

Sharing the 2018 Proposed Updates and Improvements to the Petroleum Resources Management System*

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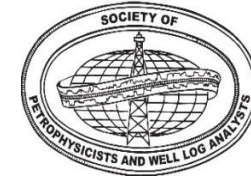
Abstract

It has been over ten years since the initial publication of the 2007 Petroleum Resource Management System (PRMS). While well-received and applied by multiple stakeholders, developments in the industry have necessitated an update. The Society of Petroleum Engineers (SPE) Oil and Gas Reserves Committee (OGRC) has been tasked by the SPE Board to generate the updated version. Efforts began in earnest in early 2016, and the OGRC has incorporated comments from co-sponsoring societies, such as AAPG, and has recently completed the incorporation of public comments. The draft version including those comments is currently under final review by the co-sponsoring societies, with a goal to publish the updated PRMS by July, 2018. This presentation will highlight the overall review process and key components of the updated system.

Sharing the 2018 Proposed Updates and Improvements to the Petroleum Resources Management System



World Petroleum Council



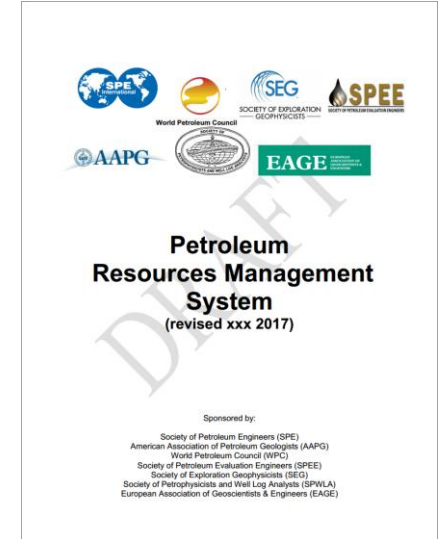
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Disclaimer

- This presentation provides the status of the proposed 2018 SPE-PRMS (PRMS) as reflected following incorporation of public and co-sponsor society comments, and recommendation by the SPE Oil and Gas Reserves Committee (OGRC) for approval by the SPE Board
- The opinions expressed in this presentation reflect those of the presenter and do not necessarily represent the views of Sproule or any other person at Sproule

PRMS Historical Development

- 1965: Following plea from banks made in 1962, SPE Board approves a one page document with Proved reserves definitions
- 1981: SPE release updated Proved oil and gas reserves definitions
- 1987: SPE releases definitions for all reserves categories
- 1997: WPC and SPE issue joint release of single set of definitions, including probabilistic method
- 2000: SPE, WPC and AAPG jointly develop classification system for all resources
- 2001: Application Evaluation Guidelines issued
- 2005: Glossary of terms used in resources definitions issued
- 2005: Standards for estimating and auditing reserves information issued (revised in 2007)
- 2007: SPE/WPC/AAPG/SPEE Petroleum Resources Management System Issued (subsequently endorsed by SEG)
- 2011: Guidelines for the Application of PRMS issued
- 2017: Draft PRMS update agreed amongst 7 sponsor societies and issued for 3 month Public comment in Sept.
 - For AAPG, review handled by the six-member PRMS 2018 Review Committee appointed by the Executive Committee
- 2018: Updated PRMS planned to be issued in mid-2018



Scope of the PRMS

- The PRMS is focused on supporting consistent Petroleum Resources evaluations based on technically sound industry practices
 - Not specifically designed for external reporting including securities disclosures
 - Modeled according to technical and business requirements of oil and gas companies
- Also to meet the needs of government agencies, financial institutions and industry consultants
 - By directly referencing the SPE system agencies can develop reporting and disclosure rules that meet their specific requirements yet retain industry consistency

PRMS Adoption Status as of 2018

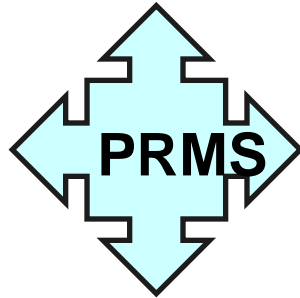
Securities Regulators

USA (SEC)
Canada (CSA)
Hong Kong (HKEX)
Australia (ASX)
UK (LSE-AIM)
Singapore
Argentina
Netherlands
Brazil
Italy
France
South Africa
(ESMA)



