

THE ENERGY FORUM

“2007 UNIFIED RESERVES DEFINITIONS”

***An update on the activities of the SPE Oil
& Gas Reserves Committee***

November 15, 2006

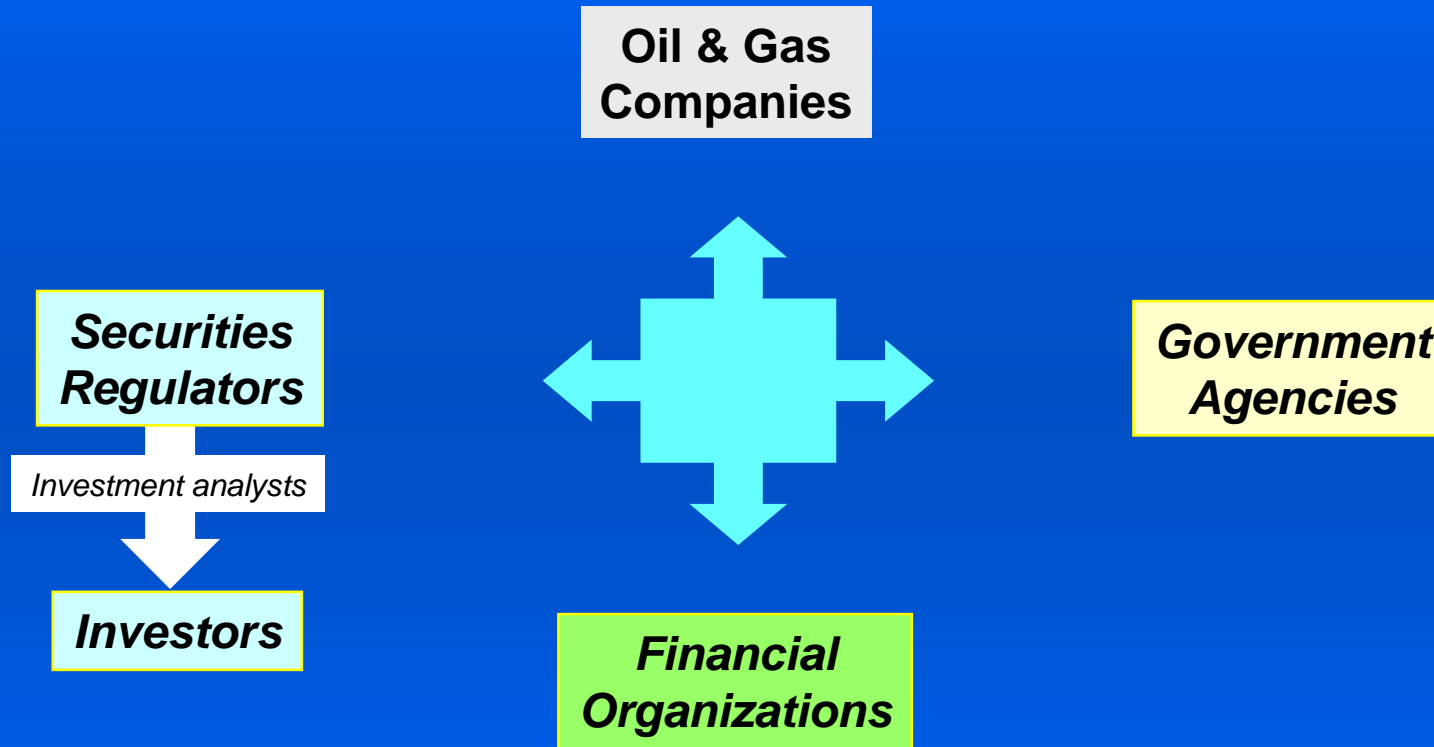
Ron Harrell

Chairman Emeritus Ryder Scott Company

SPE “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 Vision: “Universal Standard” for Petroleum



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

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.

