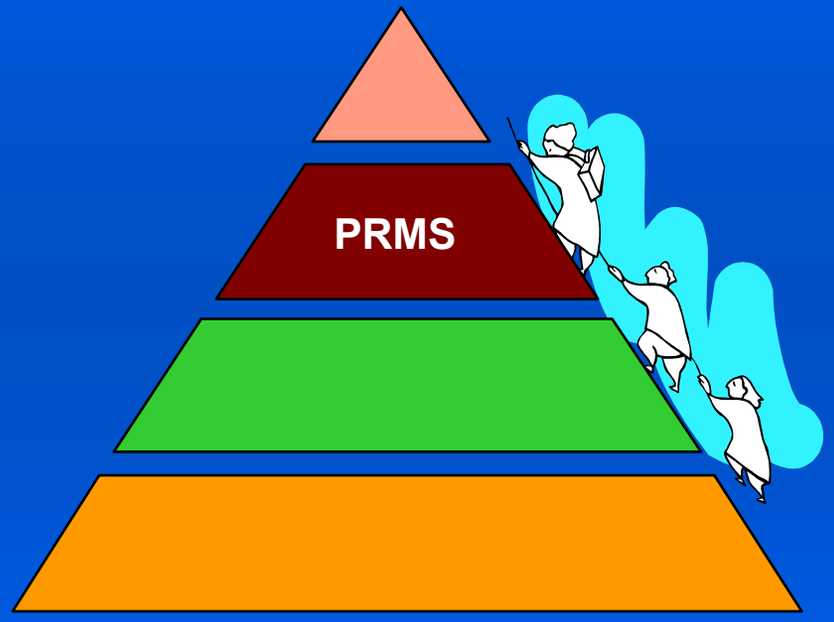
SPE/WPC/AAPG/SPEE Petroleum Resources Management System



SPE Oil & Gas Reserves Committee (OGRC) Status Report

INTRODUCTION……

- This presentation was prepared by John Ritter, SPE OGRC Chair, and John Etherington, OGRC Member
- Their work is outstanding

- Any presentation errors are mine alone

Ron Harrell, P.E., Ryder Scott - retired

Who is the OGRC?

SPE Oil and Gas Reserves Committee

Structure

- Eleven members with reserves expertise.
- Appointed for 3-year terms.
- Worldwide representation.

Duties

- Deals with oil and gas reserves matters, including definitions and standards.
- Disseminates information to other agencies, companies, and organizations.
- Works to achieve worldwide use of standard reserves definitions.
- Monitors activities in reserves definitions and recommends revisions to reserves definitions to SPE Board of Directors.

Committee Observers

- American Assn. of Petroleum Geologists.
- Intl. Accounting Standards Board.
- Soc. of Exploration Geophysicists.
- Soc. of Petroleum Evaluation Engineers.
- U.S. Energy Information Agency.
- World Petroleum Council.

International representation
(USA, Canada, Australia, UK, Italy, Hungary, Saudi Arabia)

Focus on technical standards

Inter-organizational cooperation

September 2004: Houston – we have a problem!

“Grand Vision” for Reserves/Resources

- 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.

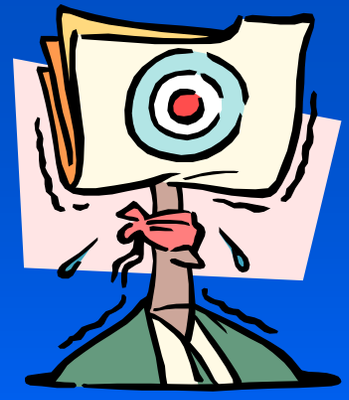
- SPE will actively promote and facilitate in-depth understanding of the definitions and their universal adoption by the oil, gas, and related industries; international financial organizations; governments; regulatory agencies; and reporting bodies.

SPE/WPC/AAPG/SPEE PRMS – The "Process"

Final Approval
March 2007

Submit for SPE board and partner approval

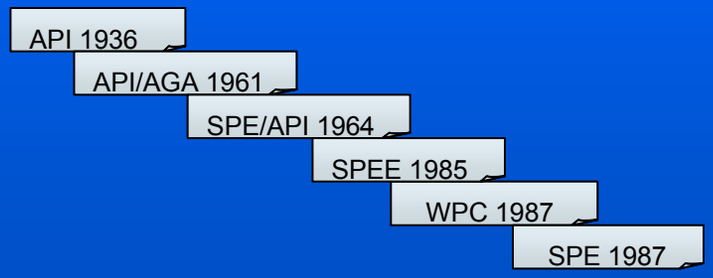
OGRC
Definitions Revision
Project - Phase 1
Sept 2004 – Oct 2006



100 Day Industry
Review Period
(30 presentations –
global feedback)

OGRC reviews/incorporates feedback into a final PRMS

Evolution of Petroleum Evaluation Guidelines



SPE "Mapping Project"

1997 SPE/WPC Petroleum Reserves Definitions

2000 SPE/WPC/AAPG Petroleum Resources Classification and Definitions

2001 SPE/WPC/AAPG Guidelines for the Evaluation of Petroleum Reserves and Resources

2005 SPE/WPC/AAPG Glossary of Terms

2007 SPE/WPC/AAPG/SPEE **P**etroleum **R**esources **M**anagement **S**ystem (**PRMS**)

SPE Mapping Project

Agencies Selected for Comparison

Securities Disclosures

Government Reporting

International Standards

1. **US Securities and Exchange Commission (SEC-1978)**
2. **UK Statement of Recommended Practices (SORP-2001)**
3. **Canadian Security Administrators (CSA -2002)**
4. **Russian Ministry of Natural Resources (RF-2005)**
5. **China Petroleum Reserves Office (PRO-2005)**
6. **Norwegian Petroleum Directorate (NPD–2001)**
7. **United States Geological Survey (USGS-1980)**
8. **United Nations Framework Classification (UNFC-2004)**

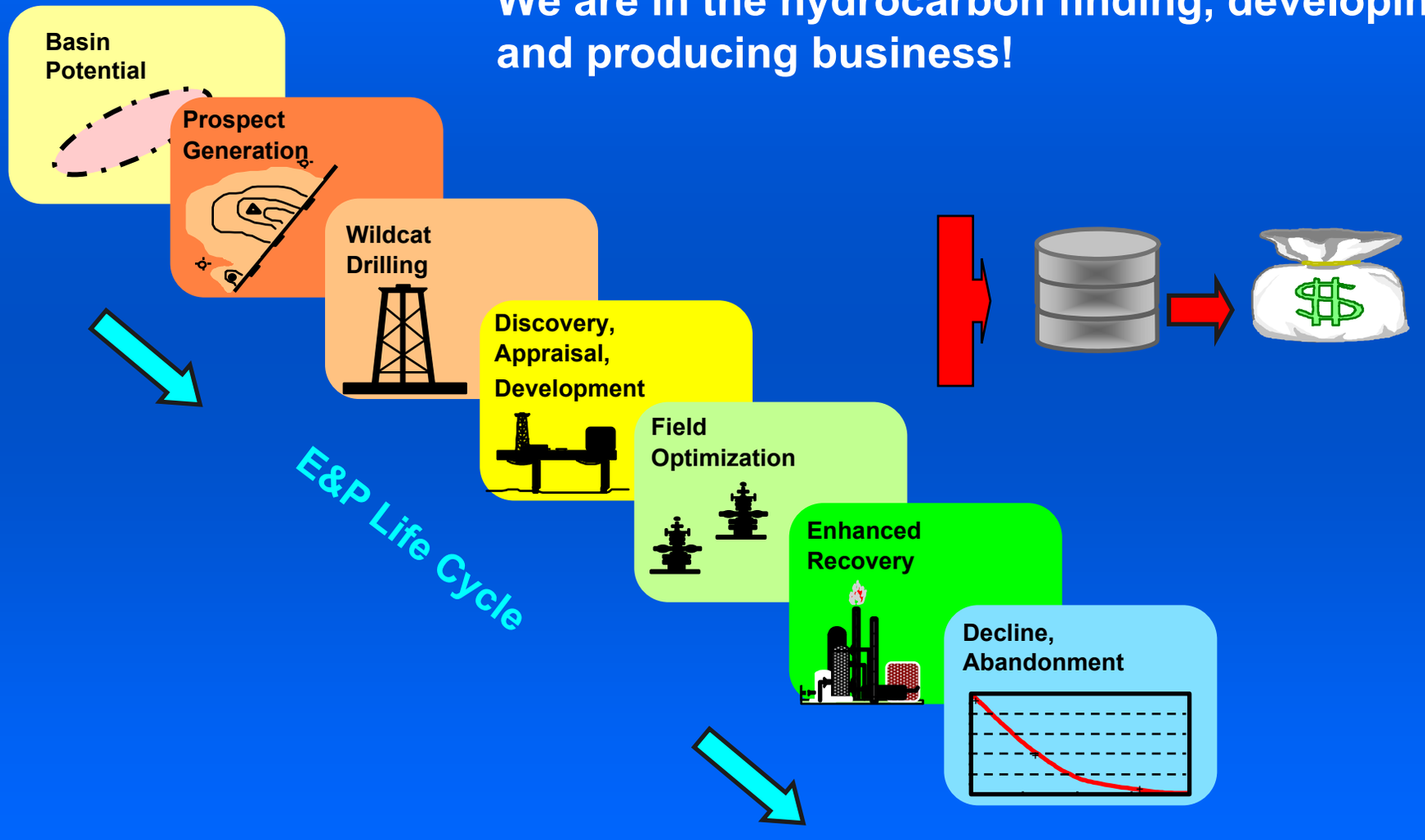
(see final report December 2005 on SPE.org)

