Reserves/Resources Reporting Standard Petroleum Resources Management System (PRMS)*

John R. Etherington[1]

Search and Discovery Article #120000 (2009)
Posted November 25, 2009

*Adapted from presentation at AAPG Geoscience Technology Workshop, "Geological Aspects of Estimating Resources and Reserves," Houston, Texas, September 9-11, 2009

[1]Managing Director, Petroleum Resource Analysts (PRA) International Ltd. (jetheri@shaw.ca)

Abstract

Over the last 50 years, the Society of Petroleum Engineers (SPE), through its Oil and Gas Reserves Committee (OGRC), has published standards regards the assessment of petroleum reserves and resources. The standards document has been periodically updated to accommodate new technologies and incorporate evolving industry best practices in assessment methods. The most recent documentation of these standards is contained in the Petroleum Resources Management System (PRMS) co-sponsored by the World Petroleum Council (WPC), the American Association of Petroleum Geologists (AAPG), and the Society of Petroleum Evaluation Engineers (SPEE). PRMS is also endorsed by the Society of Exploration Geophysicists (SEG). These organizations in combination represent the majority of the technical professionals within the international petroleum industry involved in resources assessments.

PRMS was designed around a "project-based" model that aligns with the assessment approach utilized by oil and gas companies. The total in-place hydrocarbons of each reservoir are estimated based on available geoscience and engineering information. By applying a series of development projects to one or groups of reservoirs under defined social and economic conditions, multiple disciplines collaborate to forecast production and associated cash flow schedules. 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 revenue.

It all starts with establishing the presence and estimated extent of in-place hydrocarbons at the reservoir level; however, it is only by combining reservoir information with the development projects (wells and facilities) that one can estimate the sales volumes. It is at the project level that technical and commercial uncertainties are combined with economic criteria. It is at the project level that investment decisions are made and cash flows are tracked to assess economic value by associating the sales volumes with the sales price received at the custody transfer point.

Copyright © AAPG. Serial rights given by author. For all other rights contact author directly.

PRMS provides common framework and a series of guidelines that allow consistency in assessing and reporting estimations of recoverable quantities based on technical and commercial risk and uncertainty. While focused on internal processes to support project and portfolio management, this same framework provides a basis for external reporting that allows investors to compare the future performance of companies.

References Cited

Holditch, Stephen A., 2007, Hydraulic fracturing: Overview, trends, issues: Fracturing and Stimulation, July/August, 2007, p. 26-28.

Holditch, Stephen A., 2009, The role of IOCs and NOCs in developing unconventional oil and gas reservoirs: The Way Ahead, v. 5, no. 3, p. 7-8, 12. Holditch, JPT Nov. 2002.

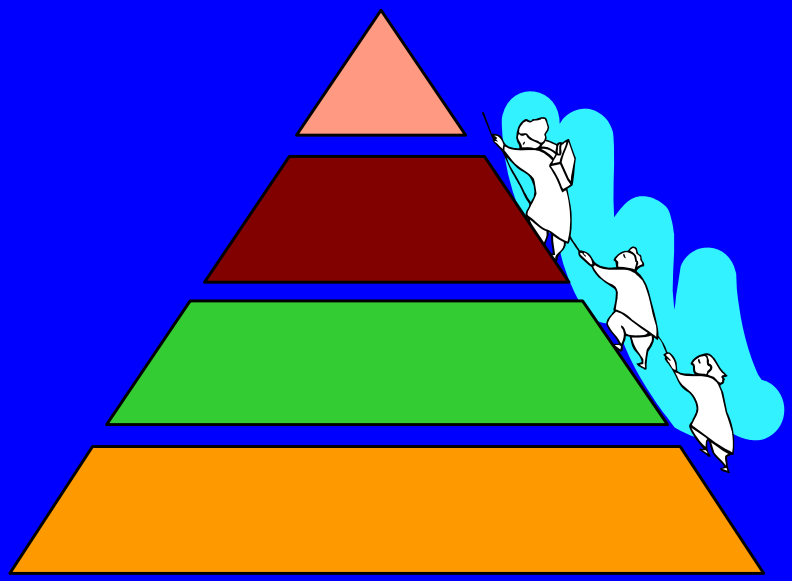
PRMS Official Reference (www.spe.org)

Reserves/Resources Reporting Standard

Petroleum Resources Management System

PRMS

Co-sponsored by:
SPE
AAPG
WPC
SPEE
Endorsed by:
SEG



presented by: John R. Etherington, Managing Director,
Petroleum Resource Analysts (PRA) International Ltd.

