Workshop on UNFC Resource Classification

PRMS and Relationship to UNFC 2009

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PRA International Ltd
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• UNECE, Charlotte Griffiths

• SPE OGRC

• Satinder Purewal, David McDonald, Jim Ross, David Elliott
Outline

• Objectives
• UNFC Classification for Petroleum
• PRMS
• UNFC _ PRMS (& CRIRSCO) Mapping
• Concluding Remarks
Objectives

- Compare UNFC and PRMS
- Petroleum vs Energy Minerals
- Mapping/Integration Status
The UNFC Classification for Petroleum
UN Framework Classification (UNFC) for Petroleum

Total Initial in-Place

Principles

Classification

Economic and commercial viability
- E1 Economic
- E2 Potentially economic
- E3 Intrinsically economic

Field project status and feasibility
- F1 Justified
- F2 Contingent
- F3 Undefined

Geological knowledge
- G1 Reasonably assured
- G2 Estimated
- G3 Inferred
- G4 Potential
UNFC 3D Matrix

Legend:
- Commercial Projects
- Potentially Commercial Projects
- Non-Commercial Projects
- Exploration Projects
- Additional quantities in place
- Combinations not frequently used
- Codification (E1:F2;G3)

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<table>
<thead>
<tr>
<th>Total Commodity Initially in Place</th>
<th>Extracted</th>
<th>Non-Sales Production</th>
<th>Sales Production</th>
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<tbody>
<tr>
<td></td>
<td>Class</td>
<td>Categories</td>
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<tr>
<td>Future recovery by commercial development projects or mining operations</td>
<td>Commercial Projects</td>
<td>E: 1 F: 1 G: 1, 2, 3</td>
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<tr>
<td>Potential future recovery by contingent development projects or mining operations</td>
<td>Potentially Commercial Projects</td>
<td>E: 2 F: 2 G: 1, 2, 3</td>
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<td></td>
<td>Non-Commercial Projects</td>
<td>E: 3 F: 2 G: 1, 2, 3</td>
<td></td>
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<tr>
<td>Additional quantities in place associated with known deposits</td>
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<td>E: 3 F: 4 G: 1, 2, 3</td>
<td></td>
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<tr>
<td>Potential future recovery by successful exploration activities</td>
<td>Exploration Projects</td>
<td>E: 3 F: 3 G: 4</td>
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<tr>
<td>Additional quantities in place associated with potential deposits</td>
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<td>E: 3 F: 4 G: 4</td>
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PRMS

Petroleum Resources Management System
Sponsored by the 5 major professional organizations:

Society of Petroleum Engineers (SPE)
Word Petroleum Council (WPC)
American Association of Petroleum Geologists (AAPG)
Society of Petroleum Evaluation Engineers (SPEE)
Society of Exploration Geophysicists (SEG)

Maintained by SPE Oil & Gas Reserves Committee (OGRC)
What is PRMS?

PRMS is a framework for classifying and categorizing estimates of all petroleum reserves and resources.

Developed by a collaboration of technical professionals.

Provides an industry consensus on basic principles and high level guidelines, that if adopted, will improve assessment and reporting consistency ... and help companies manage their business.

**PRMS was not written as public disclosure rules – issuers should continue to comply with applicable regulatory requirements for external reporting.**

However, most disclosure guidelines align with and build on PRMS principles
### What’s in the PRMS Document?

**Discussion of Principles**
- Section 1. Basic Principles & Definitions
- Section 2. Classification and Categorization Guidelines
- Section 3. Evaluation and Reporting Guidelines
- Section 4. Estimating Recoverable Quantities

**Resource Definitions & Guidelines**
- Table I: Classes & Sub-classes
- Table II: Resource Status Modifiers
- Table III: Category Definitions & Guidelines

**Auxiliary Definitions**
- Appendix A: Glossary

[http://www.spe.org/industry/reserves.php](http://www.spe.org/industry/reserves.php)
# Guidelines for the Application of PRMS

Supplemental Guidelines published in **November 2011**

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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. 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. Company net reserves are based on contractual entitlement.

8. Applies to both conventional and unconventional resources.
PRMS is a Project-Based System

- **Reservoir**
  - *in-place volumes*

- **Project**
  - *development plan*

- **Property**
  - *ownership/contract terms*

- **Net recoverable resource**
Each project applied to a specific reservoir(s) development under defined conditions generates a unique production and cash flow schedule.