2007 SPE-PRMS: Major Principles

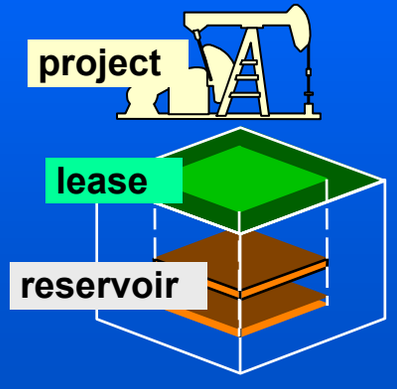
1. The System is “Project–Based”.
2. Classification is based on project’s chance of commerciality.
   Categorization is based on recoverable quantity uncertainty.
3. Base case uses evaluator’s forecast of future conditions.
4. Applies to both conventional and unconventional resources

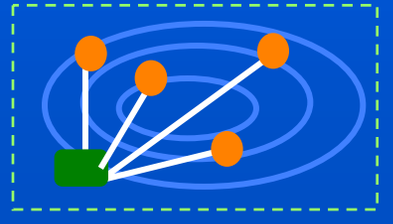
Exploration and Production Business Model

We are in the hydrocarbon finding, developing and producing business!



“Project-Based” System

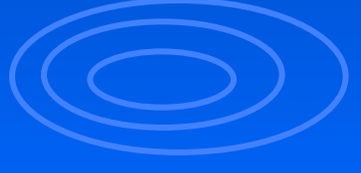




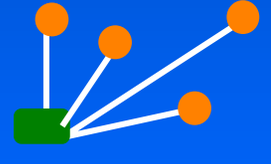
Reservoir
(in-place volumes)

net recoverable resource

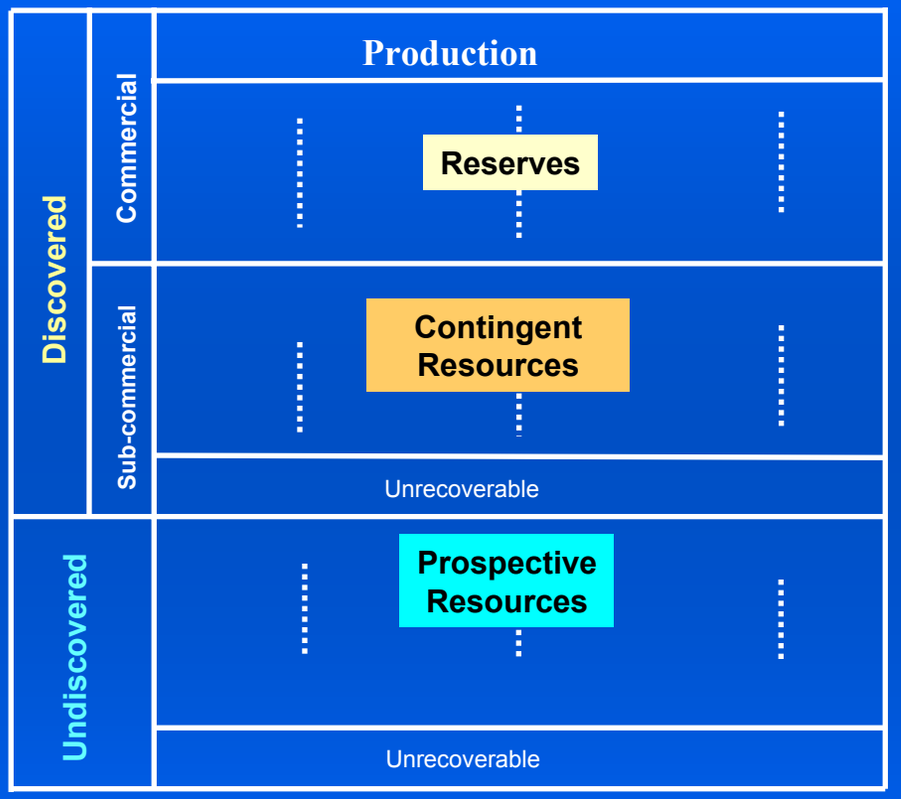
Project
(production & cash flow schedules)



Property
(ownership/contract terms)



Separate Classification & Categorization



classify by Chance of Commerciality of *project* applied

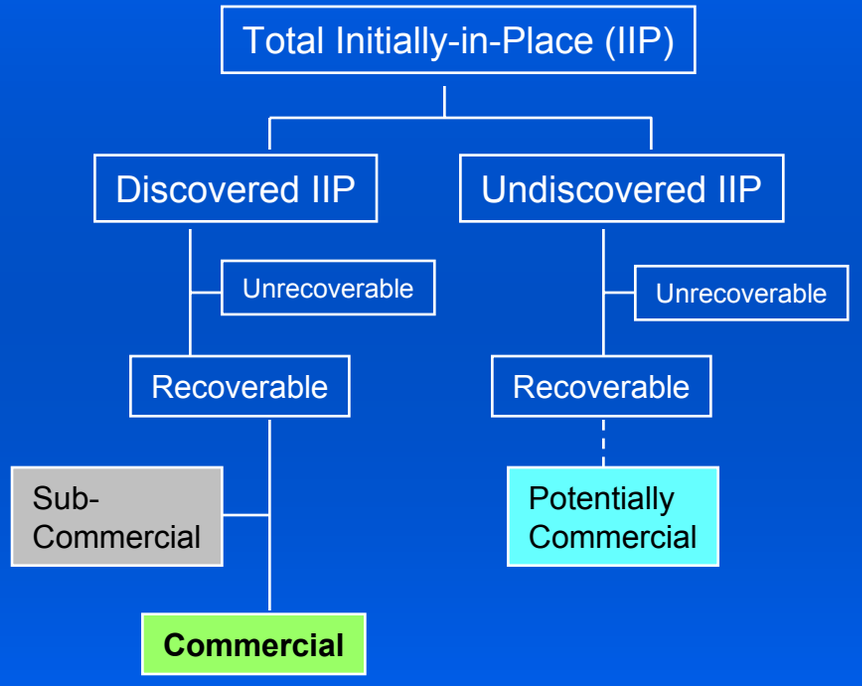
chance of development

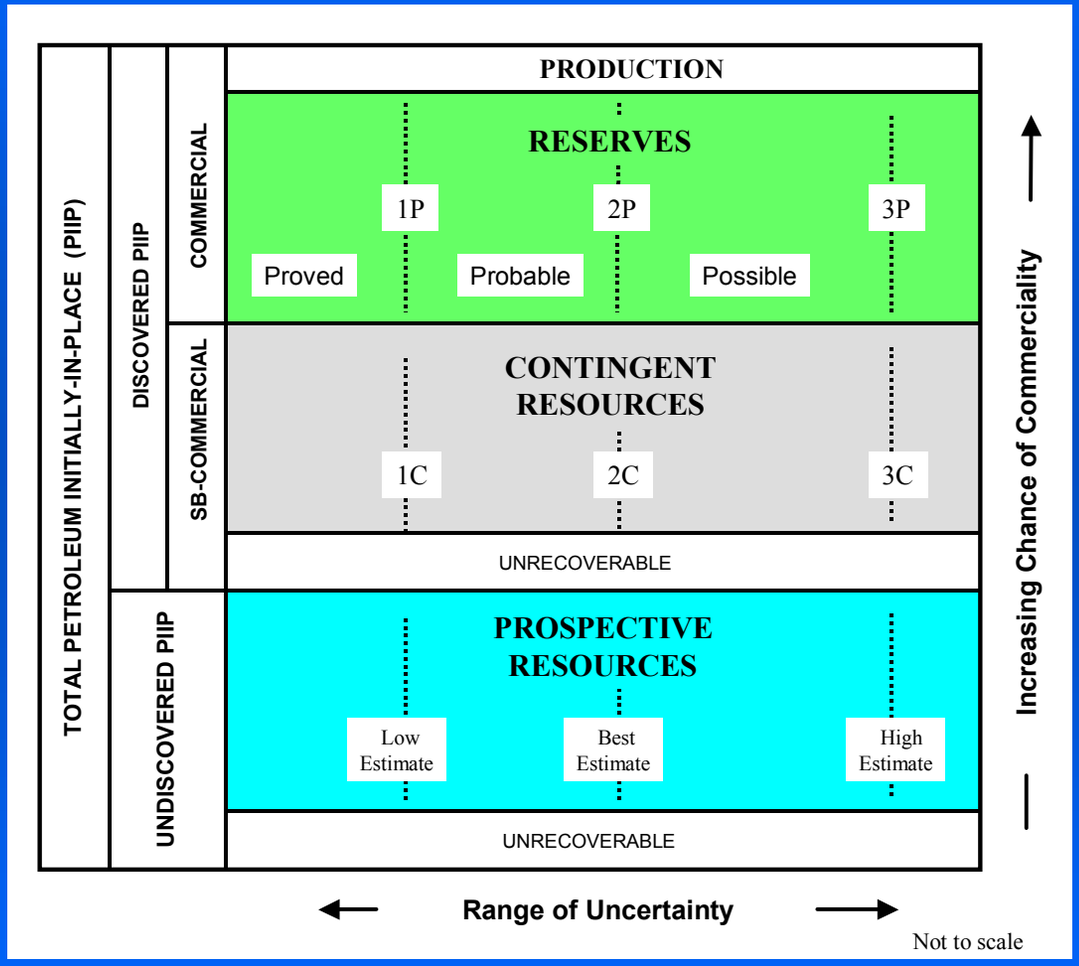
chance of discovery

categorize estimates based on Uncertainty of sales quantities associated with *project*

reservoir in-place uncertainty + project recovery efficiency (+commercial uncertainty)