“Vision” for Reserves/Resources

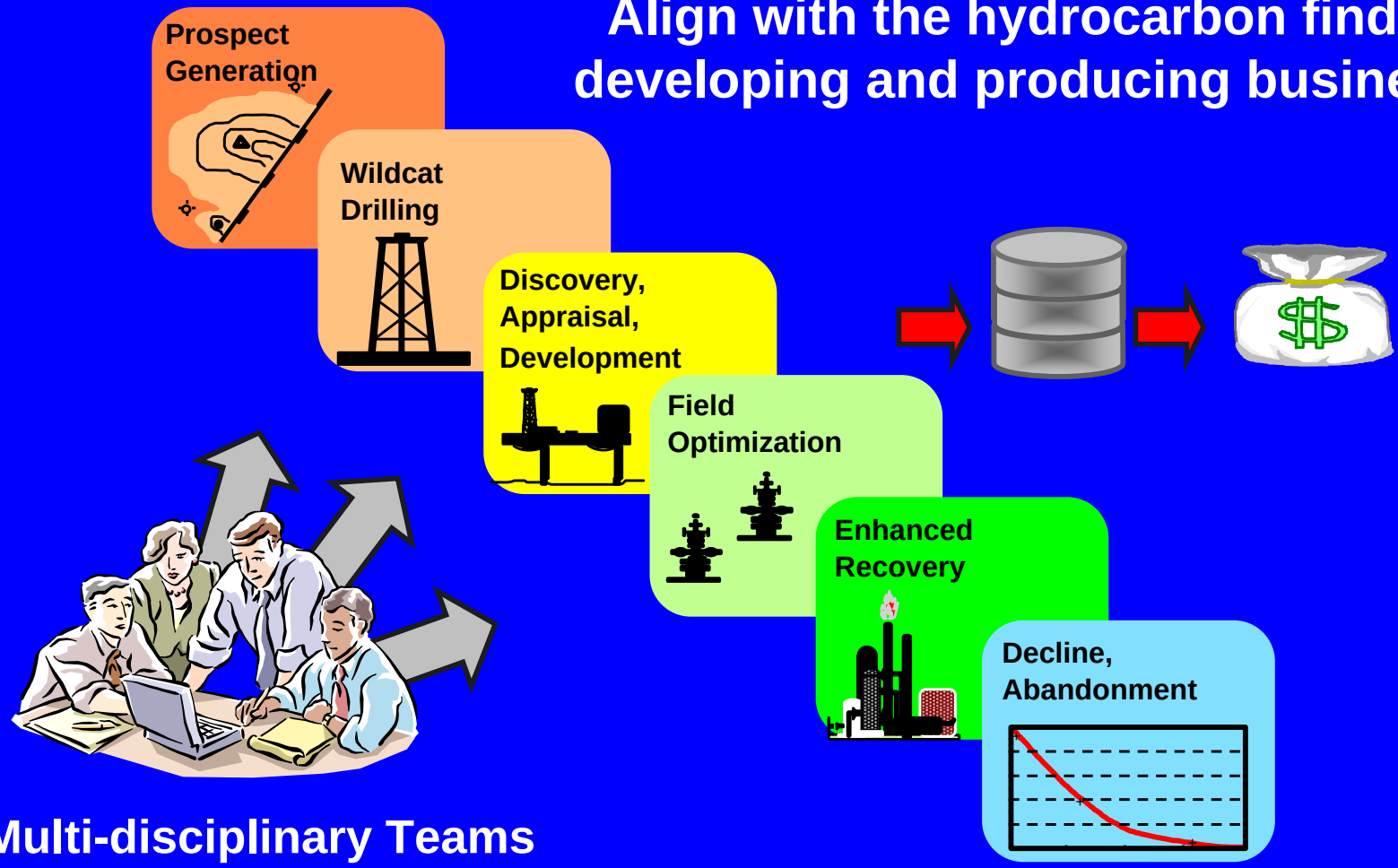
(October 2004)

SPE/WPC/AAPG/SPEE definitions and classification system (and associated estimating guidelines) will continue to be maintained evergreen and enhanced to incorporate new best practices, and unconventional resources, and will be recognized as the premier classification standard.

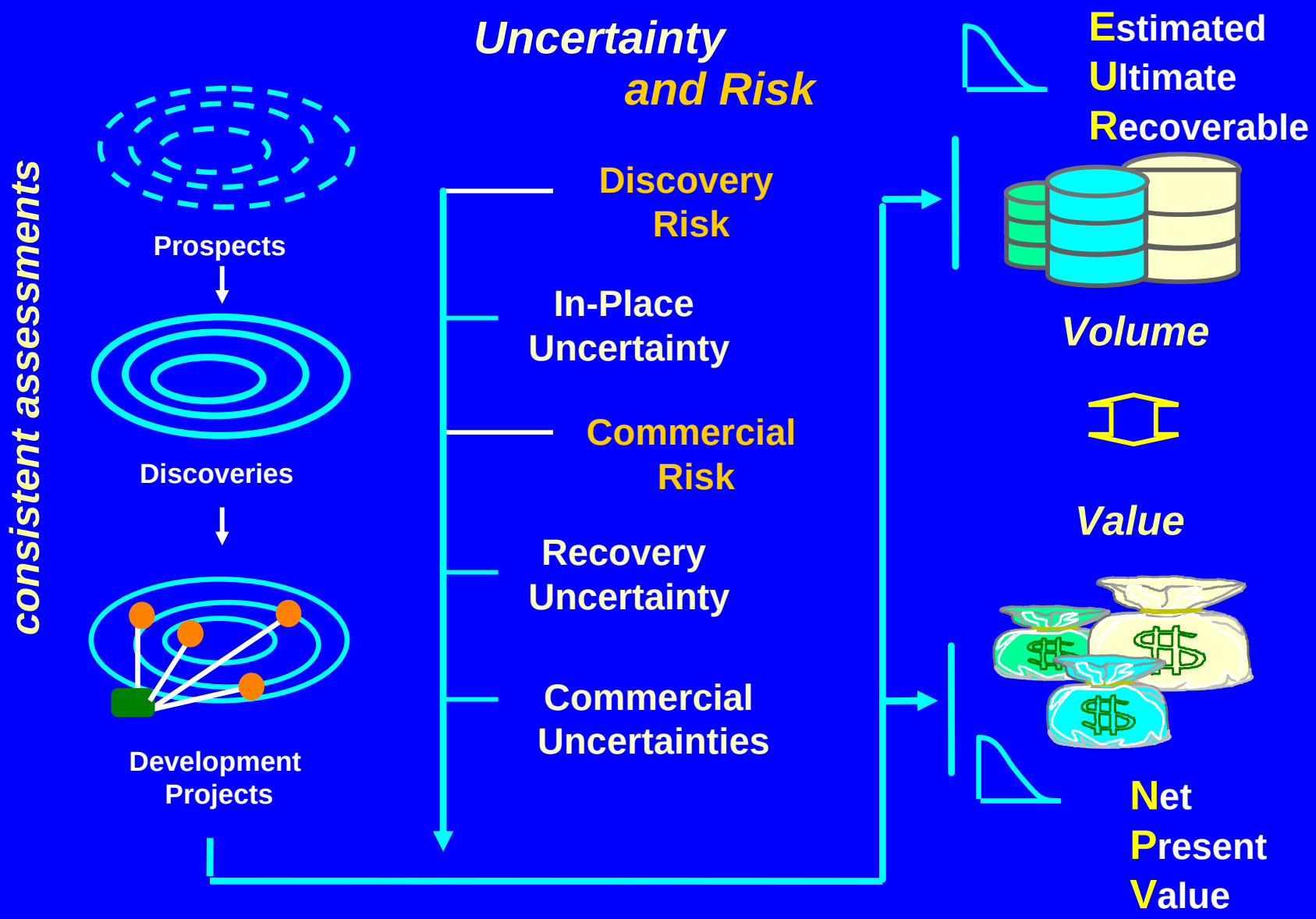
- SPE will actively promote and facilitate in-depth understanding of the definitions and their universal adoption by the oil, gas, and related industries, international financial organizations, governments, regulatory agencies, and reporting bodies.