PRMS is implicitly or explicitly referenced by:

Oil & Gas Companies



Financial

International Accounting Standards Board (IASB)



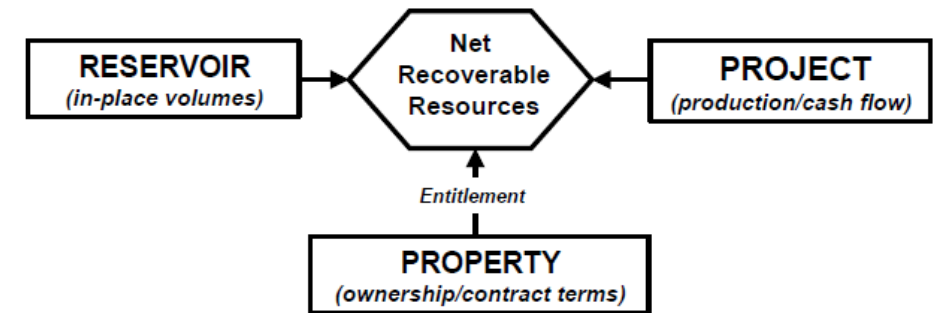
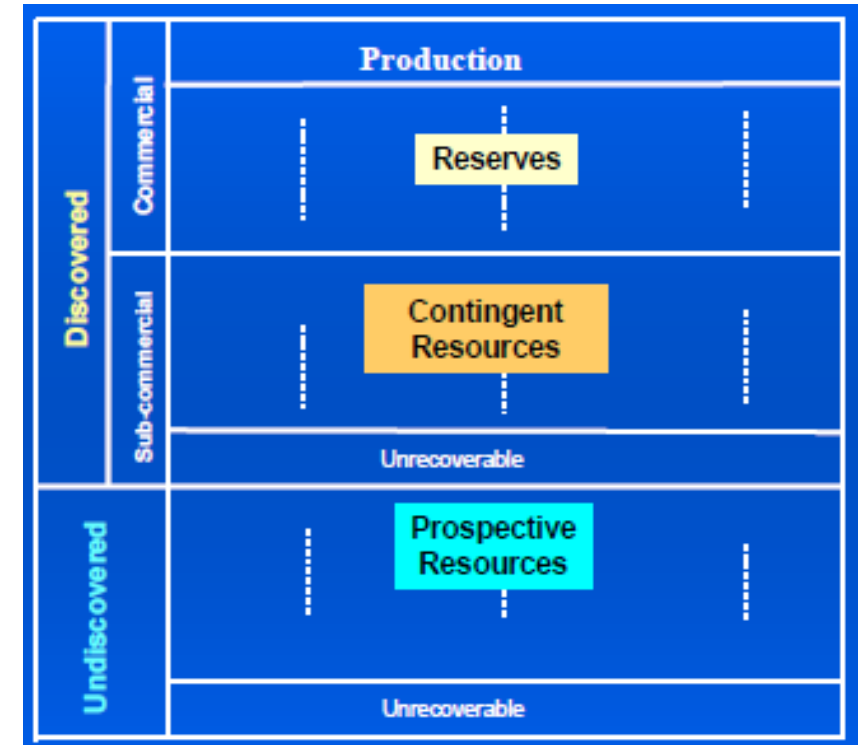
Government Reporting



OPEC
NPD - Norway
BOEM - USA
Offshore
ANP - Brazil
CNH - Mexico
ANH - Colombia
& several others
UNFC - United Nations

PRMS - Major Principles Retained from 2007

1. The System is “**Project-Based**”
2. Classification is based on project’s **chance of commerciality**
 - Categorization is based on **recovery 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. Applies to both conventional and **unconventional resources**
7. Reserves / resources are estimated in terms of the **sales quantities** and **allowing for fuel separately**
8. Net Resources are allocated based on **contractual entitlement**



Reserves – Reminder of Principles (No change in 2018)

Reserves are those quantities of Petroleum anticipated to be **commercially recoverable** by application of **development Projects** to known accumulations **from a given date forward** under **Defined Conditions**

The four criteria that Reserves must satisfy:

- Discovered
- Recoverable
- Commercial and
- Remaining, based on the development project(s) applied

Key Clarifications and Updates to the 2007 PRMS (1 of 2)