Resources Classification System





Resources Class Criteria

Discovered

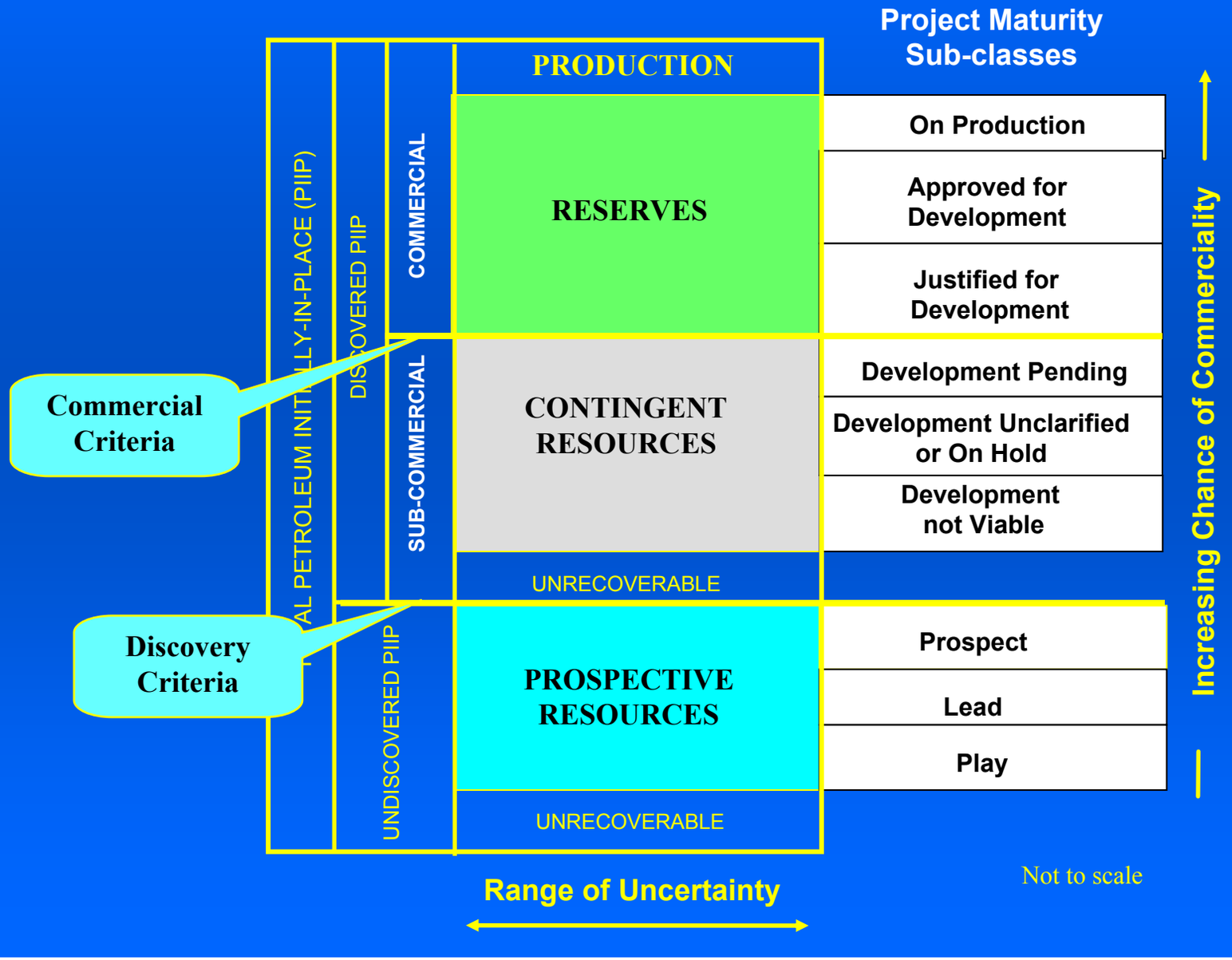
Established through testing, sampling and/or logging the existence of a significant quantity of potentially moveable hydrocarbons.

Commercial

- Meets evaluator's economic criteria
- No significant contingencies that would prevent development
- Reasonable expectation that all internal/external approvals will be forthcoming
- Intent to initiate development within a reasonable time frame

*" **reasonable time frame"** depends on the specific circumstances and varies according to the scope of the project.*

Sub-classify by Project Maturity



Additional Classification Modifiers

Reserves Status

Recoverable quantities my be subdivided based on the funding and operational status of wells and associated facilities into:

Developed (Producing or Non-Producing)
Undeveloped

Reserves status may be applied to Proved, Probable and Possible

Economic Status

Projects may be further characterized by economics and commercial modifiers into:

Economic *(Reserves)*

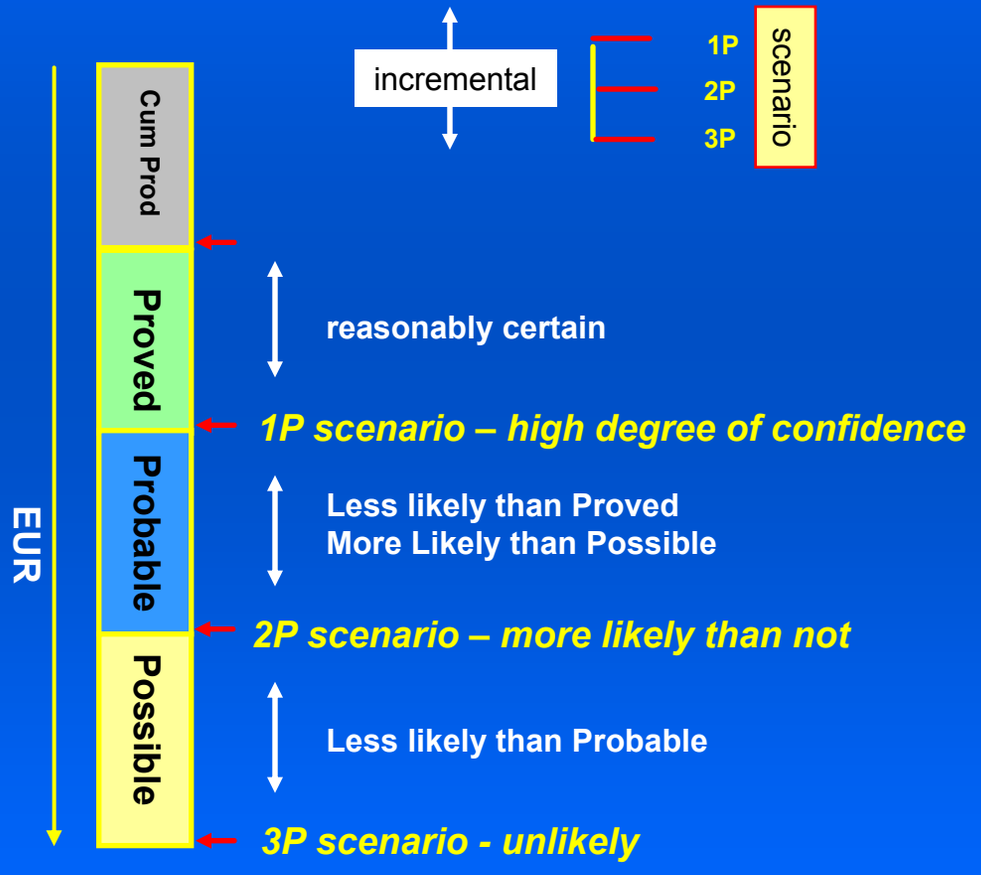
Marginal Economic *(Contingent Resources)*
Sub-Marginal Economic *(Contingent Resources)*

"Reserves" and "Economic" Status may be applied separately or in combination with Project Maturity Sub-classes