PRMS is Designed to Support Asset Management – "Cradle to Grave"

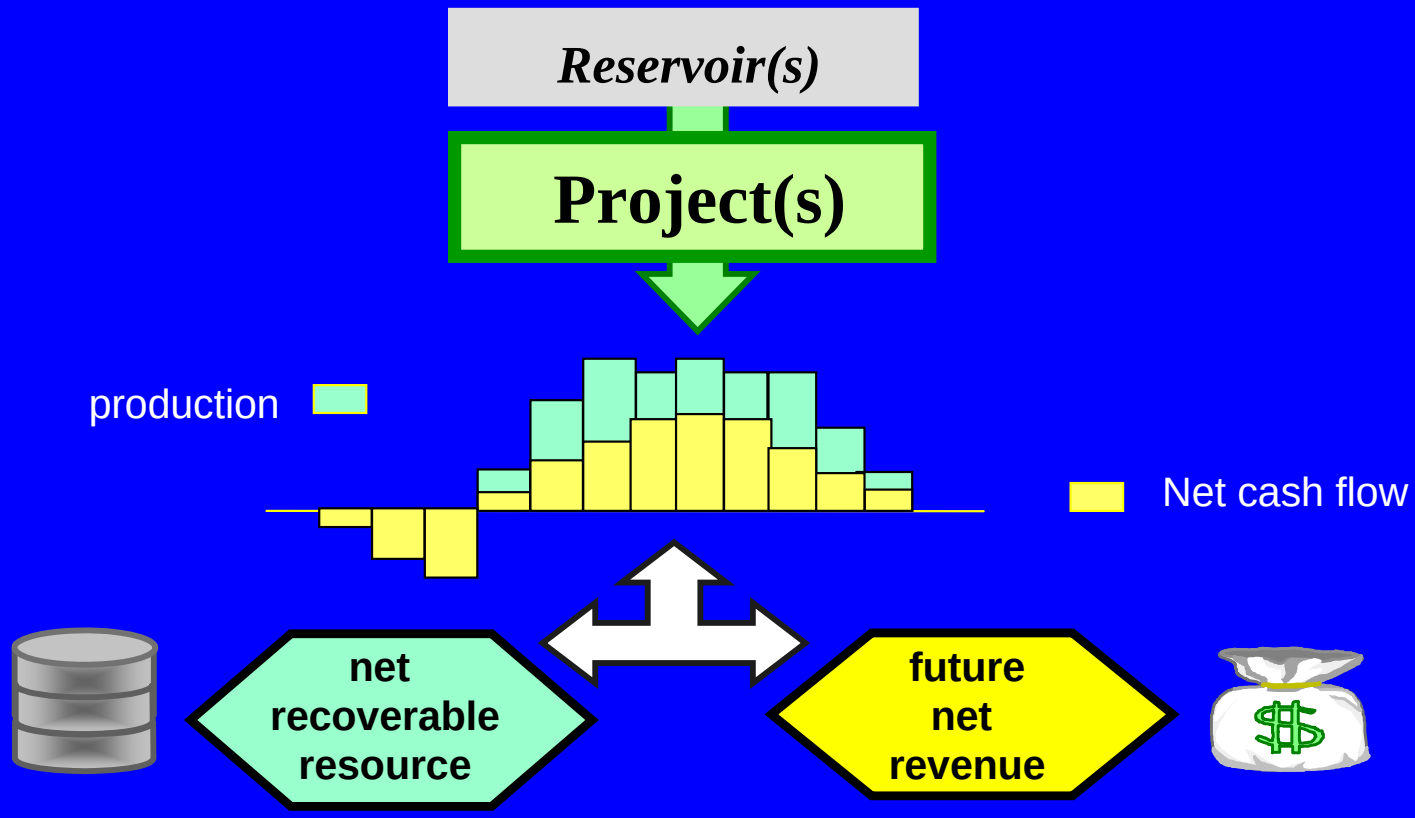
Align with the hydrocarbon finding, developing and producing business!



It's all about Risk and Uncertainty



It's all about Linking Volumes and Value



Each project applied to a specific reservoir(s) development generates a unique production and cash flow schedule.