- Improving the PRMS's clarity and granularity
- Updates to Resource Classification Framework
- Update to Project Maturity Sub-Classes
 - Recommend sub-class usage for Entities' to have clarity on project's maturity
- Economically Producing and Economic Limit
- Clarify the use of the 2P, utilizing the Best Estimate, (or higher confidence) for the Project Commercial decision criteria
 - Once Project tested and Commercial criteria established, the scenario (Low and High) is checked for economics to pass as Reserves
- Clarifying risk vs. uncertainty
- Justified for Development clarification and how differs from Development Pending
 - Requires Commerciality to be achieved with Reasonable Expectation of development

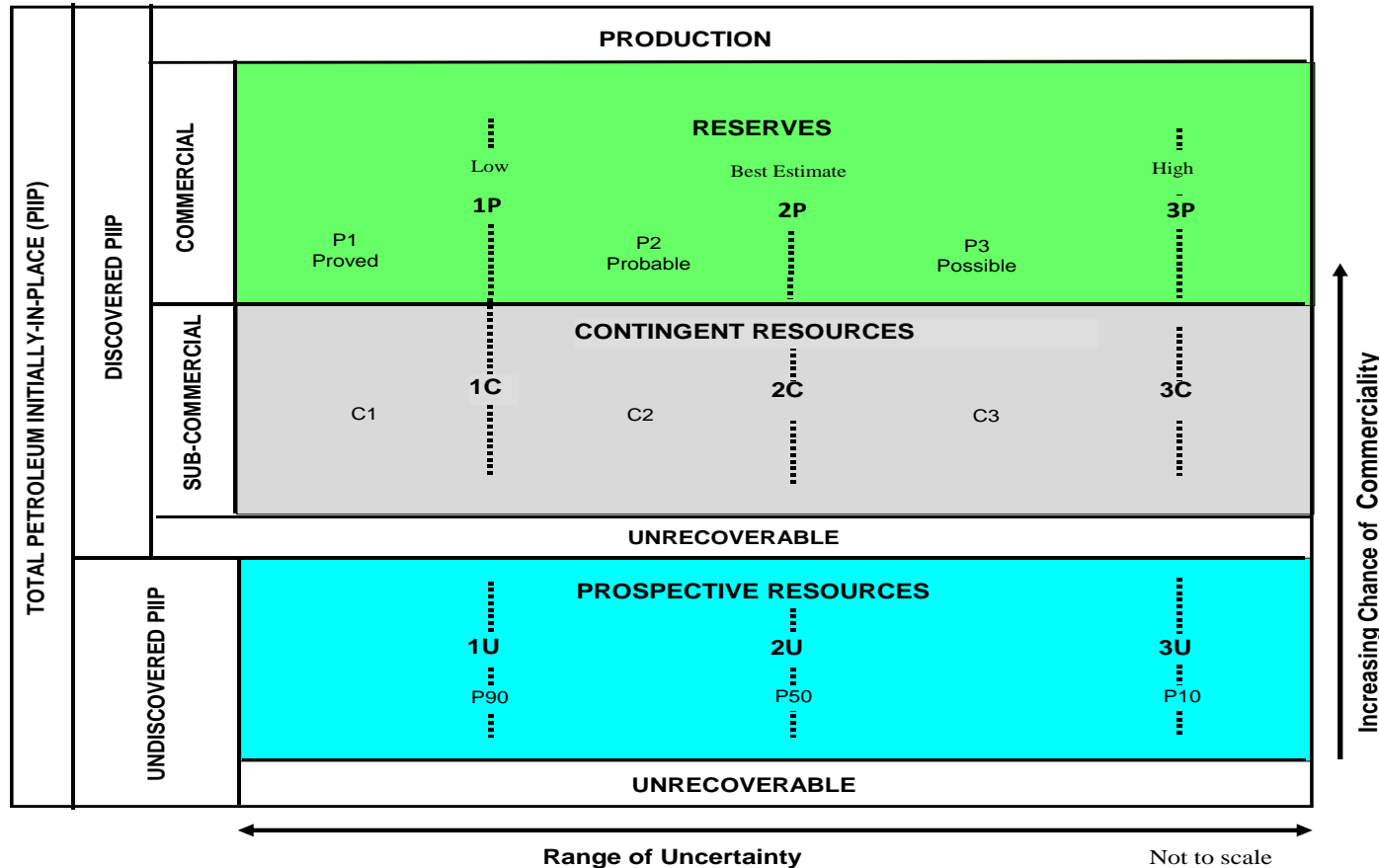


Key Clarifications and Updates to the 2007 PRMS (2 of 2)

