

Key Changes from the Petroleum Resources Management System (PRMS 2007) to the PRMS 2018

Dan DiLuzio, PRMS Update Project Lead, SPE Oil and Gas Reserves PRMS Update Sub-Committee members: Bernard Seiller, John Etherington, Dan Olds, Steve McCants, Rawdon Seager, the SPE Oil and Gas Reserves Committee (OGRC), and the PRMS sponsor societies: WPC, AAPG, SPEE, SEG, EAGE and SPWLA who all worked together to provide the 2018 PRMS update with direction from Melissa Schulte (Secretary OGRC).

The 2018 PRMS update is an evolutionary progression that maintains the foundation principles contained in the 2007 PRMS. The update addressed many of the clarification points that have been collected over the years and reflect the public comments received as well. The PRMS foundation principles that are maintained are:

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 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 Consumed in Operations (CiO) quantities may be included as Reserves only when reported separately from sales
8. Net Resources are allocated based on contractual entitlement

Key updates are listed below:

- The terms “shall” or “must” indicate that a provision herein is mandatory for PRMS compliance, while “should” indicates a recommended practice and “may” indicates that a course of action is permissible”.
- The PRMS Classification framework Figure 1.1 (below) has the following updates:
 - New reference designations to the incremental categories of Contingent Resources (C1, C2, C3) and to the cumulative categories of Prospective Resources (1U, 2U, 3U) have been added.
 - o This change in reference designation was intended to clarify that either Deterministic or Probabilistic methods can be utilized for volume classification and/or categorization at any point of project maturity, e.g., exploration or appraisal.
 - In a minor modification, Production and the Unrecoverable classes are now shown as subsets of Discovered Petroleum Initially In-Place (PIIP). This maintains mass balance such that Production + Reserves + Contingent Resources + Unrecoverable = Discovered PIIP.

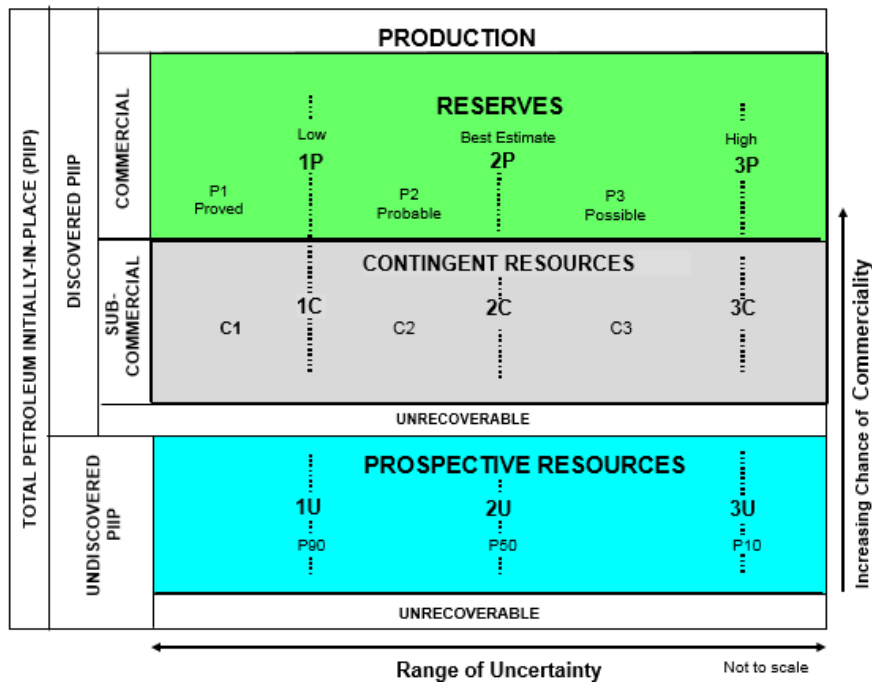


Fig.1.1: PRMS Classification Framework

Other areas where clarification elements were provided include:

- A project is commercial when the entity has demonstrated a firm intention to proceed with development based on satisfying the internal decision criteria (typically rate of return at or above the weighted average cost-of-capital or the hurdle rate) and has satisfied all other technical and commercial criteria contingencies.
 - o Economics is one of the criteria that are required to be met in achieving Commerciality.
- A project is Economic when the net revenue attributable to the Entity interest from production exceeds the Entity's cost of operation.
- Clarification of the use of the 2P estimate, utilizing the Best Estimate (or higher confidence), for the Project Commercial decision criteria.
 - o After the 2P Project has been assessed to achieve Commerciality, the scenarios (Low and High) are checked for economics to also qualify as Reserves for 1P and 3P, respectively.
 - o 2P Reserves can exist without 1P when 1P is not economic.
- Clarification of the risk associated with the Chance of Commerciality (y-axis).
- Clarification of the uncertainty in the Categorization based on the range of uncertainty in the resources quantities (x-axis).
- Project sub-classes are recommended to be used to differentiate the Contingent Resources project variability of commerciality.
 - o The Contingent Resources project maturity sub-classes are updated to separately define Development on Hold from Development Unclassified.
- Split conditions and split classification are not permitted. A single set of defined conditions is applied for the resources categorization and the resources classification of the project.

- Projects should not remain in the Justified for Development sub-class for extended time periods without positive indications that all required approvals are expected to be obtained without undue delay.
- The development scenarios may vary in the Low, Best and High Estimate Cases with regard to number and type of wells, facilities and infrastructure. Multiple project scopes are present in the early stages of Contingent and Prospective Resources. In later stages, as the project moves toward Reserves, decision steps will generally align with a project or multiple projects.
- Stand-alone Possible Reserves are not allowed, with the exception when they are an extension of a neighboring project with 2P.
- Reserves and Resources are estimated in terms of petroleum sales quantities with the option to include Consumed in Operations (CiO) quantities (i.e., lease fuel). When recognizing CiO as Reserves or Resources, CiO must be separately reported from sales quantities.
- Renamed PRMS 2007 Marginal and Sub-Marginal Contingent Resources terms to Economically Viable and Economically Not Viable for Contingent Resources.
- Projects associated with Undeveloped Reserves should initiate development within five years from the initial classification date (with exceptions to be clearly justified). The “5-year rule” applies to the Reserves class and not solely to the Proved Reserves category.
- Shale oil and shale gas are subtypes of tight oil and tight gas.
- In oil and gas developments with high well counts and a continuous program of activity (multi-year), the use of a demonstrated analog learning curve within a resources evaluation may be justified to predict improvements in either the time taken to carry out the activity, the cost to do so, or both.
- Abandonment, Decommissioning and Restoration (ADR) costs must be included in the economics assessment of new investments. The economic limit for developed projects that are on production are not impacted by ADR unless specifically addressed in the contract terms.
- Contingent Resources may include Projects where commercial recovery is dependent on Technology Under Development. Reserves classification requires use of Established Technology where the methods of recovery or processing are technically feasibility and has been proved successful.
- Guidance in the use of Analogs has been improved to align more closely with subsurface elements, development criteria and facility consideration.
- Estimated Ultimate Recovery (EUR) must reference the associated technical and commercial conditions being applied. (the descriptor of the quantity EUR category and class i.e., Proved EUR = 1P + Prod; 2P EUR = 2P + Prod)
- Technically Recoverable Resources (TRR) was added to reference those quantities of petroleum producible using currently available technology and industry practices, regardless of commercial considerations.
- Qualified Reserves Evaluator (QRE) and Qualified Reserves Auditor (QRA) qualifications have been added.