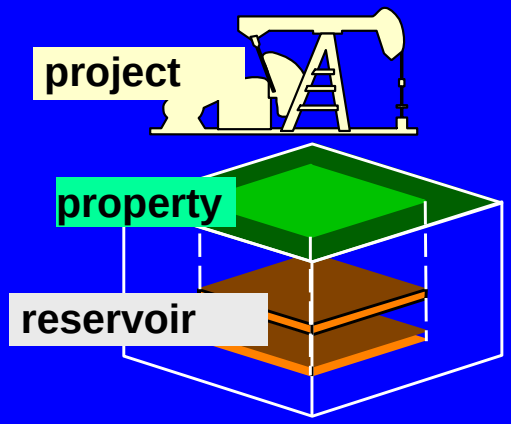
The time integration of these schedules taken to the project's technical, economic, or contractual limit defines the estimated recoverable resources and associated future net cash-flow forecast for each project.

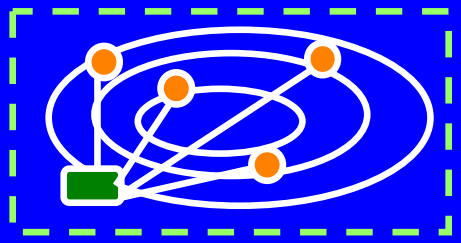
PRMS - Major Principles

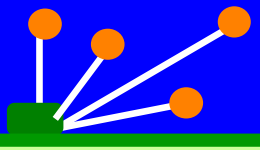
1. The System is **"Project–Based".**
2. Classification is based on project's **chance of commerciality**. Categorization is based on **recoverable uncertainty**.
3. Base case uses evaluator's **forecast of future conditions**.
4. Provides more **granularity for project management**.
5. Estimates based on **deterministic and/or probabilistic** methods.
6. Applies to both conventional and **unconventional resources**.
7. Reserves /resources are estimated in terms of the **sales products.**

Principle # 1

*The System is **"Project–Based".***



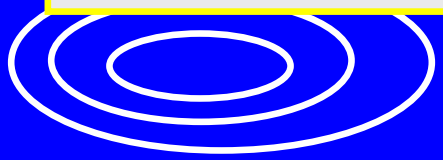




Project
(production & cash flow schedules)

net recoverable resource

Reservoir
(in-place volumes)

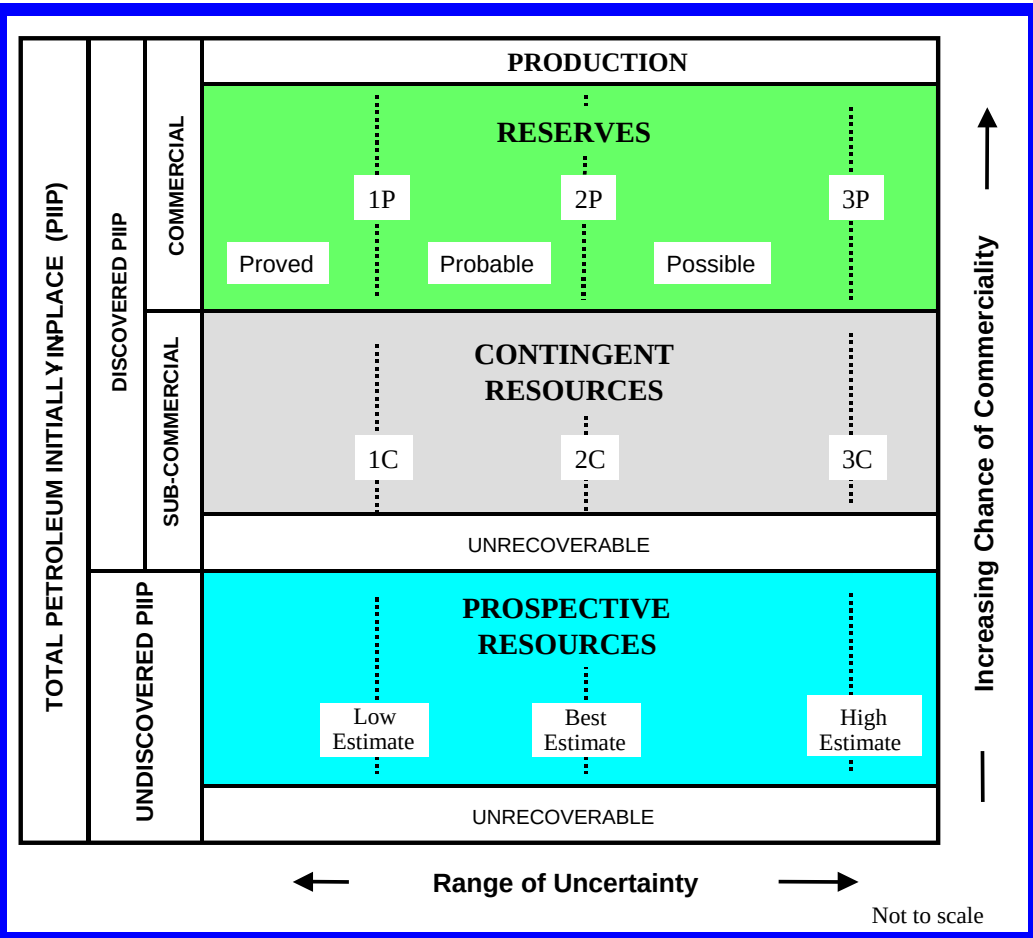


Property
(ownership/contract terms)

Principle # 2

*Classification is based on project's **chance of commerciality**.*

*Categorization is based on **recoverable uncertainty**.*



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

categorize estimates based on uncertainty
of sales quantities associated with a project