- Discovery criteria
- Chance of: discovery, development and commerciality
- Analog application has been improved to align more closely with subsurface elements, development criteria and facility consideration
- Stand-alone Possible not allowed, required to be extension of neighboring project with 2P, otherwise Contingent Resources
- Abandonment Decommissioning and Restoration (ADR) costs
 - Clarity on use, importance and requirement to record
- Clarifying the range of uncertainty (low, best, high / P90,P50, P10) and their use in economic tests
 - Results in truncation of the forecast (i.e., economic, license..) achieving Reserves and Resources categories
- Various assessment methods are acceptable and results should be similar when using Deterministic, Probabilistic, Geostatistical and Integrated Methods
- Qualified Reserves Evaluator (QRE) and Qualified Reserves Auditor (QRA) qualifications have been added



PRMS – Framework Updated



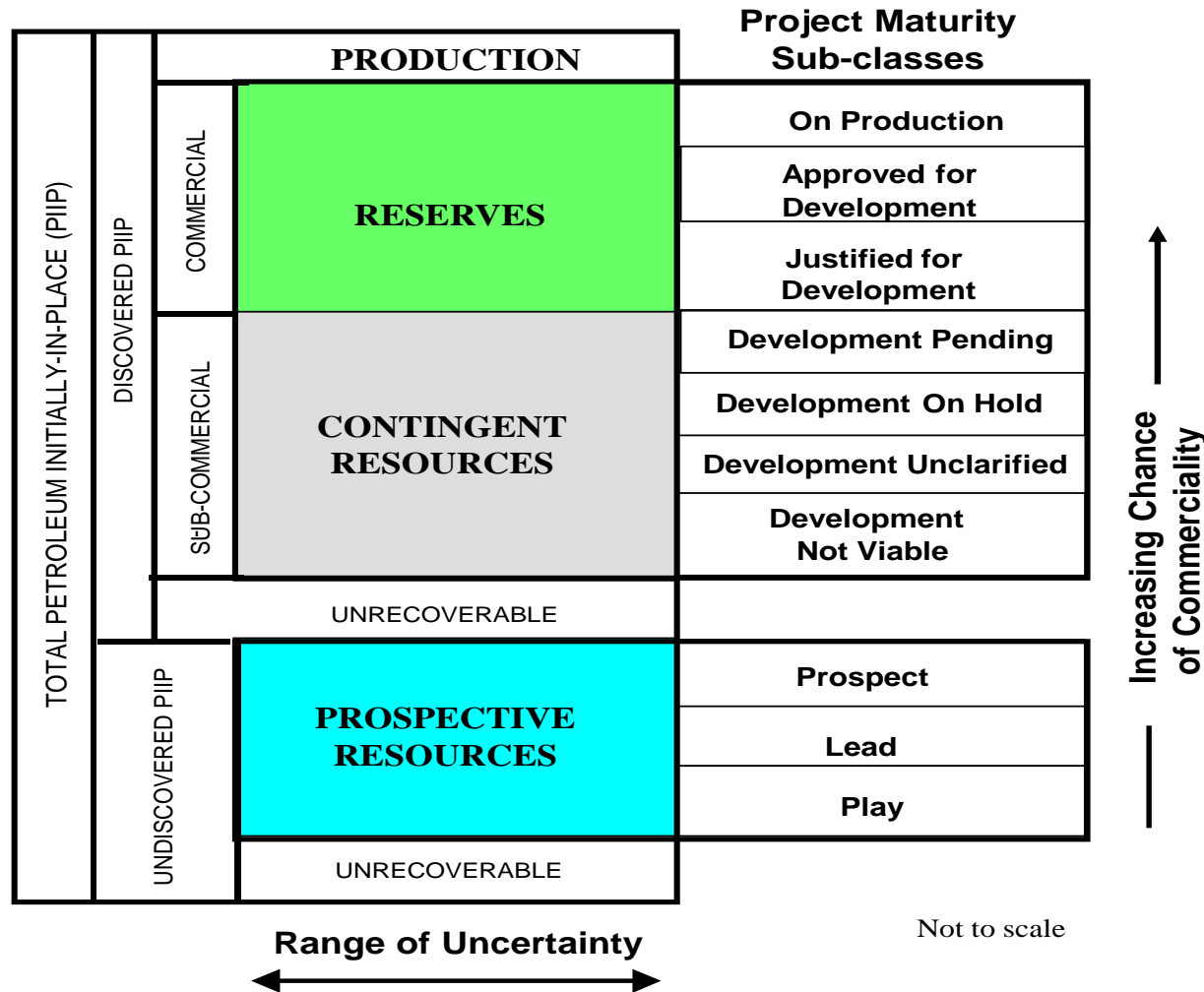
Proposed modifications:

- + Truncated commerciality arrow in the Reserves class
- + Added P1, P2 and P3
- + Added C1, C2 and C3
- + Added 1U, 2U and 3U ("U" for undiscovered)
- + Low, Best and High and P90, P50 and P10 in background referencing the technical forecast category relation.
 - Different name to highlight qualification of the technical forecast with economic and contractual criteria
 - Provides clarity that there is a step to arrive to the appropriate resource classification

+ Contingent Resources carry a Chance of Commerciality (Pc) which is equal to the Chance of Development (Pd)

+ Prospective Resources carry a Chance of Commerciality (Pc) which includes both the Chance of Development (Pd) and the Chance of Discovery (Pg)

PRMS – Project Maturity Sub-classes



Proposed modifications:

- To manage Project's and their maturity, evaluators are **encouraged** to use the Project maturity sub-classes
- + Recommend use of sub-classes (Quantitative Pc% may be included)
 - + Separate Development On Hold from Development Unclassified

PRMS – No Splits

- + **'Split conditions'** are not allowed (e.g. different defined conditions, such as prices, inflation, and escalation used in resource categories)
 - The assumed commercial conditions are associated with the resource classes or sub-classes (Y axis) and not with the resource categories (X axis)
 - If there are differing commercial conditions, separate projects and sub-classes should be defined
- + Of note is that **'split classification'** is having a single project assigned to more than one project maturity sub-class along with its uncertainty range e.g. 1C, 2P and 3P is not permitted
 - A Project cannot have quantities classified in both Contingent Resources and Reserves



