

**Booking Unconventional Reserves
Under U.S. SEC Guidelines
Ryder Scott Canada Reserves Conference
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John Lee, University of Houston**



Disclaimer

The opinions expressed in this presentation are my personal opinions, and do not necessarily reflect the opinions of the U.S. SEC or any of its staff members.

Narrow Definition of Unconventional Resources

- Discussion limited to low (μd) and ultra-low permeability (nd) reservoirs, notably oil and gas shale reservoirs

What Special Rules Has SEC Issued for UCR's?

- Short answer: None
 - Reporting regulations same for all reserves, conventional and unconventional
- Still, three features of modernized rules (2008) dominate guidance and discussion
 - Change of 'certainty' criterion for PUD's to 'reasonably certain'
 - Introduction of 'reliable technology' concept
 - Five-year rule

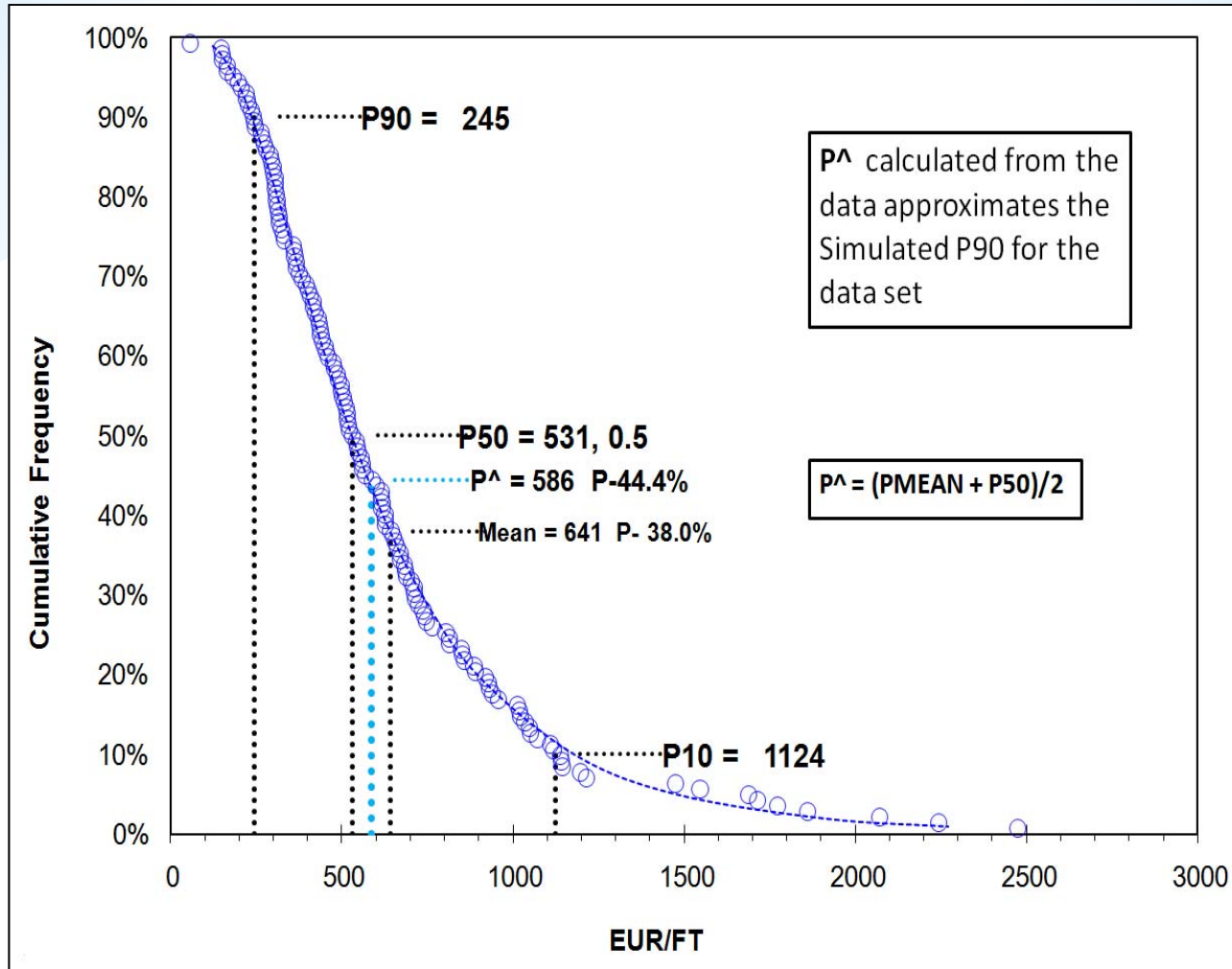
Effect of Certainty Criterion Change for PUD's

- Drilling locations beyond immediate offsets may qualify as PUD's if reasonable certainty criterion met
- Technology satisfying definition of 'reliable technology' required to provide appropriate certainty level
 - Reliable technology: Based on sound physical principles and demonstrated in practice to lead to correct conclusions *much more often than not* (for 1P reserves)
 - Documentation up to filer – SEC staff will not issue 'approved list'

Notable Example of Reliable Technology

- SEC has not objected to computational technique proposed in SPEE Monograph 3 for estimating PUD's possibly beyond immediate offset locations
- Basic idea
 - Establish EUR distribution for wells with economic production within area with geological similitude
 - Estimate distance beyond economic producers out to which EUR distribution remains essentially unchanged – consider it 'proved area'

Example EUR Distribution in Resource Play



And How Are Filers Estimating EUR's?

- Predominate method: Arps hyperbolic model, with conservative 'b' and conservative D_{min} – probably SEC staff preference
- Methodology used even for wells with only a few months of production history at reserves determination time
 - Argument: What's the alternative?

Reliable Technology Provides Opportunity in UCR's

- Monograph 3 example not extent of opportunities offered by reliable technology concept – possibilities unlimited
 - More extensive application of Rate Transient Analysis Techniques?
 - More defensible applications of volumetric and analog methodology, based on better reservoir characterization and more confident estimation of recovery factors?
 - Others we haven't thought of yet?

Five-Year Rule Rigorously Enforced

- SEC staff has taken hard-line stand that, in onshore North American resource plays, PUD's disclosed in filings must be drilled within five years of *initial booking date*
 - Strong indications of position in 26 October 2009 guidance
 - Stronger indications in comment letters – requests for exceptions not granted

Recent Focus in Comment Letters Affecting UCR's

- PUD's: Do you really plan to drill PUD's you have disclosed within five years? Your drilling to date indicates less than 10% of your inventory has been drilled each year for the last two years ... ?
- Hydraulic fracturing: Have you properly identified the environmental risk from hydraulic fracturing?

(Based on Ryder Scott analysis of comment letters presented in May 2013)

Recent Significant Changes in SEC

- John Hodgkin, former president of Ryder Scott joined staff in August 2012, increasing technical staff to two engineers/geoscientists
- Engineering Fellow may be added soon
 - Possible initial two-year term, with possible extension
 - Qualifications may include familiarity with 'modern forecasting methods' beyond Arps with D_{min}

Summary

- No special disclosure requirements for UCR's
- Formal guidance on rules limited (October 2009, one issue in May 2013), but UCR's received major attention
 - Most 'guidance' specific-issue focused in comment letters
- Emphasis on five-year rule in guidance and comment letters
- Promising acceptance of techniques claimed to meet criteria for 'reliable technology,' providing opportunities for creative thinking

Booking Unconventional Reserves Under U.S. SEC Guidelines

End