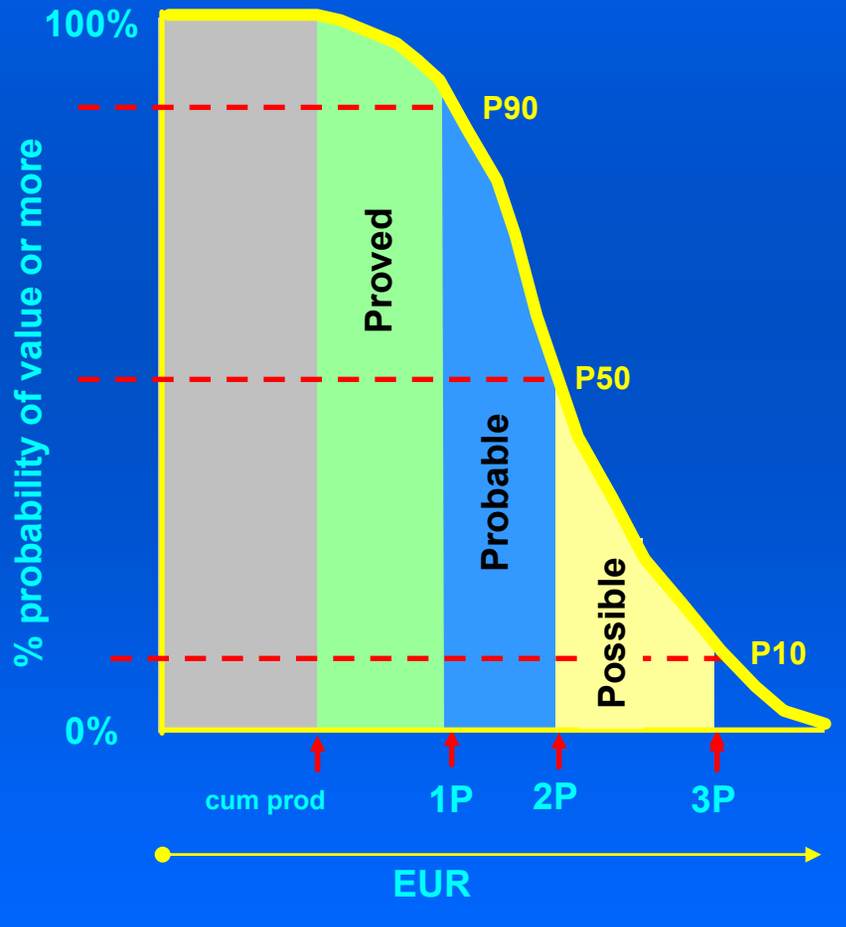
Categorize by Uncertainty

Different Views of Uncertainty

Deterministic View



Probabilistic View



Probabilistic Reserves

Pragmatic considerations suggest that an outright total conversion from deterministic to probabilistic methodology is impractical at best for the foreseeable future and may never be reliable.

-- SPEE Monograph 1, 1998

"He uses statistics as a drunken man uses lamp-posts... for support rather than illumination."

-- Andrew Lang (1844-1912)

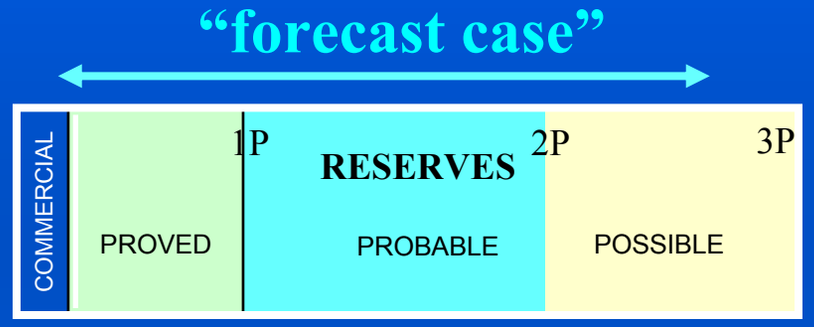
In some cases, use BOTH deterministic and probabilistic methods

Based on Forecast Conditions

"Forecast Conditions" = those assumed to exist during the project's implementation

Conditions include:

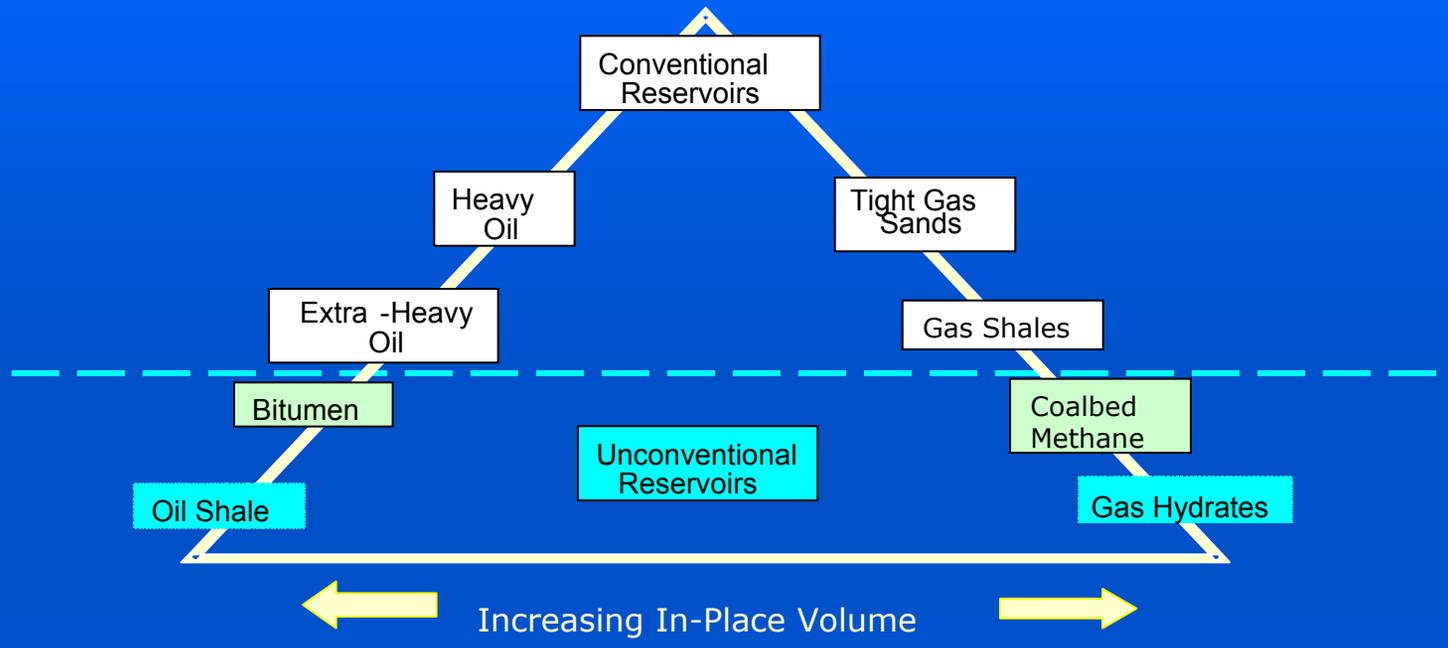
- Prices and costs
- Technology available
- Environmental standard
- Fiscal terms
- Regulatory constraints



Alternate economic scenarios are typically considered in the decision process and, in some cases, to supplement reporting requirements.

For example, one sensitivity case may assume "current conditions" will remain constant throughout the life of the project ("constant case").

Unconventional Resources

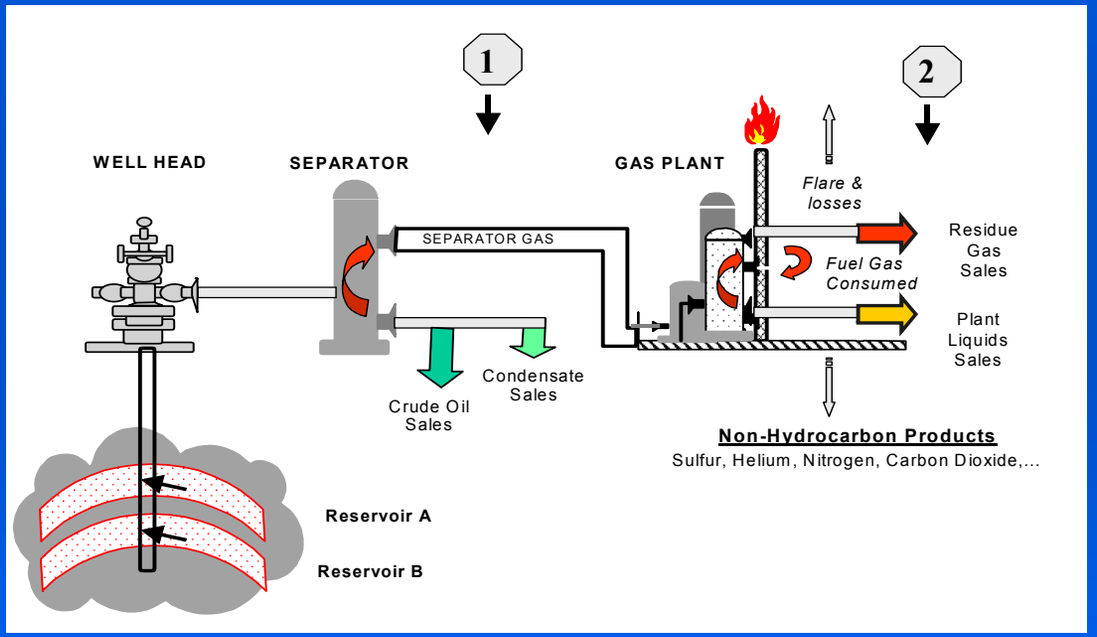


➡ *Pervasive over large areas and not significantly affected by current hydrodynamic influences, i.e. buoyancy of petroleum on water!*

SPE classification still applies (but may require alternative assessment approaches).