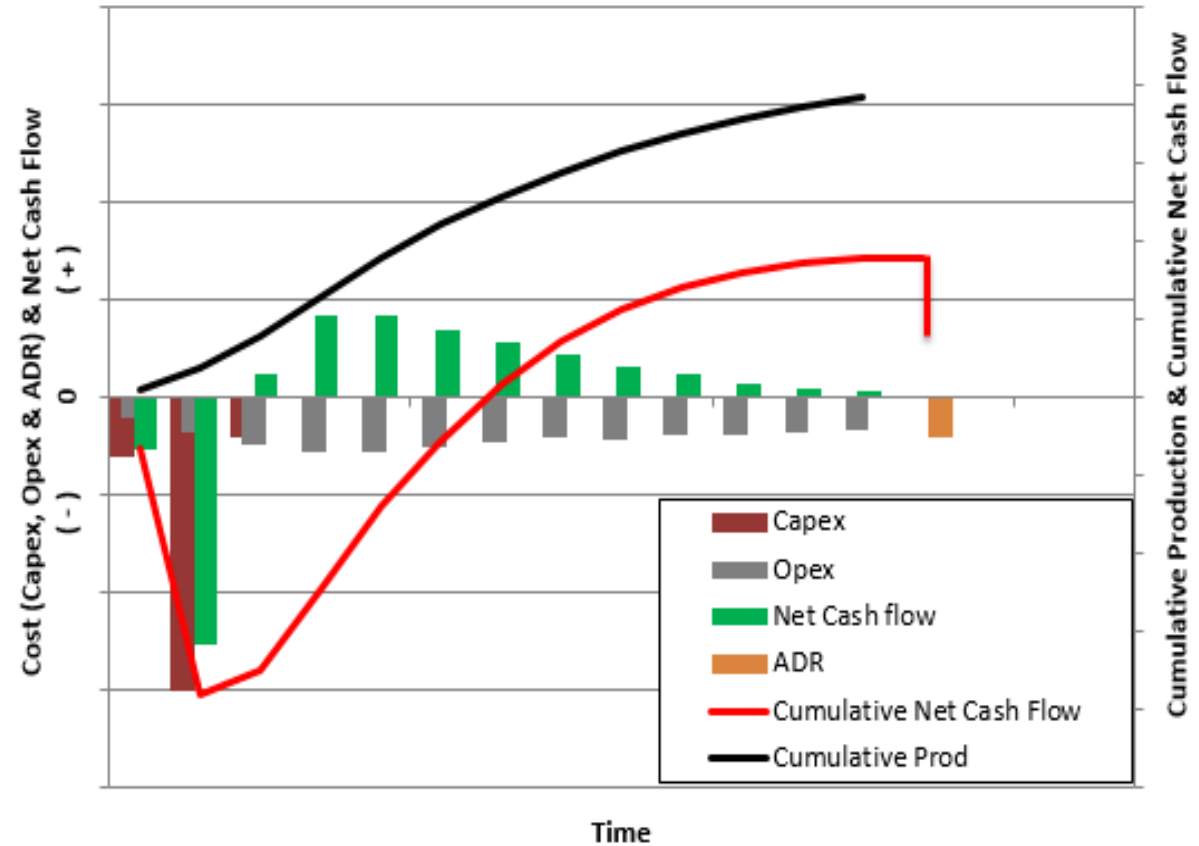
Clarification Economic and Commercial

- **Economic** determination is related to the Best Estimate recoverable quantities of a project (or Low case for more conservative evaluations) meeting the minimum evaluation criteria (e.g. NPV > 0 or = 0) up to the Economic Limit cut off (maximum cumulative net cash flow)
 - Careful not to confuse Project decision and Budget criteria with Reserves evaluation (as of date)
 - Careful not to confuse life cycle Project with “as of date” and remaining quantities for Reserves evaluation
- **Commerciality** addresses: reasonable time frame for development, feasible technical plan, financial appropriations, market availability, availability of production and transportation facilities, environmental and social conditions, regulatory requirements, contractual conditions, economics, minimum evaluation decision criteria (e.g. rate of return, investment payout time, etc.) and have a reasonable expectation of having both participation from partners and confidence in addressing remaining contingencies
 - Determined for “the Project” and NOT for the individual Reserves categories of the Project
 - Once Commerciality established, Low and High Estimates reviewed for economics



Net Cash-flow Based Evaluation

- Entity's net cash flow
- Limited by period of economic interest or reasonable certainty of renewal
 - May be defined differently by Entity (company, regulator, government)
- Utilizes forecast production, costs and schedule
- Applies set of Defined Conditions
 - May be either Constant Case (Current Economic Conditions) or Forecast Case (not both)
- Entity's net resources are defined by the earliest truncation of technical, license, or economic limit
- Example: Undeveloped project cumulative (as of a given date) net cash-flow must exceed ADR liabilities



PRMS – Treatment of Lease Fuel



- + The term Consumed in Operations (CiO) proposed to replace lease fuel or fuel gas
- + CiO reduces operating costs and may be considered a marketable resource (if there is a market)
 - + Marketable resources are those that generate revenue or will add commercial value to the Project (e.g. sales quantities, quantities of CiO that replace energy that would otherwise be purchased)
- + **Key Point!** Reserves are recommended to be Sales quantities, however CiO may be included
- + **Note:** for transparency and consistency when included, CiO **must** be stated and recorded separately from the Sales portion
- + Resources that are lost, flared or vented are excluded from Reserves and Resources classes
- + Purchased fuel gas where there is no use entitlement cannot be claimed as Reserves

Status and Future Vision

PRMS update is complete and in the process of final review and approval by the co-sponsoring societies

- Proposals, discussions and any wording are draft, subject to additional review



There is a light at the end of the tunnel!

Other OGRC active subcommittees and mandates:

- **Proposed PRMS Reporting Guidelines**
 - Complement the PRMS by providing a minimum standard of what should be reported
- **Examples on key issues interpretation**
 - Provides for select items that industry needs further guidance outside of timelines of PRMS and Application Guidelines updates
 - More interactive, topics posted to a linked website and updated more frequently



Following adoption of the 2018 PRMS Update, and the above mandates, work will then start on the Application Guidelines update

Questions?

5/22/2018



AAPG
Annual Convention and Exhibition