Who is the OGRC?



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

Focus on technical standards

Inter-organizational cooperation

The Evolution of “SPE Reserves/Resources System”



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 Petroleum Reserves and Resources Classification, Definitions and Guidelines



OGRC

SPE's Role Began 44 Years Ago



- SPE Board appointed 12-man committee – “Special Committee On Definitions Of Proved Reserves For Property Evaluation”

- Comprised of 2 oil companies, 1 gas pipe line, 1 college professor, 2 banks, 2 insurance cos. and 4 consultants
- Three years later - in June 1965, definitions approved by SPE Board (with API concurrence; AGA objected)
- Board Vote: 7 yes, 3 no, 2 abstained

What this first committee tells us



- Concerted effort by some producers, pipe lines, bankers, other investors and consultants (in the US) to provide improved consistency in reserves estimates and evaluations.
- Both banks and insurance companies were primary sources of external capital for the industry in various forms of loans

In Pursuit of the “Grand Vision”



Definitions

International Systems
“Mapping” Study



**Revised
Definitions**



Industry Feedback

.....and Beyond

International Accounting
Standards Board (IASB)

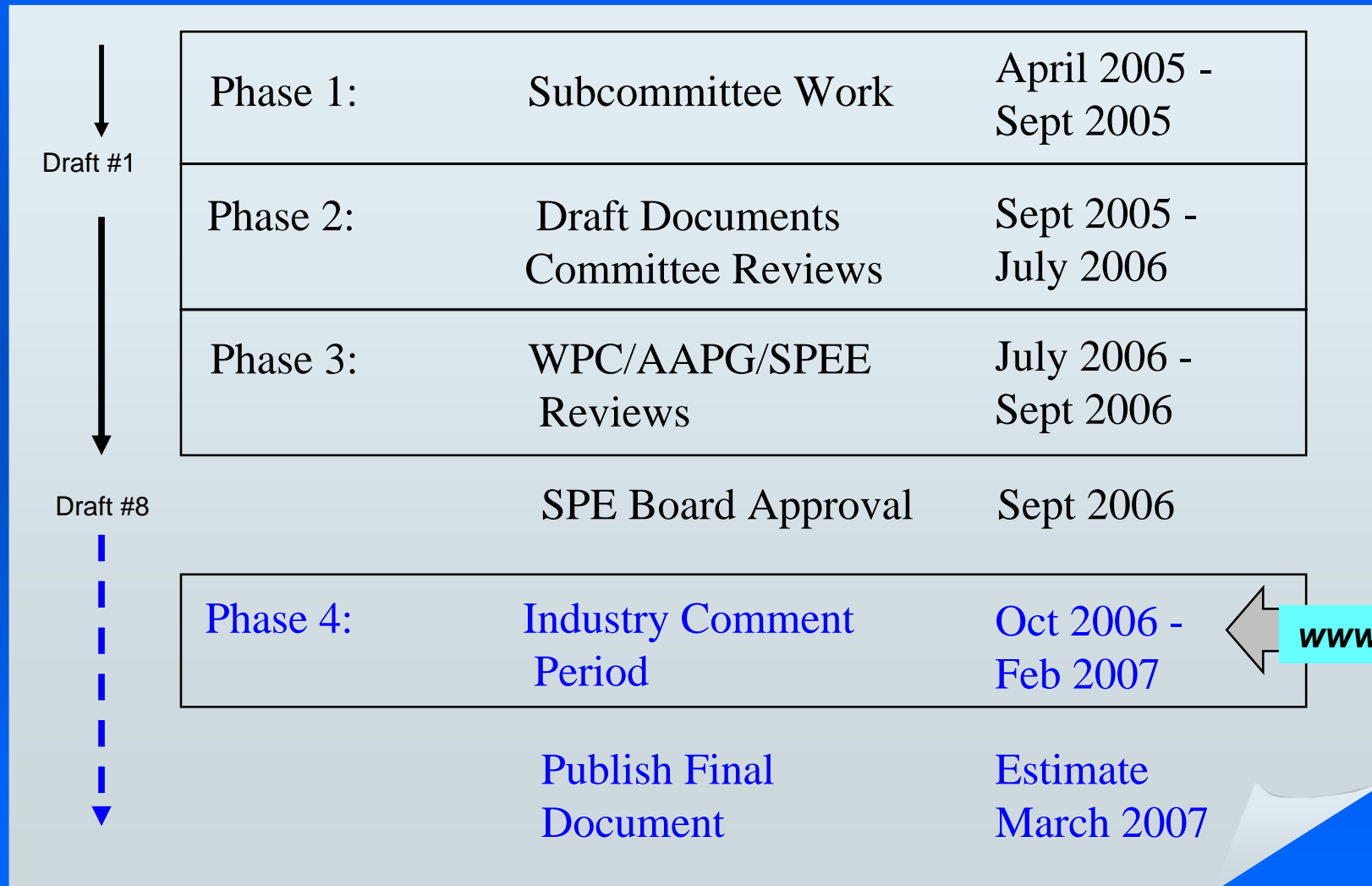
Committee for Mineral Reserves
International Reporting Standards
(CRIRSCO)