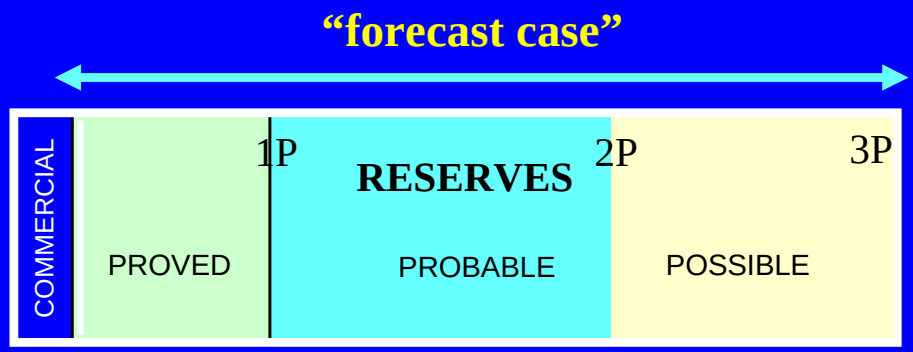
Principle # 3

Base case uses evaluator's ***forecast of future conditions***

Project decisions are based on the evaluators view of "Forecast Conditions" = those assumed to exist during the project's implementation

Conditions include:

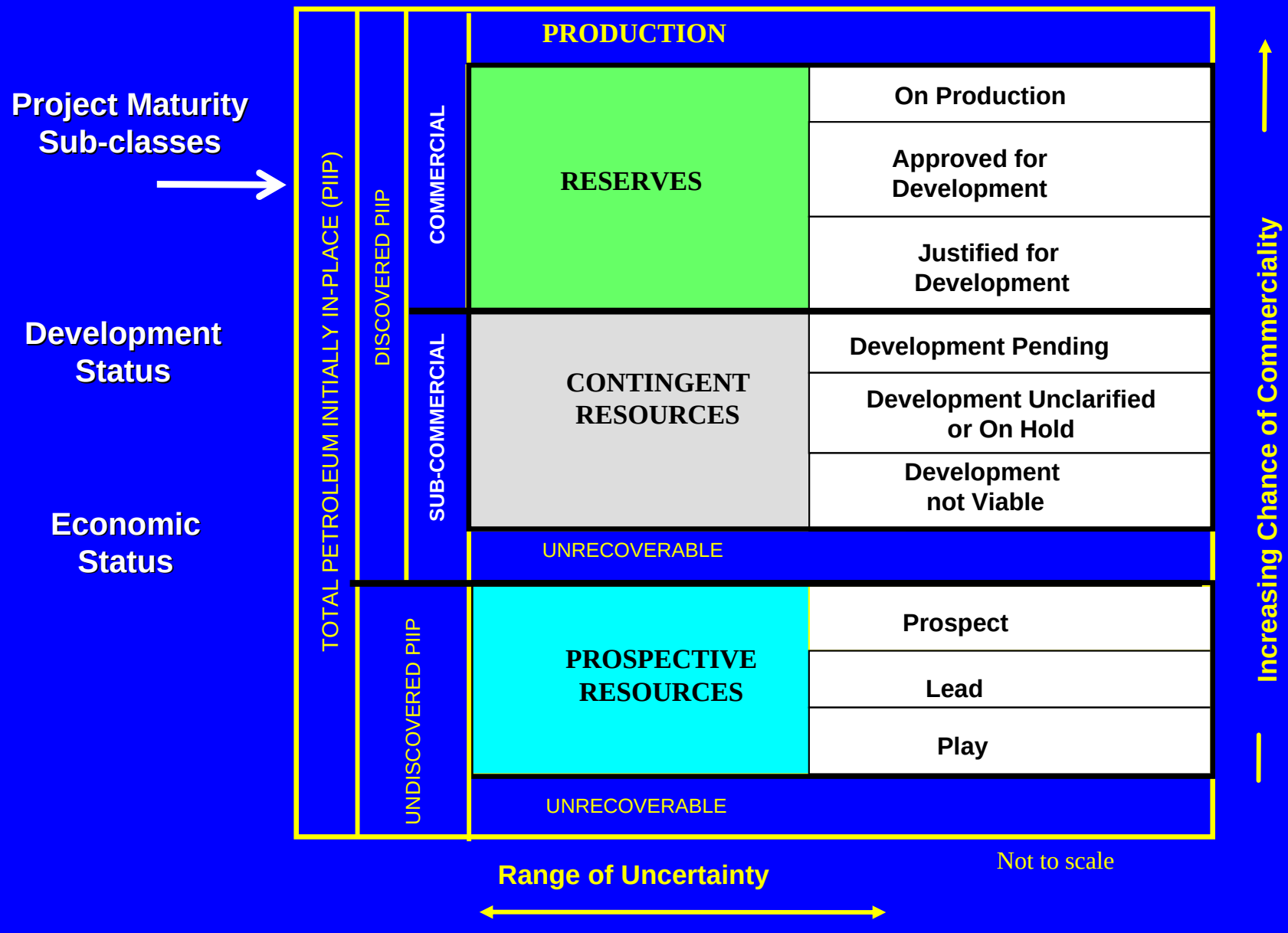
- Prices and costs
- Technology available
- Environmental standard
- Fiscal terms
- Regulatory constraints



