Understanding Contingent Resources

Prepared for REU Houston 2015
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1. What are contingent resources?
2. Why do we need contingent resources?
3. How do we sub-classify and risk contingent resources?
4. How do contingent resources become reserves?
Acronyms

ROTR – Resources Other Than Reserves
PRMS – Petroleum Resources Management System
COGEH – Canadian Oil & Gas Evaluation Handbook
SEC – United States Securities Exchange Commission
ASC – Alberta Securities Commission
SAGD – Steam Assisted Gravity Drainage
Resource Classification Framework

From COGEH Volume 1, Section 5, Figure 5-1
CONTINGENT RESOURCES are 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.
Contingencies

1. Legal
2. Regulatory
3. Market Access
4. Political Factors
5. Social License
6. Economic
7. Commitment to Develop
8. Development Timing
Canadian Disclosure of ROTR

Source: ASC Oil and Gas Review Report December 2014
Conventional Resource Progression

Prospect
↓
Prospective Resources

Discovery
↓
Contingent Resources

Project
↓
Reserves
Unconventional Resources

Montney Development
- Entire township is discovered
- 22 Sections (shaded green) could be assigned reserves
- Drill 12 wells/section
- Total 264 wells
- 62 wells drilled
- 202 undeveloped locations
Montney Development
• 14 Sections (shaded red) classified as contingent resources
• Drill 12 wells per section
• Total 168 wells
Let’s say we get 5 Bcf/well in this township then:

**Reserves**

Developed 2P Reserves = $62 \times 5 = 310$ Bcf

Undeveloped 2P Reserves = $100 \times 5 = 500$ Bcf

Total 2P Reserves = $810$ Bcf

**Resources**

Contingent 2C Resources = $270 \times 5 = 1,350$ Bcf
Importance of Contingent Resources

• For unconventional resource plays, contingent resources can quickly grow to volumes that dwarf reserves

• Managers need to have contingent resources quantified for portfolio management

• Investors need to know what a company has in their portfolio beyond the reserves base

• But, not all contingent resources are created equal; so we have project maturity sub-classes
Project Maturity Subclasses

From COGEH Volume 2, Section 2.4.7, Figure 3
Project Maturity Subclasses

Contingent Resources

- Development Pending
- Development On Hold
- Development Unclarified
- Development Not Viable

Increasing Chance of Development
Risking Contingent Resources

Chance of Commerciality =  
Chance of Discovery × Chance of Development

For Contingent Resources:  
Chance of Discovery = 1.0

Therefore:
Chance of Commerciality = Chance of Development
Contingent Resources

- Development Pending
- Development On Hold
- Development Unclarified
- Development Not Viable

- Contingencies are being actively pursued
- Resolution expected in reasonable time period
- Contingencies directly influenced by developer
  - Internal approvals and commitment
  - Development timing
- High chance of development (>80%)
Development On Hold

Contingent Resources

- Development Pending
- Development On Hold
- Development Unclarified
- Development Not Viable

- Major non-technical contingencies identified
- Reasonable chance of development (>50%)
- Contingencies are beyond control of developer
  - External approvals
  - Economic factors
  - Market access
  - Political Factors
  - Social License
Development Unclarified

Contingent Resources

- Development Pending
- Development On Hold
- Development Unclarified
- Development Not Viable

- Project is currently under active evaluation
- Significant further appraisal may be required
- Contingencies have not been clearly defined
- Progress is expected in a reasonable time period
- Chance of development difficult to assess and could be a big range (20% to 80%)
Development Not Viable

Contingent Resources

- Development Pending
- Development On Hold
- Development Unclarified
- Development Not Viable

- Contingencies have been identified
- Project was evaluated and considered not viable or
- Significant further appraisal may be required
- Progress is not expected in a reasonable time period
- Low chance of development (<<50%)
## Economic Status

<table>
<thead>
<tr>
<th>Contingent Resources</th>
<th>Project Maturity Sub-Class</th>
<th>Economic Status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Development Pending</td>
<td>Economic</td>
</tr>
<tr>
<td></td>
<td>Development On Hold</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Development Unclarified</td>
<td>Economics Undetermined</td>
</tr>
<tr>
<td></td>
<td>Development Not Viable</td>
<td>Sub-Economic</td>
</tr>
<tr>
<td></td>
<td>Unrecoverable</td>
<td>Sub-Economic</td>
</tr>
</tbody>
</table>

1. Uneconomic at a reasonable high price forecast
Recovery Technology Status

Established Technology
  • Repeated commercial success of a recovery process

Technology Under Development
  • Established technology in reservoirs that are not good analogues to the subject reservoir

Experimental Technology
  • Recovery process that is being field tested to determine technical viability
<table>
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<tr>
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<th>Project Maturity Sub-Class</th>
<th>Recovery Technology Status</th>
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<tbody>
<tr>
<td>Development Pending</td>
<td>Established Technology</td>
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<tr>
<td>Development On Hold</td>
<td>Established Technology</td>
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<tr>
<td>Development Unclarified</td>
<td>Technology under Development</td>
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<tr>
<td>Development Not Viable</td>
<td>Experimental Technology</td>
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<tr>
<td>Unrecoverable</td>
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<td></td>
</tr>
</tbody>
</table>
Montney Development
- 102 locations classified as contingent resources
- Contingencies are:
  - Timing
  - Commitment
- Contingencies are controlled by the operator
- Sub-Classify as Pending Development
Chance of Development

Legal Factor = 1.00
Regulatory Factor = 1.00
Market Access Factor = 1.00
Political Factor = 1.00
Social License Factor = 1.00
Economic Factor = 1.00
Commitment to Develop Factor = 0.90
Development Timing Factor = 0.90

Chance of Development = 0.81
Montney Development
• 168 locations classified as contingent resources
• Contingencies are:
  • Timing
  • Commitment
• Development is well into the future, development plan is conceptual therefore risk is higher
• Sub-Classify as Development Unclarified
Chance of Development

Legal Factor = 1.00
Regulatory Factor = 1.00
Market Access Factor = 1.00
Political Factor = 1.00
Social License Factor = 1.00
Economic Factor = 1.00
Commitment to Develop Factor = 0.80
Development Timing Factor = 0.80

Chance of Development = 0.64
Conventional Resource Progression

Prospect $\rightarrow$ Prospective Resources $\rightarrow$ Discovery $\rightarrow$ Contingent Resources $\rightarrow$ Project $\rightarrow$ Reserves
<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
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<tbody>
<tr>
<td>Source</td>
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<tr>
<td>Migration</td>
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<tr>
<td>Trap</td>
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<tr>
<td>Seal</td>
<td>0.70</td>
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<tr>
<td>Reservoir</td>
<td>0.80</td>
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</table>

**Chance of Discovery = 0.392**
<table>
<thead>
<tr>
<th>Factor</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Legal Factor</td>
<td>1.00</td>
</tr>
<tr>
<td>Regulatory Factor</td>
<td>0.90</td>
</tr>
<tr>
<td>Market Access Factor</td>
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<tr>
<td>Economic Factor</td>
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<td>Commitment to Develop Factor</td>
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<tr>
<td>Development Timing Factor</td>
<td>1.00</td>
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</table>

Chance of Development = 0.576

Chance of Commerciality = 0.392 × 0.576 = 0.226
When contingencies are resolved, contingent resources are reclassified to reserves:

- 1C to 1P
- 2C to 2P
- 3C to 3P
Questions?
Thank You

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