Reporting the “Whole Enchilada” 
- Going Beyond Reserves -

Prepared for SPEE AGM
Halifax – June 8, 2015

by John Etherington, Managing Director, PRA International Ltd
Agenda

- Internal vs External Reporting
- Impact of ROTR & Unconventionals
- NI 51-101 Amendments
- Summary
How to Provide Investors a Full View of the Company’s Portfolio?

Complete and Consistent .. not Misleading
Internal vs External Reporting

SEC Disclosures

Internal Reporting

CSA Disclosures

SEC rules

Company Guidelines

NI 51-101

Canadian Oil & Gas Evaluation Handbook (COGEH)

What management sees!

What investors see!

PRMS
Two Reporting Objectives

Internal
(Business Management)

Make money!
Project and Portfolio Management system

External
(Required by Law)

Stay out of jail!

Regulatory Commissions
Government Reporting
Shareholders Rights

Make money!

Stay out of jail!

Resource Inventory

Production

Proved Developed

Proved Undeveloped

Probable

Possible

Discovered Not Yet Commercial

Undiscovered Potential

Production

Proved Developed

Proved Undeveloped

Probable

Possible

Discovered Not Yet Commercial

Undiscovered Potential
Internal Reporting

The "Whole Enchilada"

2P + r 2C + r BE
CSA Disclosures (2013)

**Required**
- Proved and 2P
- Developed and Undeveloped

**Optional**
- Possible Reserves
- Developed/Undeveloped
- Contingent Resources
- Prospective Resources

**ROTR**
- 1P & 2P
- Contingent Resources
- Prospective Resources

**Range of Uncertainty**
- Not to scale
Resources Other Than Reserves (ROTR)

Do you want to open that door?

+ Show investors the whole picture
+ Significant value in ROTR

- High degree of risk and uncertainty
- High volatility in volume/value/timing

Voluntary - not continuous
Potentially misleading?
What is ROTR?

categorize estimates based on uncertainty of sales quantities associated with a project

classify by Chance of Commerciality of project applied
What is ROTR?

Chance of Commerciality (COC%): Reserves = 100%  ROTR < 100%

ROTR includes:
- conventional and unconventional
- primary and enhanced recovery projects
- in-place and recoverable (& unrecoverable)

The Challenges

How can we achieve reporting consistency and comparability?

Do current definitions “work”? Are they complete?

Same guidelines for conventional and unconventional resources?
Types of Unconventional Resources

- Coal Bed Methane
- Bitumen
- Tight Gas
- Shale Gas
- Tight Oil
- Kerogen Shale
- Coal Gasification
- Methane Hydrates
Unconventional Resources - Evaluation Issues

Relatively limited history - few good analogs

Porosity and water saturation may have little relevance
Total organic carbon & rock mechanics important

Production mechanisms not the same
Requires stimulation – fracs, thermal, solvents (mining?)

Areally extensive - Poorly defined limits
Productivity extremely heterogeneous

What is discovered?
Reporting Uncertainty by Category

Estimates based on deterministic and/or probabilistic methods.

Deterministic Methods
- High degree of certainty
- 1P scenario – high degree of certainty
- 2P scenario – more likely than not
- 3P scenario - unlikely

Probabilistic Methods
- Incremental
- 100% probability of value or more

1P scenario – high degree of certainty
- Less likely than Proved
- More Likely than Possible

2P scenario – more likely than not
- Less likely than Probable

3P scenario - unlikely

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### Reserves

<table>
<thead>
<tr>
<th>Category</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRODUCTION</td>
<td>On Production</td>
</tr>
<tr>
<td></td>
<td>Approved for Development</td>
</tr>
<tr>
<td></td>
<td>Justified for Development</td>
</tr>
</tbody>
</table>

### Contingent Resources

<table>
<thead>
<tr>
<th>Category</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Development Pending</td>
</tr>
<tr>
<td></td>
<td>Development On Hold</td>
</tr>
<tr>
<td></td>
<td>Development Unclarified</td>
</tr>
<tr>
<td></td>
<td>Development not Viable</td>
</tr>
</tbody>
</table>

### Prospective Resources

<table>
<thead>
<tr>
<th>Category</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prospect</td>
</tr>
<tr>
<td></td>
<td>Lead</td>
</tr>
<tr>
<td></td>
<td>Play</td>
</tr>
</tbody>
</table>

### Range of Uncertainty

- Economic
- Economic Undetermined
- Sub-economic
- Development
- Pre-Development
- Conceptual Plan
- Established Technology
- Technology Under Development
- Experimental Technology

**NOT TO SCALE**
Pulling it all Together

Qualitative to Quantitative Risk for Discovered Resources

- Technology Under Development
  - Experimental technology
    - Not technically Viable
    - Technically Viable
      - Economics Undetermined
        - Not Economic
        - Economic
          - Repeated Commercial Success
            - Established Technology
              - Reserves

- [CR = Contingent Resources]

COC%
“Because an evaluator with access to all available data for a prospect (or project) should have an informed opinion of the chance of discovery (and development), it can be potentially misleading to disclose unrisked estimates and leave the risking to the investor.”
COGEH provides the tools to consistently classify and report both conventional and unconventional resources.

The key is to clearly define the projects and sub-classify as specifically as possible.

