SPE/WPC/AAPG/SPEE Petroleum Resources Management System (PRMS)

Prepared by the SPE Oil & Gas Reserves Committee (OGRC)
Who is the OGRC?

- **International representation** (USA, Canada, Australia, UK, Italy, Hungary, Saudi Arabia)
- **Focus on technical standards**
- **Inter-organizational cooperation**

**SPE Oil and Gas Reserves Committee**

**Structure**
- Eleven members with reserves expertise.
- Appointed for 3-year terms.
- Worldwide representation.

**Duties**
- Deals with oil and gas reserves matters, including definitions and standards.
- Disseminates information to other agencies, companies, and organizations.
- Works to achieve worldwide use of standard reserves definitions.
- Monitors activities in reserves definitions and recommends revisions to reserves definitions to SPE Board of Directors.

**Committee Observers**
- Intl. Accounting Standards Board.
- Soc. of Exploration Geophysicists.
- Soc. of Petroleum Evaluation Engineers.
- U.S. Energy Information Agency.
- World Petroleum Council.
SPE/WPC/AAPG/SPEE definitions and classification system (and associated estimating guidelines) will continue to be maintained evergreen and enhanced to incorporate new best practices, and unconventional resources, and will be recognized as the premier classification standard.

- SPE will actively promote and facilitate in-depth understanding of the definitions and their universal adoption by the oil, gas, and related industries; international financial organizations; governments; regulatory agencies; and reporting bodies.
Our Stakeholders

Oil & Gas Companies

Securities Regulators

Investors

Financial Organizations

Government Agencies

small independents

Large IOC’s and NOC’s

All stakeholders require complete, consistent and reliable information on future production and associated cash flow estimates through full life recovery.
Align with the hydrocarbon finding, developing and producing business!

We require a system that will support assessment processes throughout the asset lifecycle.
Evolution of Petroleum Evaluation Guidelines

API 1936
API/AGA 1961
SPE/API 1964
SPEE 1985
WPC 1987
SPE 1987

1997 SPE/WPC Petroleum Reserves Definitions

2000 SPE/WPC/AAPG Petroleum Resources Classification and Definitions

2001 SPE/WPC/AAPG Guidelines for the Evaluation of Petroleum Reserves and Resources

2005 SPE/WPC/AAPG Glossary of Terms

2007 SPE/WPC/AAPG/SPEE Petroleum Resources Management System (SPE-PRMS)

Consolidate, build on, update, and replace prior guidance
SPE Mapping Project

Agencies Selected for Comparison

2. UK Statement of Recommended Practices (SORP-2001)
4. Russian Ministry of Natural Resources (RF-2005)

(see final report December 2005 on SPE.org)
PRMS - Major Principles

1. The System is “Project-Based”.

2. Classification is based on project’s chance of commerciality. Categorization is based on recoverable uncertainty.

3. Base case uses evaluator’s forecast of future conditions.

4. Applies to both conventional and unconventional resources
“Project-Based” System

- Reservoir (in-place volumes)
- Property (ownership/contract terms)
- Project (production & cash flow schedules)

- How much is there?
- What is my share of costs and revenues?
- What is my entitlement using this project?
**Separate Classification & Categorization**

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<th>Commercial</th>
<th>Sub-commercial</th>
<th>Unrecoverable</th>
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<tr>
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**classify by**

Chance of Commerciality (Risk) of project applied

- chance of development
- chance of discovery
- reservoir in-place uncertainty + project recovery efficiency

**categorize** estimates based on uncertainty of sales quantities associated with project.
Resources Classification System

- Total Initially-in-Place (IIP)
  - Discovered IIP
    - Recoverable
    - Unrecoverable
  - Undiscovered IIP
    - Recoverable
    - Unrecoverable

- Sub-Commercial
- Commercial

- Recoverable
- Unrecoverable

- PRODUCTION
  - RESERVES
    - Proved
    - Probable
    - Possible
  - CONTINGENT RESOURCES
    - Probable
    - Possible
    - Commercial
  - PROSPECTIVE RESOURCES
    - Low Estimate
    - Best Estimate
    - High Estimate

- Increasing Chance of Commerciality
- Not to scale

Range of Uncertainty
Resources Class Criteria

Discovered

Established through testing, sampling and/or logging the existence of a significant quantity of potentially moveable hydrocarbons.