Same Conditions for Proved & Unproved

Principle # 4

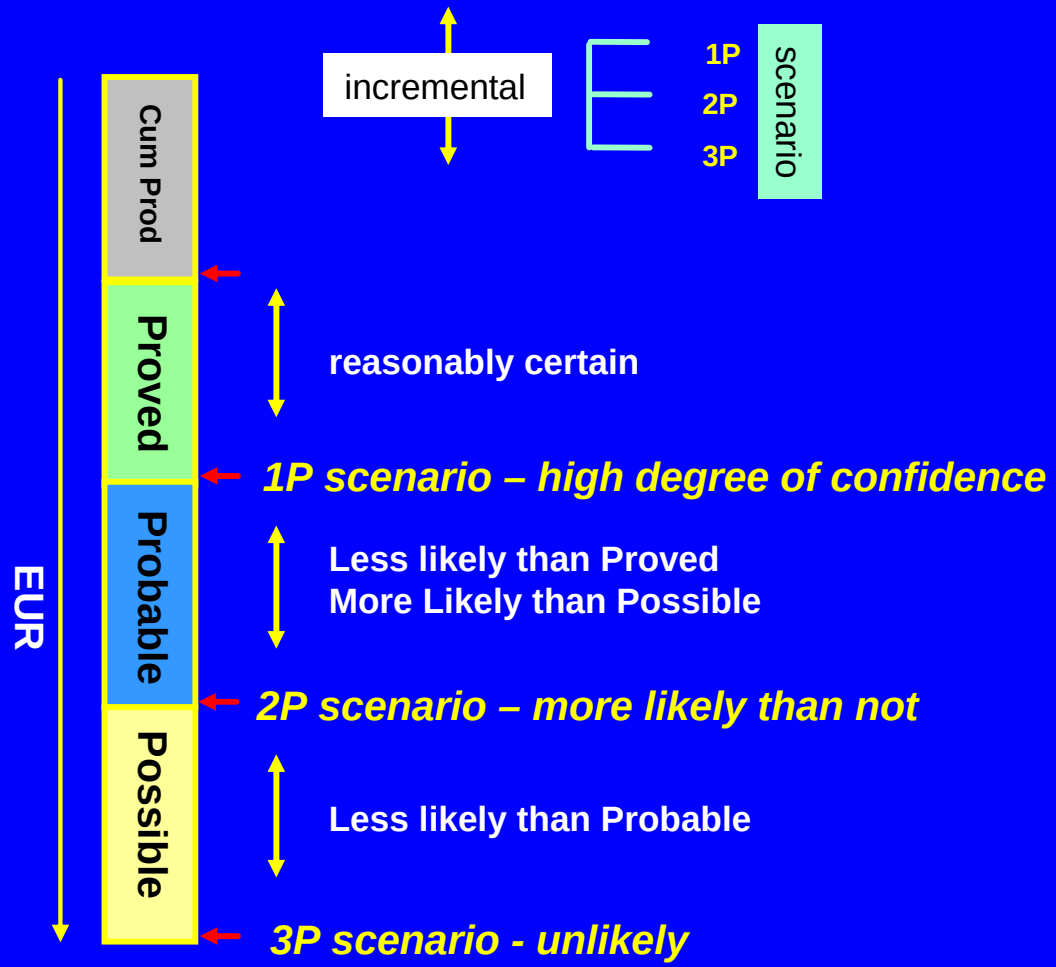
Provides more granularity *for project management.*



