An Overview of the Petroleum Resources Management System (PRMS) and its Relationship to UNFC

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Disclaimer

The material, views and opinions expressed in this presentation are solely those of presenter and do not reflect Shell International E&P or any other person at Royal Dutch Shell plc.

Readers are urged to obtain independent advice on any matter relating to the interpretation of resources definitions and guidance on classification.
Topics for Discussion

• Why are definitions needed?
• Brief history of PRMS and its Goals
• Overview of PRMS
• PRMS adoption
• Relationship of PRMS to UNFC
• Questions
What’s it all About?

It's all about predicting potentially recoverable volumes under defined conditions!

“The quantity of usable resources is not fixed but changes with progress in science, technology, and exploration and with shifts in economic conditions.” (V. McKelvey)

We need consistency in communicating future sales volumes ..... with associated risk and uncertainty!

We need an international standard!
Understand all Stakeholders’ Requirements

Small Independents → Oil & Gas Companies → Large IOCs and NOCs

Securities Regulators → Investors

Government Agencies → Financial Organizations → Public

Create a Global Consensus Reference for the Industry – a “Standard”

All stakeholders require complete, consistent and reliable information on future production and associated cash flow estimates through full life recovery.
Why do we need standard definitions?

- Internal business decisions
- Public reporting requirements
- Government reporting
- Project finance
- Mergers & Acquisitions
Brief History of PRMS

• SPE & partners recognized the need for **common global standards** for petroleum resource definitions to provide consistency, transparency and reliability

• Create and maintain an **international standard petroleum reserves and resources classification system** based on industry best practices

• Built on the past

• Incorporated current best practice

• Prepared for the future
Historic Milestones

- 1937: API definitions created
- 1962: SPE special committee on Definition of Proved Reserves for Property Evaluation
- 1981: SPE update with Unproved Categories
- 1987: SPE minor update
- 1997-2001: SPE, WPC, AAPG joint effort to incorporate Resource classes
- 2007: PRMS and Audit Standards published. SPEE becomes a sponsor
- 2011: Guidelines for Application of PRMS sponsored/endorsed by SPE, SPEE, WPC, AAPG, SEG

- Simple risk and uncertainty model
- Principal-based
- Evolutionary shifts instead of revolutionary changes
PRMS Goals

• Provide a **common reference** for the international petroleum industry, including national reporting and regulatory disclosure agencies, and to support petroleum project and portfolio management requirements

• **Improve clarity** in global communications regarding petroleum resources

• **Supplement** with industry **education** programs and **application guides**
PRMS Strategy

• Allow **flexibility** and can be tailored to particular needs

• **Does not modify** the interpretation or application of any existing **regulatory reporting** requirements

• Consider both **technical and commercial factors** that impact the project’s economic feasibility, its productive life, and its related cash flow
PRMS is Designed to Support Asset Management – “Cradle to Grave”

Align with the hydrocarbon finding, developing and producing business!
PRMS - Major Principles

0. **Understand the reservoir and “in place” resources**

1. The System is "**Project–Based**"

2. Classification is based on project’s **chance of commerciality**
   (technology, economic, legal, social environmental & regulatory)

   Categorization is based on **recoverable uncertainty**

3. Base case uses **forecast of future conditions**

4. Provides more **granularity for project management**

5. Estimates based on **deterministic and/or probabilistic** methods

6. Reserves /resources are estimated in terms of the **sales products**

7. Reserves allocation based on **contractual entitlement**

8. Applies to both conventional and **unconventional resources**
It's all about **Risk** and **Uncertainty**

**Uncertainty and Risk**

- Prospects
  - Discoveries
    - Development Projects
- Discovery Risk
- In-Place Uncertainty
- Commercial Risk
- Recovery Uncertainty
- Commercial Uncertainties

**Estimated Ultimate Recoverable**

**Volume**

**Value**

**Net Present Value**
Resources Classification

- Reserves
- Contingent Resources
- Prospective Resources
- Unrecoverable

Categorization (uncertainty)

Classification (risk)
Resources Categorization

<table>
<thead>
<tr>
<th>Exploration</th>
<th>Appraisal</th>
<th>Development / Production</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High Estimate</td>
<td>Field Abandonment</td>
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<tr>
<td></td>
<td>Best Estimate</td>
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<tr>
<td></td>
<td>Low Estimate</td>
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</tbody>
</table>

Range of Uncertainty

Time (years)

Estimated Ultimate Recovery

Absolute Range of Uncertainty Should Diminish as Project Proceeds (Arps, 1956)
PRMS is the Global Standard for Petroleum Reserves and Resource Reporting

PRMS is explicitly or implicitly referenced

Securities Regulators
- SEC (US)
- AIM (UK)
- CSA (Canada)
- HKEX (Hong Kong)
- ASX (Australia)
- (ESMA & FSA)