Reference Point for Resource Measurement

Resources estimates are defined in terms of lease sales products!
Require a common Reference Point to align Volume and Value!



Becomes unclear in integrated production & processing complexes

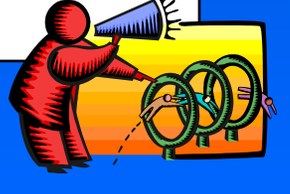
Requires coordination with oil and gas accounting

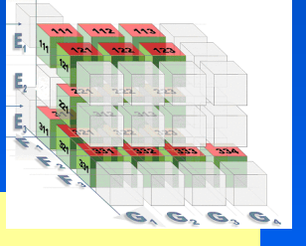
Integrating Reserves/Resources Initiatives

SPE/WPC/AAPG/SPEE Petroleum RMS

Minerals Classification System

International Accounting Standards Board (IASB)





United Nations Framework Classification (UNFC)

Summary

Evolutionary ..... Not revolutionary

Clarifies classification versus categorization

Contingent Resources get respect!

What's Next?

Education Programs (JCORET, ATW's,)

Implementation Guides, Examples

Continue Collaboration with other Standards

- *THANK YOU For Listening!*

- *Questions anyone?*

Backup

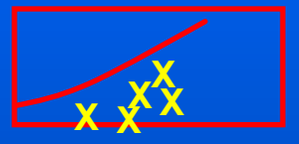
Major Changes in Proposed 2007 SPE/WPC/AAPG/SPEE-PRMS

Revision	Comment
Combines 4 previous guidance documents into single "Petroleum Resources Management System": 1997 SPE/WPC Petroleum Reserves Guidelines 2000 SPE/WPC/AAPG Petroleum Resources Classification and Definitions 2001 SPE/WPC/AAPG Guidelines for the Evaluation of Petroleum Reserves & Resources 2005 SPE/WPC/AAPG Glossary of Terms	Separate documents combined, abbreviated and clarified
Allows use of evaluators forecast of future conditions while still permitting use of constant conditions	Recognizes most companies use forecasts of future conditions to evaluate projects while some regulators require constant conditions for external reporting
Builds on the 2000/2001 project based principles	Project based system - classification based on projects chance of commerciality - categorization based on recoverable uncertainty
Recognizes growing importance of unconventional resources	System applies to both conventional and unconventional resources
Low, mid and high categories of contingent resources relabelled to 1C, 2C & 3C respectively	Alignment to 1P, 2P & 3P Reserve uncertainty categories constrained by commerciality barrier(s)
Allows use of additional classification modifiers: - Reserves status of developed and undeveloped can be applied to 1P, 2P & 3P Reserves - Reserves, Contingent Resources & Prospective Resources may be classified by project maturity sub-classes - Contingent Resources maybe classified by 'marginal economic' and 'sub-marginal economic' sub-classes	Additional classification modifiers optional but may greatly assist in understanding and tracking reserves and resources

The "Aggregation Issue"

