Petroleum Resources / Reserves Classification and Reporting System

CCOP BANGKOK
22-23 April 2015
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PETRONAS Kuala Lumpur

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OVERVIEW OF RESOURCES CLASSIFICATION

Presentation Outlines

- Evolution Resource Guidelines
- Value & Key Principles
- Preparation & Timeline
- Technical Assurance & Approval Processes
- Resources Applications
- Resources Classification
- Annual Resources Reporting
- CO₂ Reporting
- Appreciation
Evolution of Petroleum Resources Guideline

PETRONAS

SPE

Pre 1985
- 1985
- SPE 1985
- API/AGA 1961
- SPE/API 1964

1985 - 1987
- SPEE 1985
- WPC 1987
- SPE 1987

1997
- 1997 SPE/WPC Petroleum Reserves Definitions

1997
- 1997 SPE/WPC Petroleum Resources Classifications and Definitions

2005
- 2000 SPE/WPC/AAPG Petroleum Resources Classifications and Definitions
- 2001 SPE/WPC/AAPG Guidelines for the Evaluation of Petroleum Reserves and Resources
- 2005 SPE/WPC/AAPC Glossary of Terms

2007 - 2012
- 2012 Definitions and Guidelines for Classification of Petroleum Resources

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

2011 SPE/AAPG/WPC/SPEE/SEG Guidelines for Application of the Petroleum Resources Management System

2015 DGCP In progress

2015
- 2015 DGCP In progress

• 1997 Definitions and Guidelines for Classification of Petroleum Resources
• 2006 Definitions and Guidelines for Classification of Petroleum Resources
• 2012 Definitions and Guidelines for Classification of Petroleum Resources
Value or key principles ......

- International Standards and Practices
- Customer Oriented
- Flexibility
- Opportunities and Value Creation
- Transparent and Auditable
- Level of Confidence
- Deterministic & Probabilistic Approaches
- Reporting Consistency
- Field Life Cycle
- Robust
### Preparation & Timeline for ARPR submission

<table>
<thead>
<tr>
<th>Period</th>
<th>Activity</th>
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<tbody>
<tr>
<td>Nov ‘13 – Oct ‘14</td>
<td>Technical Presentation &amp; Approval</td>
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<tr>
<td>Sep ‘14 – 15 Jan ‘15</td>
<td>Offline Discussion &amp; online ARPR submission</td>
</tr>
<tr>
<td>Jan ‘15 – Feb ‘15</td>
<td>In-house Discussion, Consolidation and ARPR Document</td>
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**In the context of the diagram:**
- **PSC**
- **MPM - PREX**
- **MPM – PRD/ POM**
- **MPM PLANNING DEPARTMENT**
Technical Assurance & Approval Processes...

Customer ➔ Technical Assurance ➔ Consolidate & Report ➔ Endorse ➔ Approval

PSC - Exploration ➔ ERRC - PREX ➔ MPM SP, MPM PRAC ➔ EP Exco ➔ P’NAS Exco

PSC - Development ➔ TRC/MR - PRD

PSC - Production ➔ FRMR - POM
**Exploration Resources Review Committee**

<table>
<thead>
<tr>
<th>PSC Wells</th>
<th>MPM Wells</th>
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<tbody>
<tr>
<td><strong>Chairman:</strong></td>
<td>GM BAP or GM EAP</td>
</tr>
<tr>
<td><strong>Alternate Chairman:</strong></td>
<td>GM EAP or GM BAP</td>
</tr>
<tr>
<td><strong>Member:</strong></td>
<td>GM EPBD</td>
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<tr>
<td>3. SM EPBD</td>
<td>3. SM EPBD</td>
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<td>4. SM EAP</td>
<td>4. SM EAP</td>
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<tr>
<td>5. SM BAP</td>
<td>5. SM BAP</td>
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<tr>
<td>6. SM PRD</td>
<td>6. SM PRD</td>
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**Technical Advisor – Non permanent members**

<table>
<thead>
<tr>
<th>PSC Wells</th>
<th>MPM Wells</th>
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<tr>
<td>1. Principle in EAP and BAP</td>
<td>1. Principle in EAP and BAP</td>
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<tr>
<td>2. Staff in EAP, BAP and EPBD</td>
<td>2. Staff in EAP, BAP and EPBD</td>
</tr>
<tr>
<td>3. Managers in EAP, BAP and EPBD</td>
<td>3. Managers in EAP, BAP and EPBD</td>
</tr>
<tr>
<td>5. Principle/Staff in PRD - PEP</td>
<td>5. Principle/Staff in PRD - PEP</td>
</tr>
</tbody>
</table>

**Secretariat:** Manager of EPBD

**Secretariat:** Manager of EAP

**Quorum:** Minimum 5 members
- Chairman or Alternate Chairman, 2 other permanent members, 2 TPs from PREx and PRD (RE or PEP)
FDP Review Processes and Approval

MR#1: Milestone Review #1- Planning Milestone
MR#2: Milestone Review #2- Geological and Geophysical (Static Model) Milestone
MR#3: Milestone Review #3- Reservoir (Dynamic Model and Prediction) Milestone
MR#4: Milestone Review #4- Development Milestone
MR#5: Milestone Review #5- Front End Engineering & Design Milestone
Application: Why Do WE Estimate Petroleum Resources?