- Contingent Resources are technically recoverable but one or more contingencies prevent commerciality (chance of development <100%).
- Discovered Unrecoverable are known but current chance of development = 0%.
- Prospective Resources have both discovery & development risk.
NI 51-101 Guidance

- **Reserves**
  - On Production
  - Approved for Development
  - Justified for Development

- **Contingent Resources**
  - Development Pending
  - Development On Hold
  - Development Unclarified
  - Development not Viable

- **Prospective Resources**
  - Prospect
  - Lead
  - Play

**Range of Uncertainty**

- **Total Petroleum Initially-In-Place (PIIP)**
  - **Discovered PIIP**
  - **Undiscovered PIIP**

- **Increasing Chance of Commerciality**

- **Risk Estimates**
  - Risk all estimates for chance of commerciality
  - Risk Contingent Resources for Chance of Development
  - Risk Prospective Resources for chance of discovery and chance of development
NI 51-101 Guidance

PRODUCTION

RESERVES
- On Production
- Approved for Development
- Justified for Development

CONTINGENT RESOURCES
- Development Pending
- Development On Hold
- Development Unclarified
- Development not Viable

TOTAL PETROLEUM INITIALLY-IN-PLACE (PIIP)

DISCOVERED PIIP
- COMMERCIAL
- SUB-COMMERCIAL

UNDISCOVERED PIIP
- PROSPECTIVE RESOURCES
  - Prospect
  - Lead
  - Play

RESERVES

UNRECOVERABLE

Prospect
Lead
Play

Increasing Chance of Commerciality

Disclose by project maturity sub-class
Risked net present value of future net revenue
Provide detailed explanation of chance of commerciality

Range of Uncertainty
Not to scale
<table>
<thead>
<tr>
<th>RESOURCES PROJECT MATURITY SUB-CLASS</th>
<th>CONTINGENT RESOURCES (1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LIGHT CRUDE OIL AND MEDIUM CRUDE OIL</td>
</tr>
<tr>
<td></td>
<td>Gross (Mbbl)</td>
</tr>
<tr>
<td>CONTINGENT (2C) Development Pending</td>
<td>XX</td>
</tr>
</tbody>
</table>

(1) This disclosure is triggered by optional disclosure of contingent resources in the statement prepared in accordance with item 1 of section 2.1 of NI 51-101. Disclosure of risked estimates of volume are required under item 7.1(1)(a) of Form 51-101F1.
(2) Other product types must be added if material.
(3) The disclosure in this table must comply with and include the disclosure required by section 5.9 of NI 51-101, including section 5.9(2)(d).
(4) A reporting issuer should consider whether the disclosure of development unclarified or development not viable sub-classes contingent resources in the statement of reserves data and other oil and gas information would be misleading given the uncertainty and risk associated with those estimates. Section 2 of volume 2 of the COGE Handbook details commerciality factors.

From NI -51-101 Companion Policy
<table>
<thead>
<tr>
<th>RESOURCES</th>
<th>LIGHT CRUDE OIL AND MEDIUM CRUDE OIL</th>
<th>HEAVY CRUDE OIL</th>
<th>CONVENTIONAL NATURAL GAS</th>
<th>NATURAL GAS LIQUIDS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gross (Mbbl)</td>
<td>Net (Mbbl)</td>
<td>Gross (Mbbl)</td>
<td>Net (Mbbl)</td>
</tr>
<tr>
<td>PROSPECTIVE (Best Estimate)</td>
<td>XX</td>
<td>XX</td>
<td>XX</td>
<td>XX</td>
</tr>
</tbody>
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(1) This disclosure is triggered by optional disclosure of prospective resources in the statement prepared in accordance with item 1 of section 2.1 of NI 51-101. Disclosure of risked estimates of volume are required under Item 7.2(1) of Form 51-101F1.

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From NI -51-101 Companion Policy
An estimate of risked net present value of future net revenue of contingent resources is preliminary in nature and is provided to assist the reader in reaching an opinion on the merit and likelihood of the company proceeding with the required investment. It includes contingent resources that are considered too uncertain with respect to the chance of development to be classified as reserves. There is no certainty that the estimate of risked net present value of future net revenue will be realized.

<table>
<thead>
<tr>
<th>RESOURCES PROJECT</th>
<th>BEFORE INCOME TAXES DISCOUNTED AT (%/year)</th>
<th>AFTER INCOME TAXES DISCOUNTED AT (%/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATURITY SUB-CLASS</td>
<td>0 (MM$)</td>
<td>5 (MM$)</td>
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<td>CONTINGENT (2C) Development Pending</td>
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Summary

Prior NI 51-101 allowed voluntary disclosures beyond Reserves
But… disclosures were not consistent (and sometimes misleading)

COGEH Volume 2 Section 2 (June 2014) provides ROTR guidelines
Also see COGEH Volume 3 Bitumen Guidelines (April 2014)

NI 51-101 (July 2015 revised) provides regulatory guidance
for voluntary disclosure of Contingent & Prospective Resources

Your projects  COGEH  NI 51-101  Your disclosure  Your investors
Investors may not see the “whole enchilada”

… but close to it!

Also see:

SPE 169861- MS: Disclosures of Resources Other Than Reserves Under Canadian Guidelines

Questions?