portfolio analysis

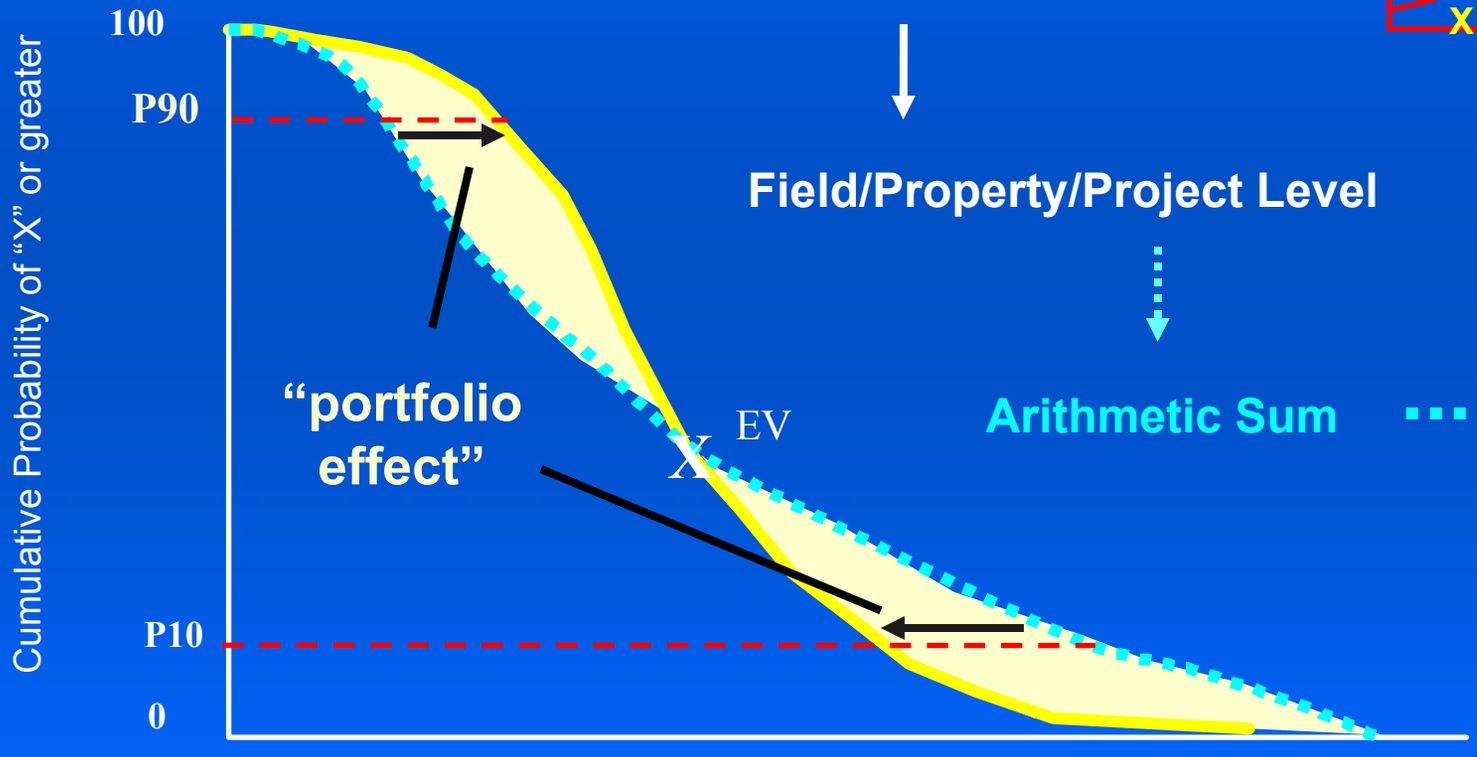
Probabilistic Aggregate



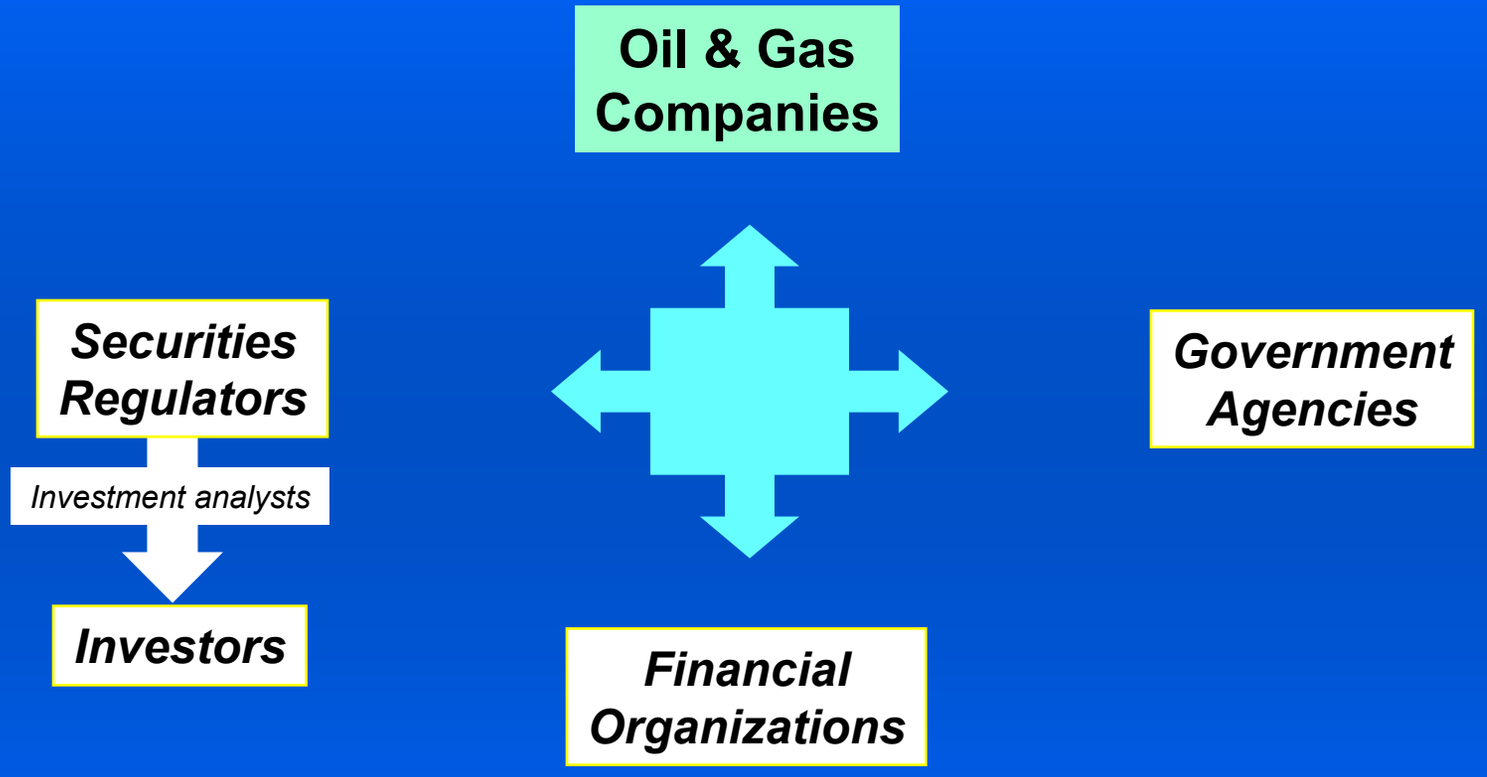
Field/Property/Project Level

Arithmetic Sum

reserves disclosures

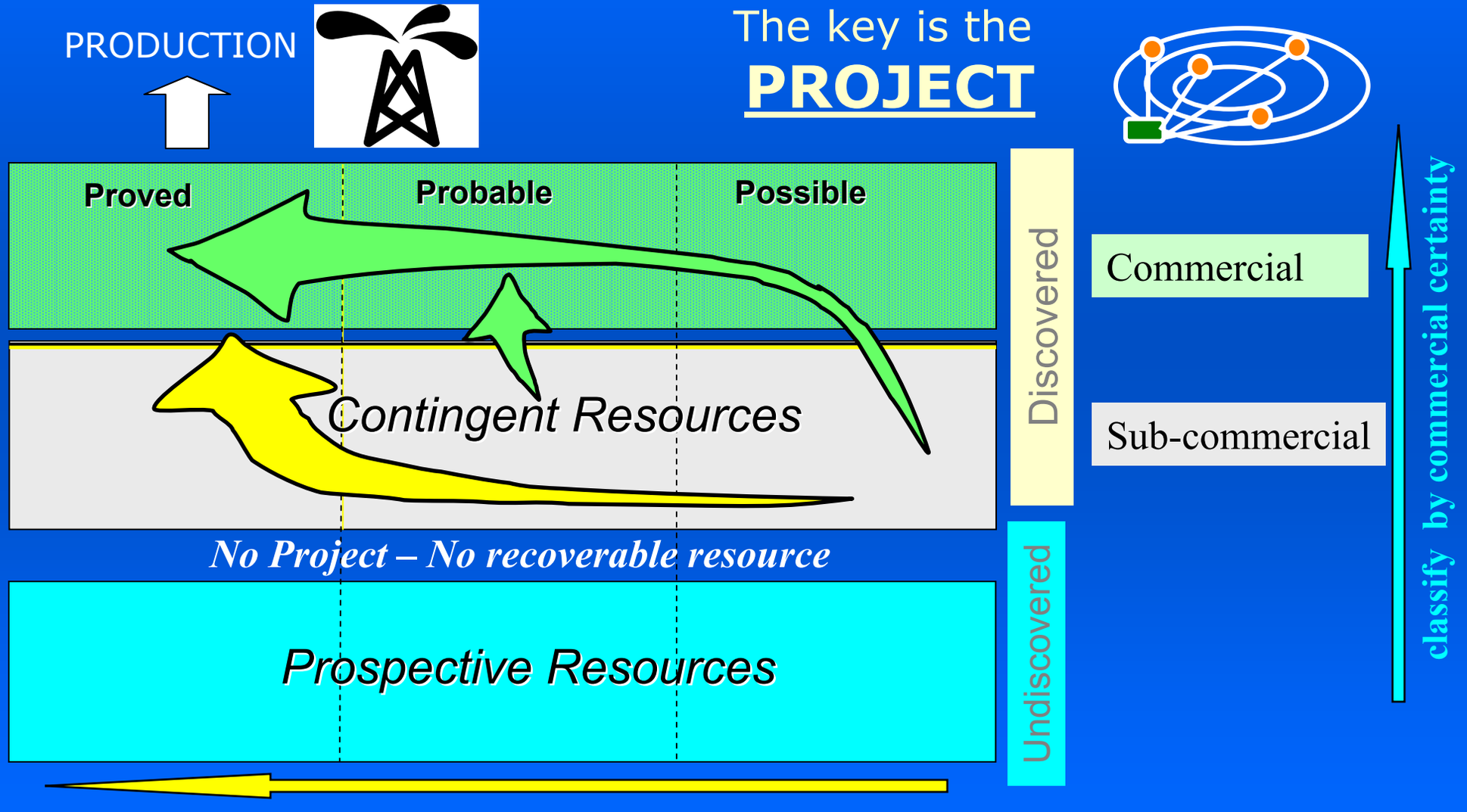


SPE Vision: “Universal Standard” for Petroleum



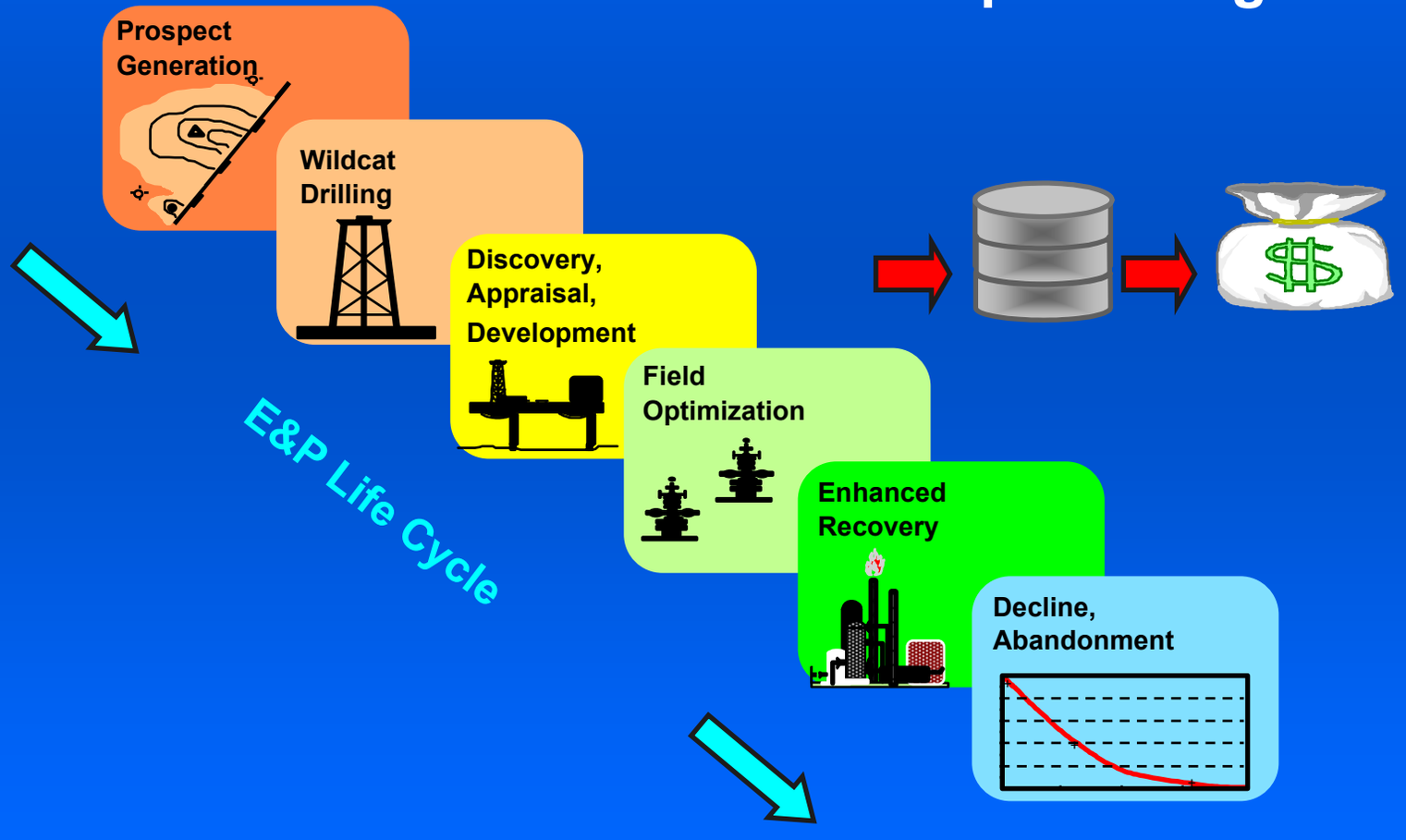
All stakeholders require complete, consistent and reliable information on future production and associated cash flow estimates through full life recovery.