United Nations Framework
Classification (UNFC)

Joint Industry
Education Program
Including training



SPE Definitions Project

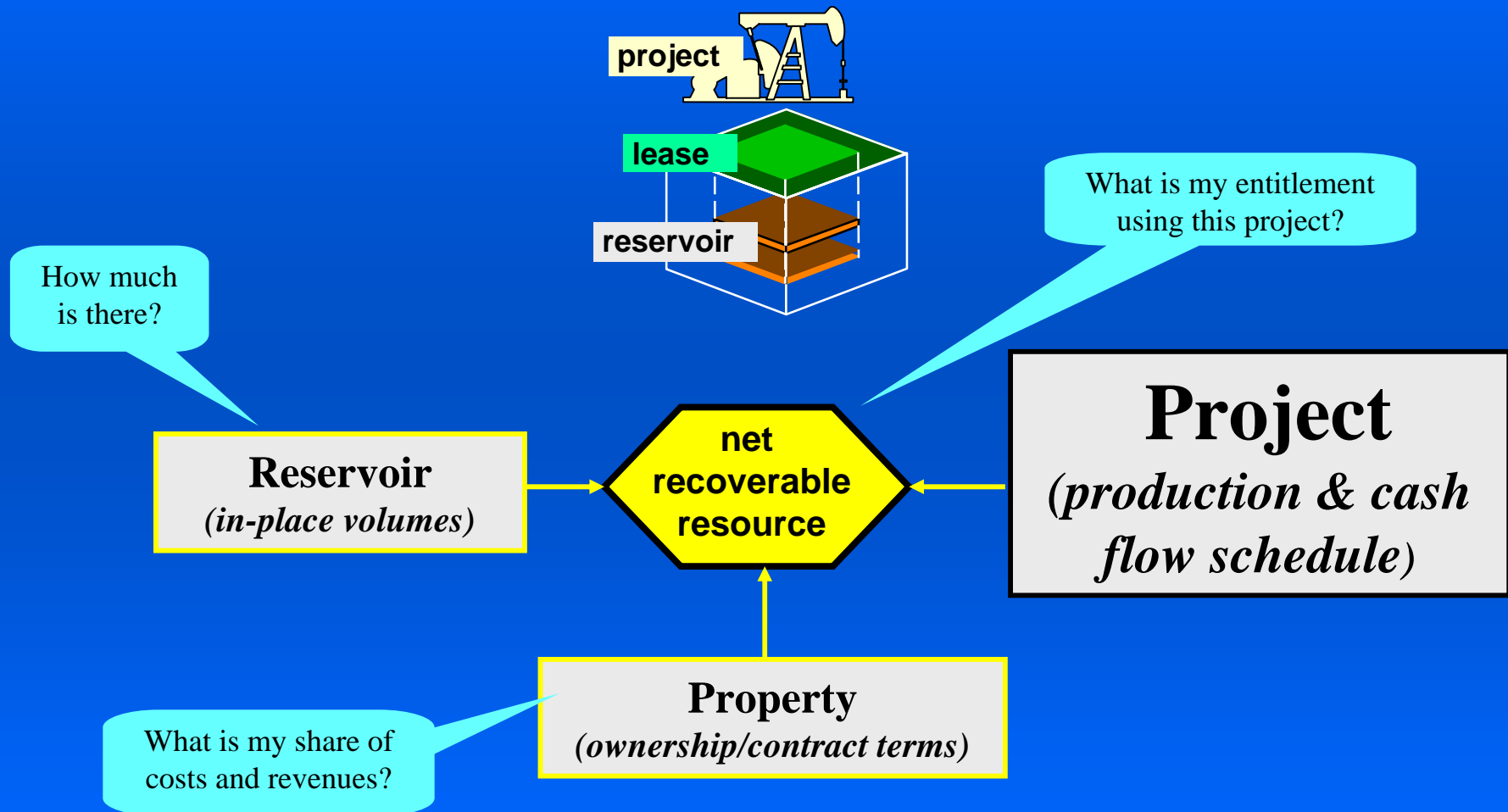


Major Principles in Revised SPE/WPC/AAPG/SPEE System

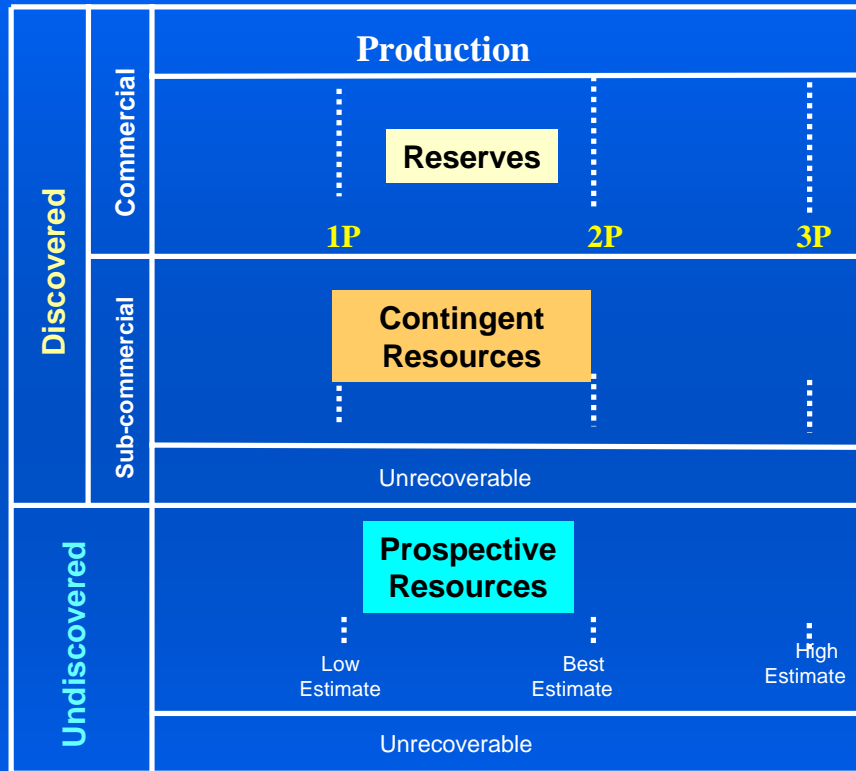
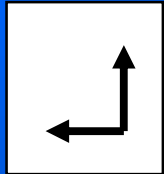


1. The System is “Project–Based”.
2. Classification is based on project chance of commerciality. Categorization is based on certainty of quantities recovered by applying a defined project to a reservoir.
3. Base case uses evaluator’s forecast of future conditions.