The time integration of these schedules taken to the project’s technical, economic, or contractual limit defines the estimated recoverable resources and associated future net cash flow forecast for each project.
PRMS Risk/Uncertainty Matrix

classify by
Chance of Commerciality
(1- Risk)
of project applied

categorize estimates based on uncertainty
of sales quantities associated with a project
PRMS for Internal Project Management

Project Maturity Sub-Classes

- On Production
- Approved for Development
- Justified for Development
- Development Pending
- Development Unclarified or On Hold
- Development not Viable

- Prospect
- Lead
- Play
Relationship of **PRMS** to “Other Guidance”

SPE OGRC maintains ongoing “mapping” of PRMS to other systems to:

- assist companies to integrate internal and external reporting
- research potential updates to PRMS

PRMS Referenced in Regulatory Disclosures

- HKEX
- ASX
- LSE-AIM
- CSA

PRMS mapped to

- Russia GKZ
- China PRO

UNFC

- IASB (accounting)
- CRIRSCO (mining)

ESMA, IPA, ….
An Evolving Industry Model For Reporting Petroleum Reserves & Resources

Base Document (International Standards)
- Evaluation Fundamentals

Supplemental Detailed Guidance
- Detailed Guidelines & Examples

Regime Specific Reporting
- User/Country Specific

Generic – Global Application Template Based on Science

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UNFC 2009 and PRMS “Mapping”
General Alignment of **PRMS** and **UNFC**

**E** Axis Reflects Economic and Commercial Viability

**F** Axis Reflects Project Status Categories of Reserves and Contingent Resources

**G** Axis Reflects Level of Uncertainty

From SPE Paper 90839
UNFC – E axis and F axis

- UNFC and PRMS are project-based
- PRMS combines E and F into “project maturity” categories
- UNFC provides additional granularity to distinguish between the primary reasons for different levels of maturity (i.e. economics versus feasibility)
- Correlation can be relatively straightforward
Aligning PRMS & UNFC Classifications

UNFC

PRMS

PRODUCTION

RESERVES

DISCOVERED PIIP

UNDISCOVERED PIIP

CONTINGENT RESOURCES

TOTAL PETROLEUM INITIALLY-IN-PLACE (PIIP)

UNRECOVERABLE

PROSPECTIVE RESOURCES

UNRECOVERABLE

Increasing Chance of Commerciality

Range of Uncertainty

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UNFC Classification:

- E1: Sales Production
- E2: Non-Sales Production
- F1: 111
- F2: 112
- F3: 113
- F4: 114
- G1: G1
- G2: G2
- G3: G3
- G4: G4

PRMS Classification:

- 1P: Proved
- 2P: Probable
- 3P: Possible
- 1C: Marginal
- 2C: Sub-marginal
- 3C: Non-marginal
- Low Estimate
- Best Estimate
- High Estimate
• UNFC, PRMS classifications co-exist.
• UNFC can be used directly or as an integration tool
• PRMS used by private industry for maintenance with prior evaluations
• The overarching principles should be the same

• UN Task Force mapping further integration of the guidelines
Petroleum vs Energy Minerals

Sometimes the boundary gets “cloudy”

- Bitumen (mined)
- Bitumen (in-situ)
- Uranium Leaching
- Coal Gasification
- Oil Shales (mined)
- Coal Bed Methane
- synthetic crude

coal gas

Report using PRMS or CRIRSCO?

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Mapping of UNFC, CRIRSCO and PRMS Classification Systems

*Maintained separately in linked websites*

- **Petroleum Classification, Principles, Definitions & Guidelines (SPE) – PRMS**
- **Minerals Classification, Principles, Definitions & Guidelines (CRIRSCO)**

**Mapping Module**

**UN Framework Classification**
### UNFC-2009

<table>
<thead>
<tr>
<th>Total commodity initially in place</th>
<th>Sales Production</th>
<th>Non-sales Production</th>
<th>Commercial Projects</th>
<th>Potentially Commercial Projects</th>
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<th>Exploration Projects</th>
<th>Additional quantities in place</th>
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### PRMS

<table>
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<tr>
<th>Production</th>
<th>Class</th>
<th>Reserves</th>
<th>Contingent Resources</th>
<th>Unrecoverable</th>
<th>Prospective Resources</th>
<th>Unrecoverable</th>
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### CRIRSCO

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<tr>
<th>Extracted</th>
<th>Class</th>
<th>Mineral Reserves</th>
<th>Mineral Resources</th>
<th>Exploration Results</th>
<th>Unrecoverable</th>
<th>Not reported</th>
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**ECE Energy Series No. 33**

UNFC Workshop
Beyond Mapping ➞ Integration

**UNFC**

Generic Definitions & Specifications

Commodity Specific Guidelines

Mineral Specifications
CRIRSCO

Petroleum Specifications
PRMS

Other Aligned Systems
Conclusions

• UNFC-2009 provides a common language for classification and reporting, regardless of extraction methodology.

• There is increasing overlap between the minerals and petroleum sectors.
  • The two industry sectors (and the regulators) have yet to address this issue.

• UNFC-2009 provides a common language for classification and reporting of petroleum and energy minerals.
Concluding Remarks

- **UNFC 2009** provides common language for classification and reporting solid mineral and petroleum resources
- **PRMS** provides industry-standard classification for petroleum resources and reserves
- **PRMS** referenced by regulators for disclosures (SEC, ASC, AIM, HSEX, ASX..)
- **PRMS & CRIRSCO** referenced by IASB
- **UNFC 2009 /PRMS integration in progress**
Are We There Yet?

Not quite!... but ..the building blocks are being created which will lead to 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!

[Harrell, R. D. : “Achieving Global Acceptance and Compliance with a Universal Set of Petroleum Resources and Reserves Definitions - Are We There Yet?”; paper SPE 114162]