Total Resource System - “Project-Based”

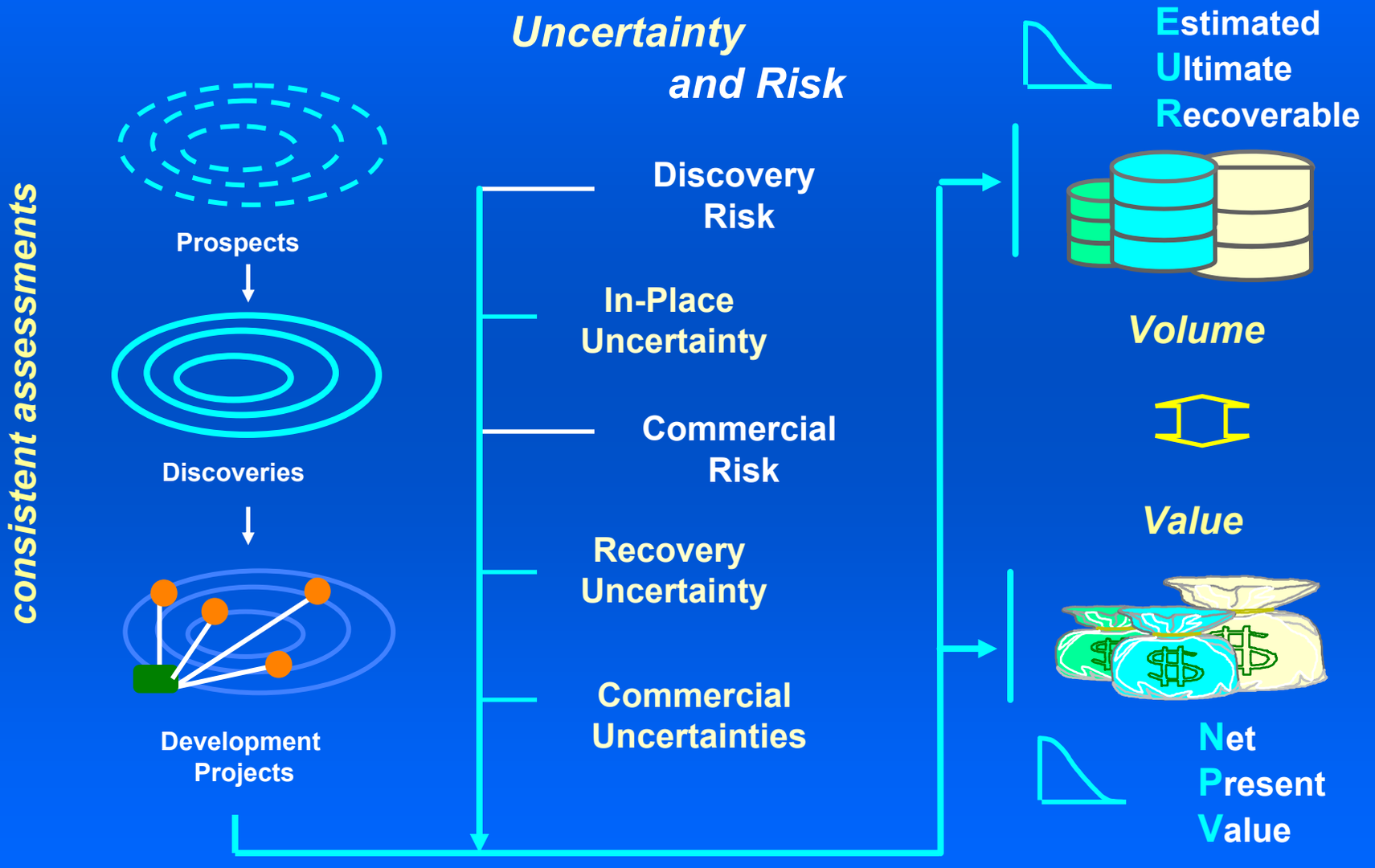


E&P Business Model

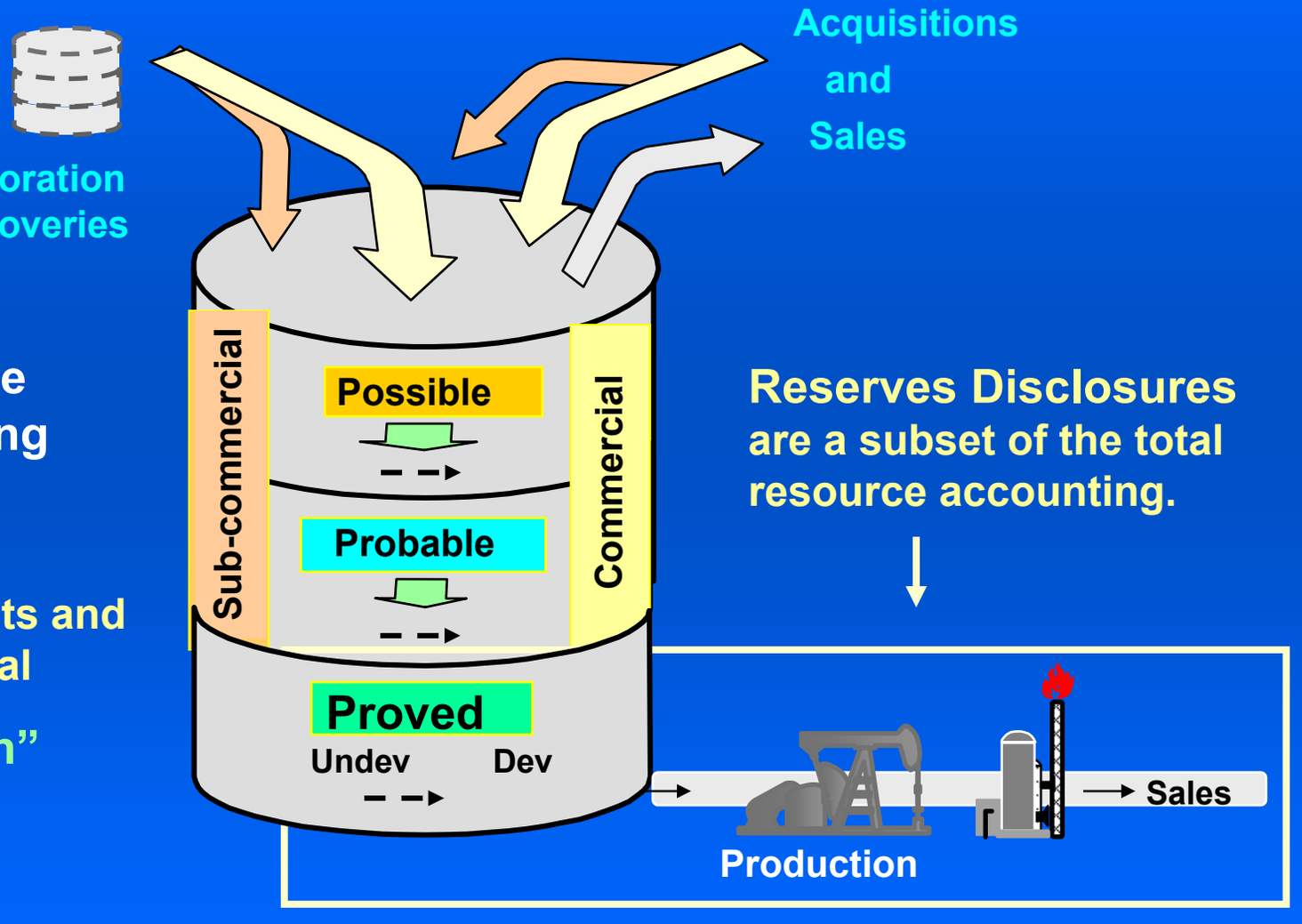
We are in the hydrocarbon finding, developing and producing business!