Principle 1: "Project-Based" System



Principle 2: Separate Classification & Categorization



classify by commercial certainty of project applied

chance of development

chance of discovery

categorize estimates based on technical certainty of sales quantities associated with project

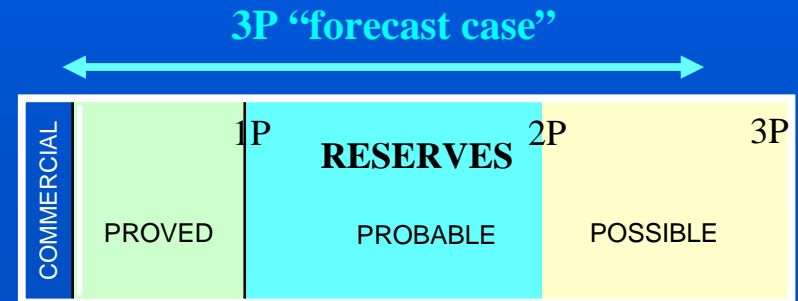
reservoir in-place uncertainty + project recovery efficiency uncertainty



Principle 3: Base Case uses Forecast Conditions

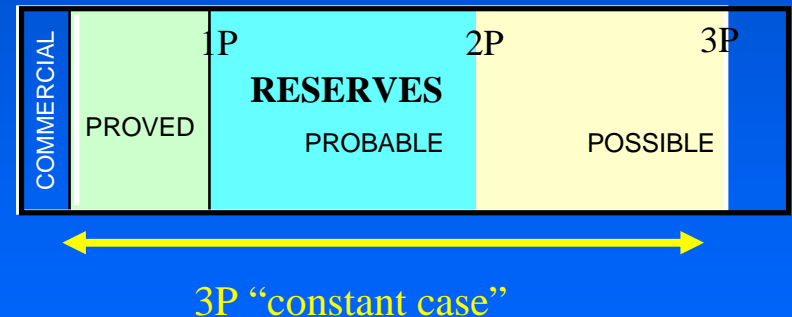
“Forecast Conditions” = those assumed to exist during the project’s implementation