Commercial

• Meets evaluator’s economic criteria
• No significant contingencies that would prevent development
• Reasonable expectation that all internal/external approvals will be forthcoming
• Intent to initiate development within a reasonable time frame

“reasonable time frame” depends on the specific circumstances and varies according to the scope of the project.
Sub-classify by Project Maturity

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

2. CONTINGENT RESOURCES
   - Development Pending
   - Development Unclarified or On Hold
   - Development not Viable

3. PROSPECTIVE RESOURCES
   - Prospect
   - Lead
   - Play

- Commercial Criteria
- Discovery Criteria

Range of Uncertainty

Not to scale
Reserves Status

Recoverable quantities may be subdivided based on the funding and operational status of wells and associated facilities into:

- Developed (Producing or Non-Producing)
- Undeveloped

Reserves status may be applied to Proved, Probable and Possible

Economic Status

Projects may be further characterized by economics and commercial modifiers into:

- Economic (Reserves)
- Marginal Economic (Contingent Resources)
- Sub-Marginal Economic (Contingent Resources)

“Reserves” and “Economic” Status may be applied separately or in combination with Project Maturity Sub-classes
Categorize by Uncertainty

The system accommodates multiple approaches to assessing uncertainty.

Deterministic Methods

- **1P scenario** – high degree of confidence
- **2P scenario** – more likely than not
- **3P scenario** – unlikely

Probabilistic Methods

- **P50**
- **P10**
- **P90**

The system accommodates multiple approaches to assessing uncertainty.
Based on Forecast Conditions

Project decisions are based on the evaluators view of “Forecast Conditions” = those assumed to exist during the project’s implementation

Conditions include:

- Prices and costs
- Technology available
- Environmental standard
- Fiscal terms
- Regulatory constraints

Alternate economic scenarios are typically considered in the decision process and, in some cases, to supplement reporting requirements.

For example, one sensitivity case may assume “current conditions” will remain constant throughout the life of the project (“constant case”).
Unconventional Resources

Pervasive over large areas and not significantly affected by current hydrodynamic influences, i.e. buoyancy of petroleum on water!

*SPE classification still applies* (but may require alternative assessment approaches).
PRMS Development and Approval “Process”

**Final Approval**
March 2007

Submit for SPE board and partner approval

OGRC Definitions Revision Project - Phase 1

100 Day Industry Review Period
(30 presentations – global feedback)

OGRC reviews/incorporates feedback into a final PRMS
# Summary of Major Changes in 2007 SPE/WPC/AAPG/SPEE PRMS

<table>
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<th>Revision</th>
<th>Comment</th>
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<td>Base case uses forecast conditions but still permits option to use constant conditions</td>
<td>Most companies base decisions on forecast conditions; some regulators require constant conditions for consistent reporting</td>
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<td>Recognizes growing importance of unconventional resources</td>
<td>PRMS applies to both conventional and unconventional resources</td>
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<td>Low, mid and high categories of Contingent Resources relabeled to 1C, 2C &amp; 3C respectively</td>
<td>Aligns with 1P, 2P &amp; 3P Reserve uncertainty categories but constrained by commerciality barrier(s)</td>
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<td>Introduces classification modifiers: - Reserves status of developed and undeveloped can be applied to 1P, 2P &amp; 3P Reserves - Reserves, Contingent Resources &amp; Prospective Resources sub-classified by project maturity - Contingent Resources subdivided into ‘marginal economic’ &amp; ‘sub-marginal economic’</td>
<td>Additional classification modifiers optional but may greatly assist in understanding and tracking reserves and resources</td>
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Total Resource System is “Project-Based”

The key is the PROJECT

PRODUCTION

Proved | Probable | Possible

Contingent Resources

No Project – No recoverable resource

Prospective Resources

classify by commercial certainty

Commercial

Sub-commercial

categorize by recovery certainty

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What’s Next?

Education Programs (ATW’s, JCORET, …)

Implementation Guides, Examples

Collaboration with Other Standards