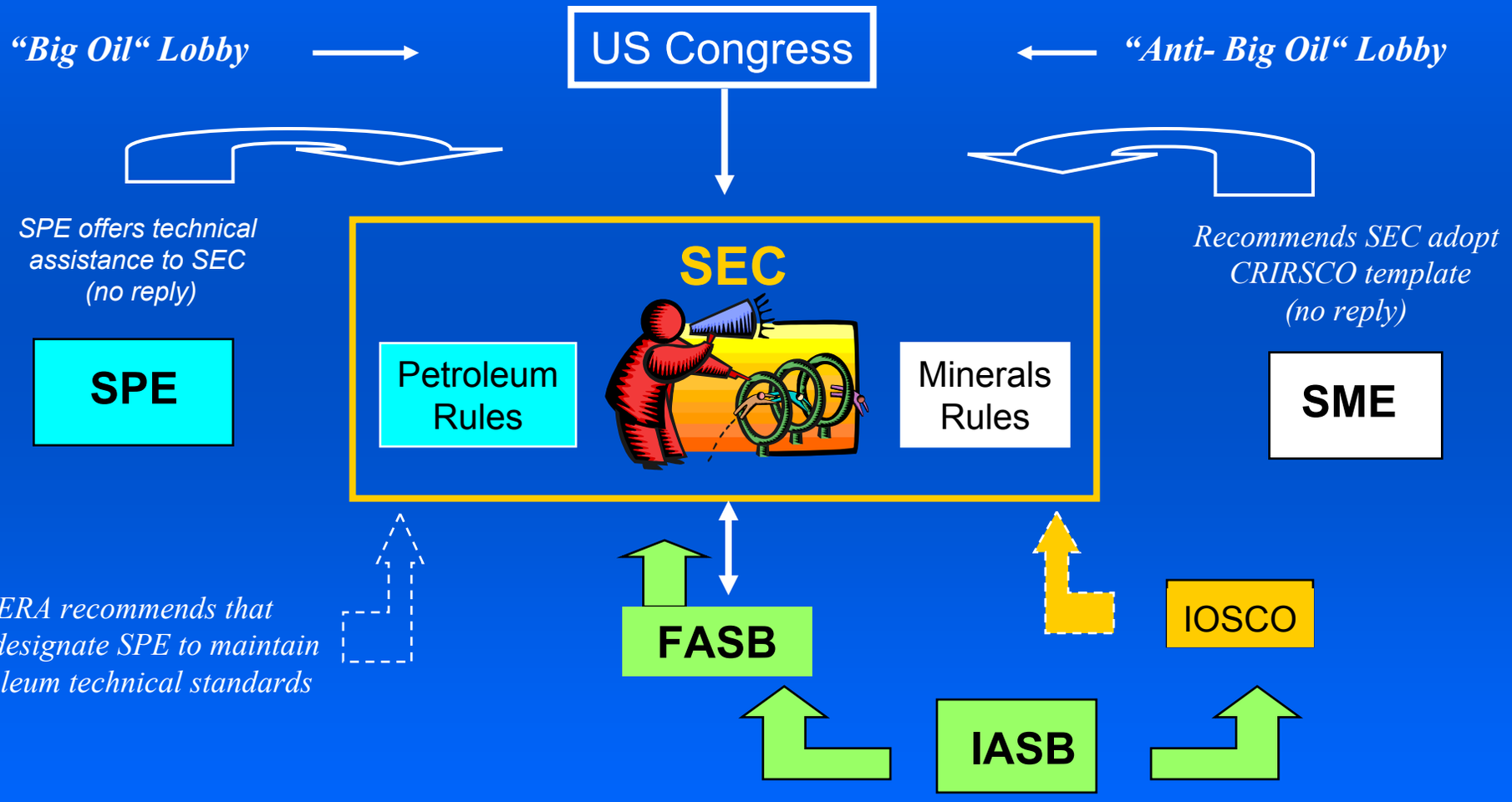
Resource Assessment Process



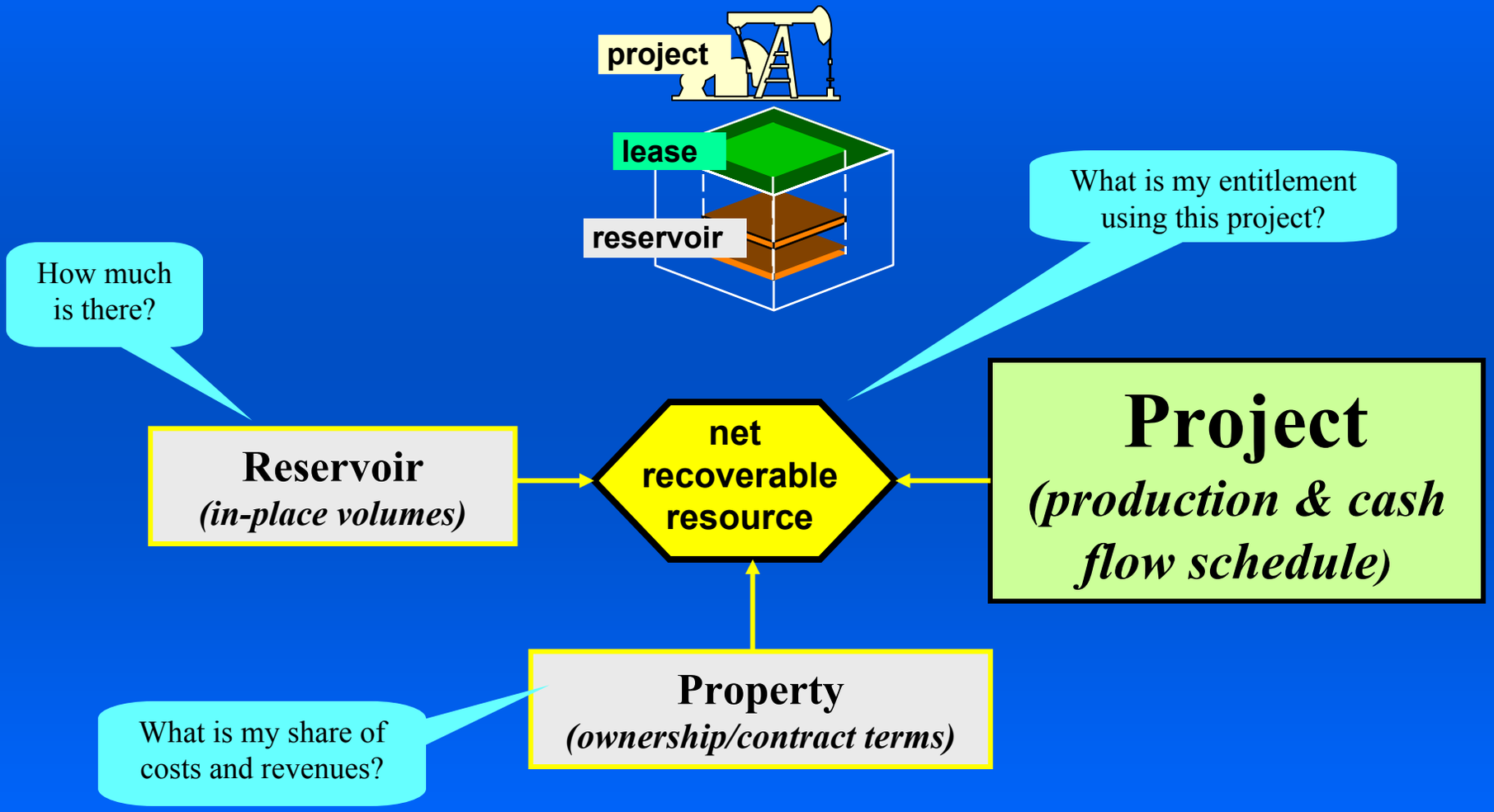
Resource Tracking & Reporting



Influencing SEC Changes



"Project-Based" System



SPE Oil and Gas Reserves Committee

1	Member		Al-Sabti	Hussain M.	Saudi Aramco	Dharhan	Saudi Arabia
2	Member		Barker	Geoff	RISC plc	Perth	Australia
3	Member		Berczi	Istvan	MOL	Budapest	Hungary
4	Member		Black	Mike	Greystone Oil and Gas	Houston	USA
5	Member	RMS/Mapping	Etherington	John R	PRA International Ltd	Calgary	Canada
6	Member		Filler	Stuart	Devon Energy Corp	Houston	USA
7	Member		Gadgil	Abhijit	ExxonMobil	Houston	USA
8	Member	RMS	Harrison	Tony	Santos Ltd.	Adelaide	Australia
9	Member		Hinkle	Delores J.	Marathon Oil Company	Houston	USA
10	Member		Hunt	Elizabeth J.	Hunt Wallace & Assoc	Dallas	USA
11	Member		Pearson	James	Miller & Lents Ltd	Houston	USA
12	Member	RMS	Ritter	John	Occidental Petroleum	Houston	USA
13	Member	Mapping	Zuccola	Luca	AGIP SpA	Milan	Italy
1	Observer	AAPG	Mallon	Ken	Consultant	Houston	USA
2	Observer	EIA	Wood	John	US Dept of Energy	Dallas	USA
3	Observer	IASB	Garnett	Robert		London	UK
4	Observer	SEG	Mikulich	Matt	Consultant	Buena Vista	USA
5	Observer	SPEE	Harrell	Ron	Ryder Scott Co.	Houston	USA
6	Observer	WPC	Martinez	Anibal R.	PDVSA E&P	Caracus	Venezuela
	2004/5 Member	RMS	Frost	Duncan	BP	Sunbury-on-Thames	UK
	2004/5 Member	Mapping	Pollen	Torbjorn	Statoil ASA	Stavanger	Norway
		RMS	Resource Mangement System Subcommittee				
		Mapping	Systems Mapping Subcommittee				