✓ Fulfill PSC requirement

✓ Platform for internal technical & business decision

✓ Public reporting requirement

✓ Government regulations

✓ Mergers and acquisitions

✓ Project Finance

✓ Public funds
Applications covers both technical and business applications.

**TECHNICAL APPLICATIONS**
1. Prospect Evaluation
2. Block Assessment
3. Work Program & Budget
4. Project Identification
5. Field Development Plan
6. Facility Plan
7. Appraisal Plan
8. R&D Promotion
9. IOR / EOR Project

**BUSINESS APPLICATIONS**
1. Corporate worth
2. Fund raising (credit rating)
3. Stock exchange reporting
4. Sales contracts (LNG buyers)
5. Earning basis
6. Investment decision (FDP)
7. Corporate financial outlook
8. Equity determination
9. Petroleum arrangement
Petroleum Resources Classification Framework

<table>
<thead>
<tr>
<th>Category</th>
<th>PROVED</th>
<th>PROBABLE</th>
<th>POSSIBLE</th>
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<tbody>
<tr>
<td>Discovered Commercial</td>
<td>Reserves</td>
<td></td>
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</tr>
<tr>
<td>Undiscovered Sub-commercial</td>
<td>Contingent Resources</td>
<td></td>
<td></td>
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<tr>
<td>Undiscovered Prospective Resources</td>
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CLASSIFY by on chance of commerciality (Risk)

**Chance of development**

**Chance of discovery**

**CATEGORIZATION is based primarily on technical uncertainty of volume eventually coming out from the ground**
**Project – Based Classification**

- The *Reservoir* assessment determines the petroleum initially in-place, fluid and rock properties that affect petroleum recovery.

- The *Project* is applied to a specific reservoir volume to generate production and cash flow schedule.

- The *Property* incorporates contractual rights and obligations, and fiscal terms, defining the entitlement share of investments, production, and revenue.
PETRONAS RESOURCES CLASSIFICATIONS

• Discovered Resources (In-place, EUR)
  ✓ Ultimate Recovery (UR)
  • Production
  • Reserves (R - 1P, 2P, 3P)

✓ Contingent Resources (CR - IC, 2C, 3C)

• Undiscovered Resources (In-place, EUR)
  ✓ Prospective Resources (PR - 1U, 2U, 3U)
  • Prospect & Lead

EUR – Estimated Ultimate Recovery
UR – Ultimate Recovery
1. Introduction

2. Malaysia’s Petroleum Resources at a glance

3. Malaysia’s Oil & Gas

4. Malaysia’s O&G Reserves standing among countries in selected region

5. Analysis on Malaysia’s Petroleum Resources
   - Crude Oil Discovered Resources (Reserves & CR)
   - Natural Gas Discovered Resources (Reserves & CR)
   - Condensate Discovered Resources (Reserves & CR)
   - Undiscovered Resources (PR)

6. Strategist, Challenges, Monetize and Exploit Hydrocarbon Resources
   - Exploration
   - Development
   - Production Operations
## Standard Reporting – Content and Format

### 1. Discovered Resources - Crude

<table>
<thead>
<tr>
<th>Field</th>
<th>Status</th>
<th>OIIP</th>
<th>EUR</th>
<th>RF</th>
<th>Cum Prod</th>
<th>1P</th>
<th>2P</th>
<th>CR</th>
<th>Total Discovered Resources</th>
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### 2. Discovered Resources - Condensate

<table>
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<th>Field</th>
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<th>EUR</th>
<th>Cum Prod</th>
<th>1P</th>
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<th>Total Discovered Resources</th>
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### 3. Discovered Resources – Associated Gas

<table>
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<th>Status</th>
<th>GIIP</th>
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<th>RF</th>
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### 4. Discovered Resources – Non-Associated Gas

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<th>Cum Prod</th>
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<th>Total Discovered Resources</th>
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<td>Dev</td>
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</table>
5. Undiscovered Resources – Oil & Gas

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<tr>
<th>Operator</th>
<th>PSC Block</th>
<th>P&amp;L</th>
<th>Obj.</th>
<th>Unrisked PR 2U</th>
<th>POS (%)</th>
<th>Risked Volume PR 2U</th>
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<td>Oil</td>
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6. Oil and Gas Key Data
**PETRONAS Resource Classification**

CO2 Reporting

The full report also comprises of the following information:

- Total Gross Gas In-place (P50)
- Total CO2 content of each reservoir (P50)
- Total Net Gas In-place (P50)
- Total Gross Gas Recovery Volumes (P50)
- Total Net Gas Recovery Volumes (P50) with 6.5 - 8% CO2 can be blended to point of sale
Special appreciation to:

- PETRONAS
- Department of Mineral Fuels
- MINISTRY OF ENERGY
- CCOP
- NORWEGIAN EMBASSY

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Terima Kasih OR Thank You