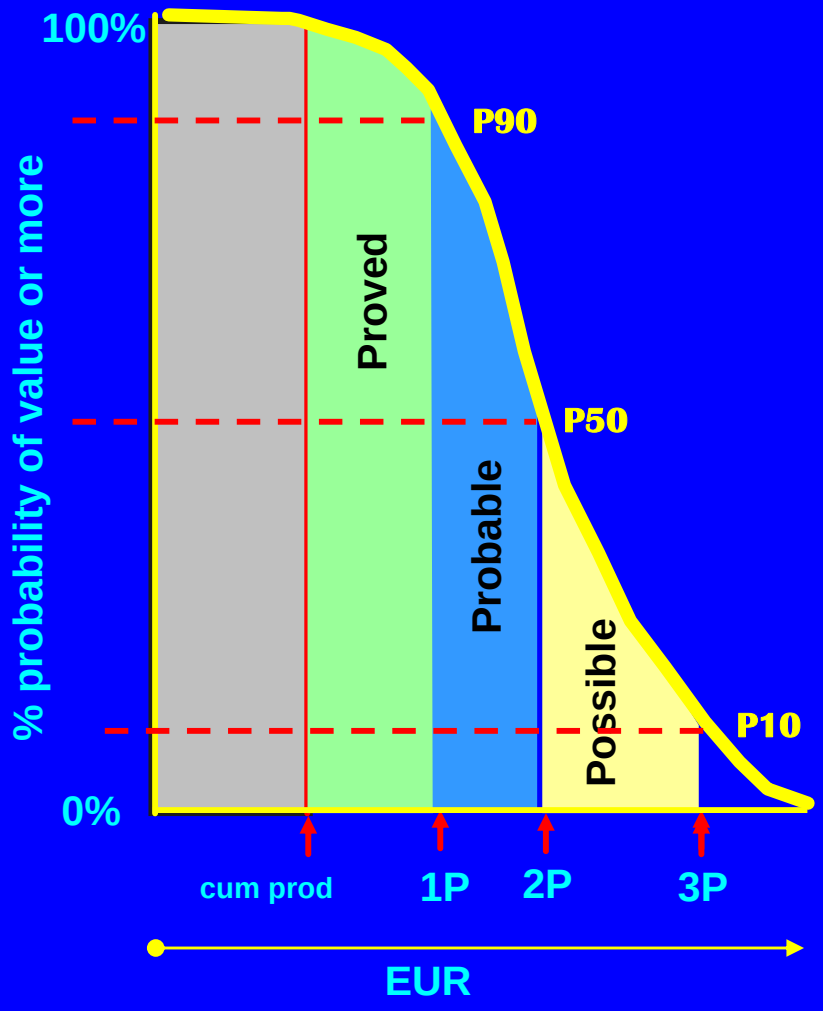
Principle # 5

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

Deterministic Methods

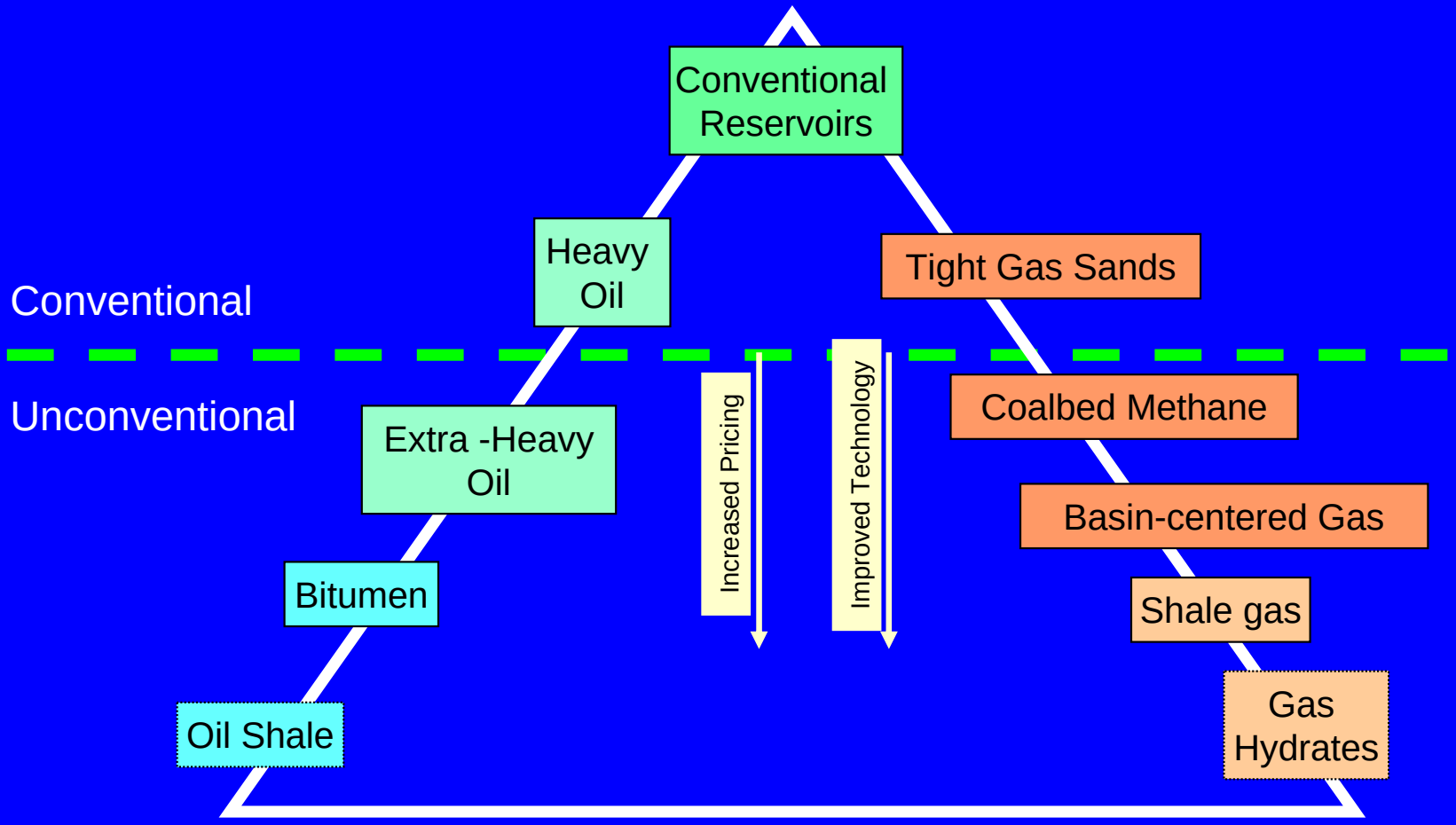


Probabilistic Methods



Principle # 6

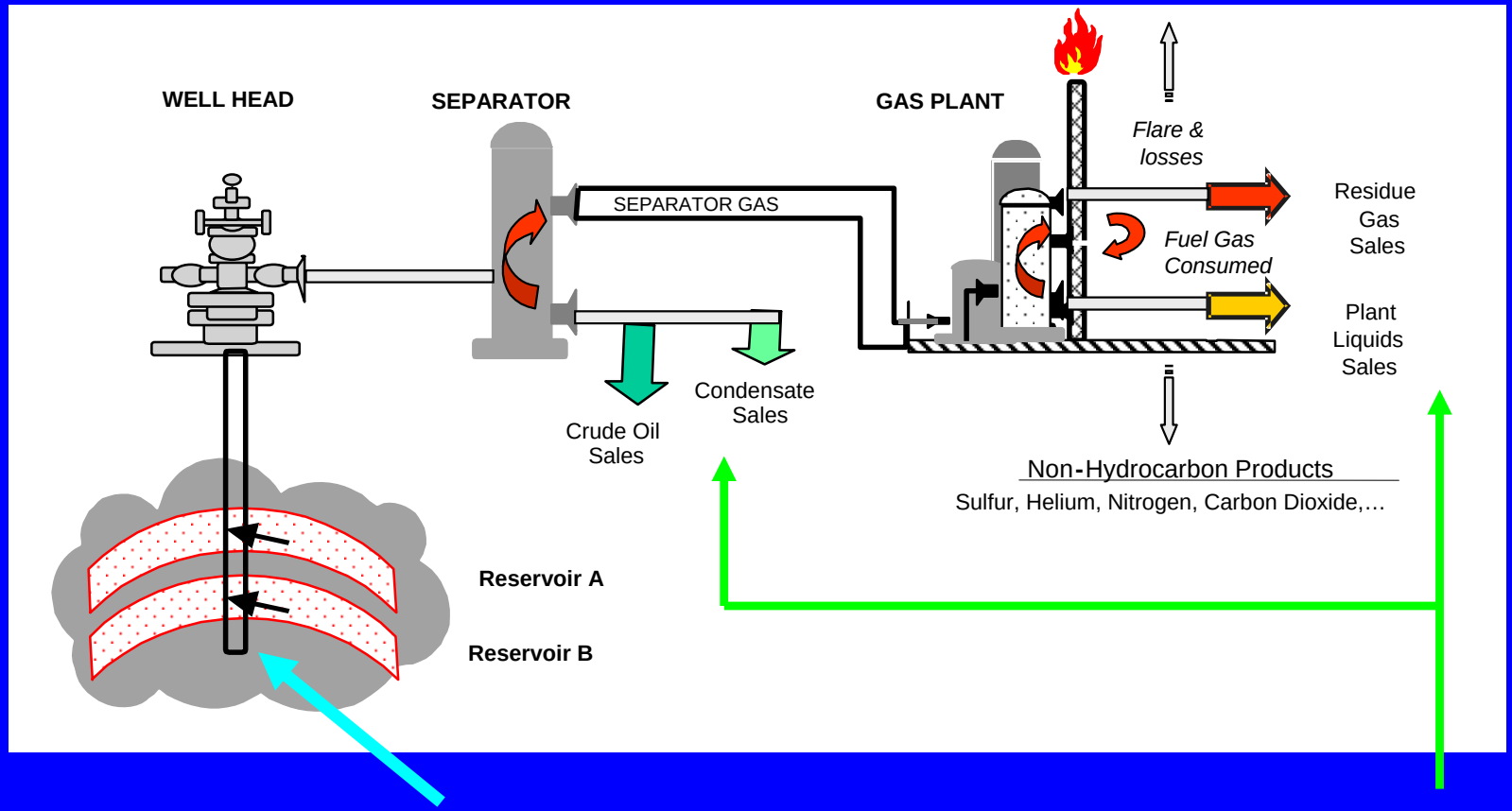
*Applies to both conventional and **unconventional resources**.*



