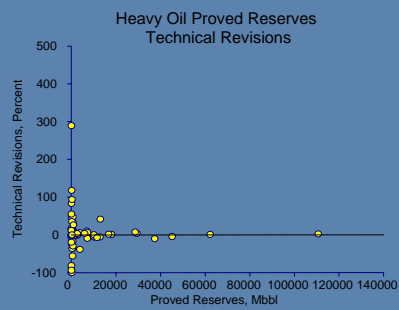
# LIGHT & MEDIUM OIL



ASC  
Alberta Securities Commission



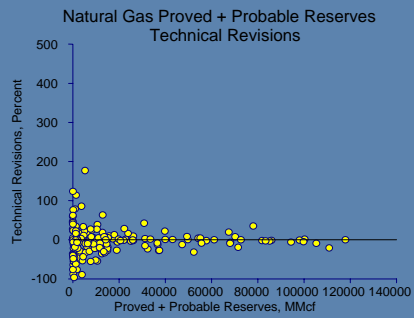
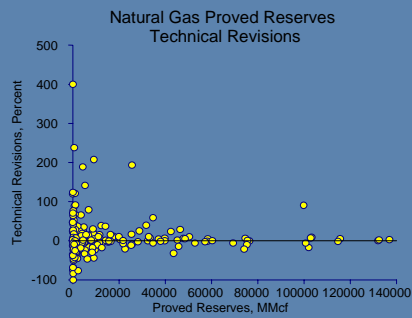
# HEAVY OIL



ASC  
Alberta Securities Commission



# NATURAL GAS



ASC  
Alberta Securities Commission

# REFERENCE MATERIAL

- ASC <http://www.albertasecurities.com/>
  - For Companies
  - Oil and GasLegislation, 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
  - Determination of Oil and Gas Reserves. Petroleum Society Monograph No.1 (2nd Edition)
- EUB <http://www.eub.ca/>
  - Publications
  - ST98: Alberta's Energy Reserves and Supply/Demand Outlook

ASC  
Alberta Securities Commission



## HOW TO CONTACT DAVID ELLIOTT

David Elliott, Ph.D., P. Geol.  
Chief Petroleum Advisor

Alberta Securities Commission  
4<sup>th</sup> Floor, 300 – 5<sup>th</sup> Avenue S.W.  
Calgary, Alberta Canada  
T2P 3C4

Tel: 403.297.4008  
Fax: 403.297.2082  
david.elliott@seccom.ab.ca  
www.albertasecurities.com