Financial
- IASB

Oil & Gas Companies

Government Reporting
- BOEM (ANP)
- ...UNFC
PRMS Current Adoption

The **United Nations Framework Classification (UNFC)** system identifies the PRMS as the reference standard for petroleum reserves and resources.
SPE Relationship with UNFC

• Long-standing agreement for the SPE to provide the commodity-specific specifications for petroleum
  • Petroleum Resources Management System of 2007 (“PRMS”)

• Link provided by a **Bridging Document** in 2013

• PRMS Bridging Document, together with the UNFC Generic Specifications, provide operational application of UNFC-2009 for petroleum
  (see details at: http://www.unece.org/energy/se/unfc_2009_spcfc.html)

• PRMS will be maintained “evergreen” by SPE OGRC
### PRMS – UNFC Bridging Document

**Using Categories only**

#### Table: PRMS Class vs UNFC-2009 Class

<table>
<thead>
<tr>
<th>PRMS Class</th>
<th>UNFC-2009 “minimum” Categories</th>
<th>UNFC-2009 Class</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Discovered</strong></td>
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<tr>
<td>Reserves</td>
<td>E1 F1 G1,G2,G3</td>
<td>Commercial Projects</td>
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<tr>
<td>Contingent Resources</td>
<td>E2 F2 G1,G2,G3</td>
<td>Potentially Commercial Projects</td>
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<td>E3 F2 G1,G2,G3</td>
<td>Non-Commercial Projects</td>
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<td>Unrecoverable</td>
<td>E3 F4 G1,G2,G3</td>
<td>Additional in Place*</td>
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<td><strong>Undiscovered</strong></td>
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<tr>
<td>Prospective Resources</td>
<td>E3 F3 G4</td>
<td>Exploration Projects</td>
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<tr>
<td>Unrecoverable</td>
<td>E3 F4 G4</td>
<td>Additional in Place*</td>
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</tbody>
</table>

*From EGRC 4th Session Geneva April 2013*
### PRMS – UNFC Bridging Document

<table>
<thead>
<tr>
<th>Reserves (Incremental)</th>
<th>PRMS Categories</th>
<th>UNFC-2009 Categories</th>
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<tr>
<td>Proved</td>
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<td>G1</td>
</tr>
<tr>
<td>Probable</td>
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<td>G2</td>
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<tr>
<td>Possible</td>
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<td>G3</td>
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<table>
<thead>
<tr>
<th>Reserves (Scenario)</th>
<th>PRMS Categories</th>
<th>UNFC-2009 Categories</th>
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<tbody>
<tr>
<td>Proved (1P)</td>
<td></td>
<td>G1</td>
</tr>
<tr>
<td>Proved plus Probable (2P)</td>
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<td>G1+G2</td>
</tr>
<tr>
<td>Proved plus Probable plus Possible (3P)</td>
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<td>G1+G2+G3</td>
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<table>
<thead>
<tr>
<th>Contingent Resources</th>
<th>PRMS Categories</th>
<th>UNFC-2009 Categories</th>
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<tbody>
<tr>
<td>Low Estimate (1C)</td>
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<td>G1</td>
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<tr>
<td>Best Estimate (2C)</td>
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<td>G1+G2</td>
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<tr>
<td>High Estimate (3C)</td>
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<table>
<thead>
<tr>
<th>Prospective Resources</th>
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<th>UNFC-2009 Categories</th>
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<td>G4.1+G4.2 (=G4)</td>
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<td>High Estimate</td>
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<td>G4.1+G4.2+G4.3</td>
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### PRMS – UNFC Bridging Document

**Using Sub-Categories**

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</tbody>
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### Reserves

- On Production: 1
- Approved for Development: 2
- Justified for Development: 3
- Development Pending: 4
- Development Unclarified or On Hold: 5
- Unclarified: 6
- Development Not Viable: 7
- Unrecoverable: 11

### Contingent Resources

- On Hold: 5
- Unrecoverable: 11

### Uncovered

- Prospect: 8
- Lead: 9
- Play: 10
- Unrecoverable: 11

### Special Cases

- Defined but not classified in PRMS: 12
- Less Common Mappings

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*Facilitates transfer of quantities to correct class or sub-class*

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For other systems seeking alignment, a bridging document to UNFC-2009 is required which allows results considered to be comparable with no significant difference to those that would result from the application of the classification system for which the Bridging documents have already been endorsed (i.e. aligned Systems).
Concluding Remarks

- UNFC-2009 provides common language for classification and reporting of solid mineral and petroleum resources
- PRMS 2007 is the dominant industry-standard classification for petroleum resources and reserves
- CRIRSCO is the dominant industry-standard classification for solid mineral reserves and mineral resources
- PRMS & CRIRSCO referenced by IASB Extractive Activities Project
Are We There Yet?

Have we achieved a global common code?

Not quite!... but …the building blocks are in place which will allow greater harmonization and consistency in the area of natural resources assessment and reporting…. …and valuation.

PRMS and UNFC will both be part of the solution!
Thank you!
Questions?