(modified from Holditch, JPT Nov. 2002)

Principle # 7

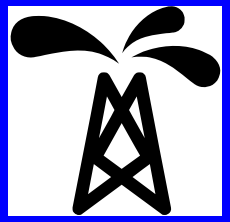
*Reserves/resources are estimated in terms of the **sales products***



You book it here based on how you sell it here

PRMS is "Project-Based"

PRODUCTION



The key is the **PROJECT**

Proved | **Probable** | **Possible**

Reserves

Contingent Resources

No Project – No recoverable resource

Prospective Resources

Discovered

Commercial

Sub-commercial

Undiscovered

classify by chance of commerciality

categorize by recovery certainty

PRMS Official Reference (www.spe.org)

Membership | Meetings/Events | Papers/Publications/Authors | Career/Education | Sections/Groups/Networking | Industry/Technical Resources | About SPE

Search in SPE.org Go

Industry/Technical Resources

- Industry News
- Industry Statistics
- Information by Discipline
- Petroleum Reserves & Resources Definitions
  - Petroleum Resources Management System
  - Mapping of Reserve Definitions
  - Auditing Standards for Reserves
  - Committee Activities
- SPE E&P Glossary
- Technical Interest Groups
- Find Products/Services
- Learn About Oil and Gas
- Reference Material
- Research & Development

Home > Industry/Technical Resources > Petroleum Reserves & Resources Definitions

Petroleum Reserves & Resources Definitions

Oil and gas that have been discovered, but not yet produced, cannot be readily measured. Trapped in the pore spaces of rock, thousands of feet below the surface, the amount of oil or gas in a reservoir cannot be measured with precision. But it is very important to have a good estimate of the amount of oil or gas that may lie in the reservoir. A company cannot evaluate whether a discovered field will be economic to develop without estimating the amount of production that it may obtain over time to balance against the investment required. Oil and gas reserves are a substantial asset on a company's balance sheet. Without a common approach to classification and estimation of oil and gas, it would be impossible to know whether those assets were comparable from one company to another.

Photo courtesy of BJ Services

Petroleum Resources Management System
Approved by the SPE Board in March 2007, this new system for defining reserves and resources was developed over more than two years, working with WPC, AAPG, and SPEE. An archive of the prior definitions is also available.

PRMS Guide for Non-Technical Users
The guide provides the concepts in the PRMS in a four-page document that is intended to provide a quick overview for non-technical professionals

Mapping of Reserve Definitions
Around the world, government agencies and other organizations use slightly different definitions. This mapping provides a comparison of many of these definitions.

Estimating and Auditing Standards for Reserves
To assist those responsible for estimating reserves, or auditing those estimates, a standard approach has been outlined, along with minimum qualifications for those involved in reserves auditing.

Printable View
Add page to My SPE Favorites
Email this page to a friend
Use larger font

Resources/Archives

White Paper: Why a Universal Language for Evaluating Reserves Is Needed

Guidelines for the Evaluation of Reserves and Resources - 2001 [2.9MB]

Definitions Development to 2005

Petroleum Reserves Definitions - 1997

Petroleum Resources Classifications - 2000

Glossary of Reserves/Resources Terminology - 2005

Estimating and Auditing Standards for Reserves - 2001

Membership of the Oil & Gas Reserves Committee

Right click, Save As.. to download

JCORET

World Petroleum Council

The **Joint Committee on Reserves Evaluator Training** (JCORET) is a not-for-profit committee created through the cooperation of four founding sponsors – The Society of Petroleum Engineers (SPE), The World Petroleum Council (WPC), The American Association of Petroleum Geologists (AAPG) and the Society of Petroleum Evaluation Engineers (SPEE) .

The purposes of this committee is to cooperate in approving, developing and delivering training courses to Petroleum Reserves Evaluators worldwide. Such training courses will initially be focused on (1) reserves and resources definitions and applications (2) recommended engineering and geological evaluation practices and (3) ethics training.

http://www.aapg.org/explorer/2007/11nov/jcoret_report.pdf