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

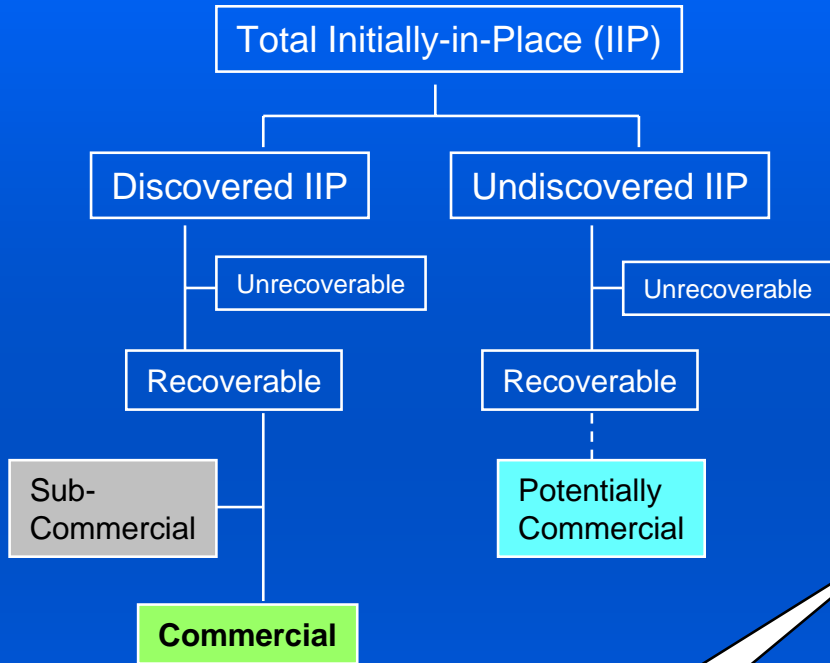


Evaluations include several sensitivity cases

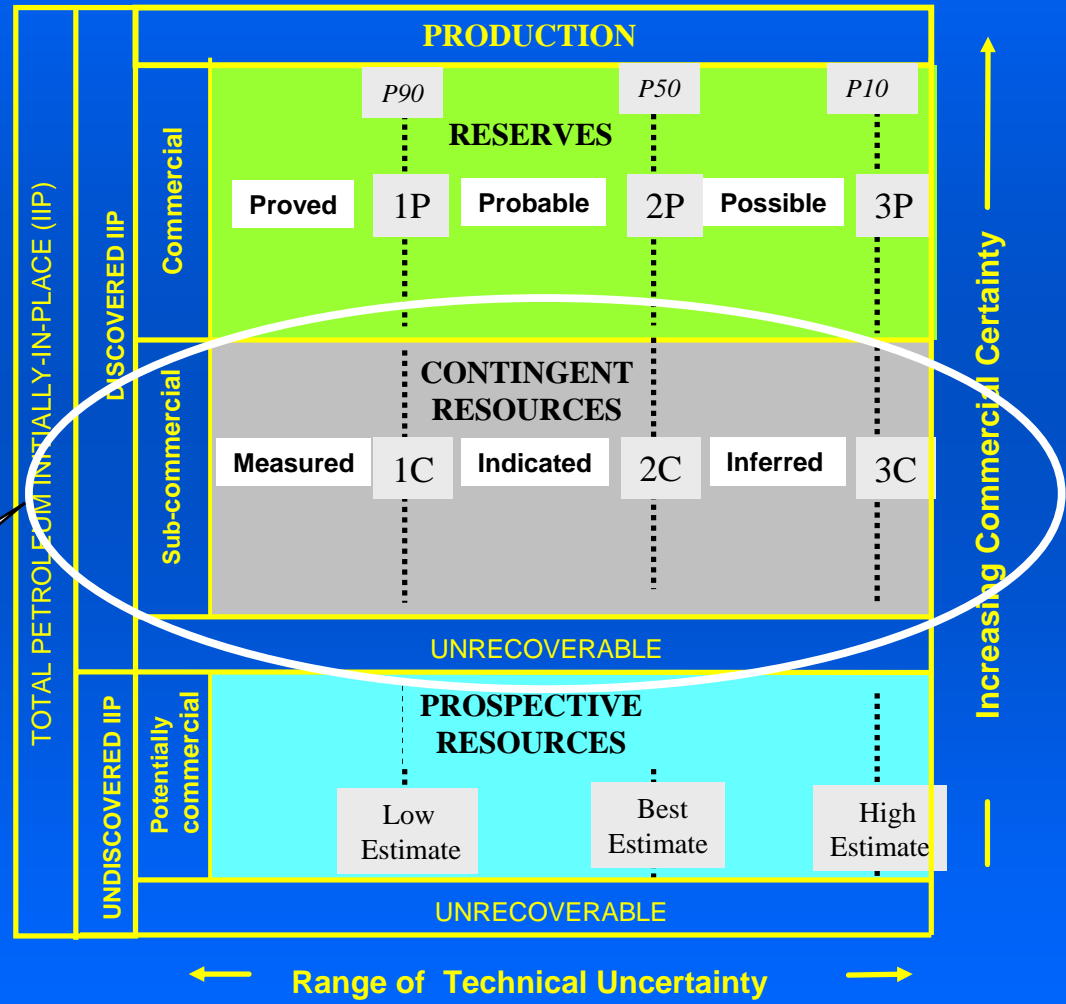
Typically one sensitivity case assumes “current conditions” will remain constant throughout the life of the project.



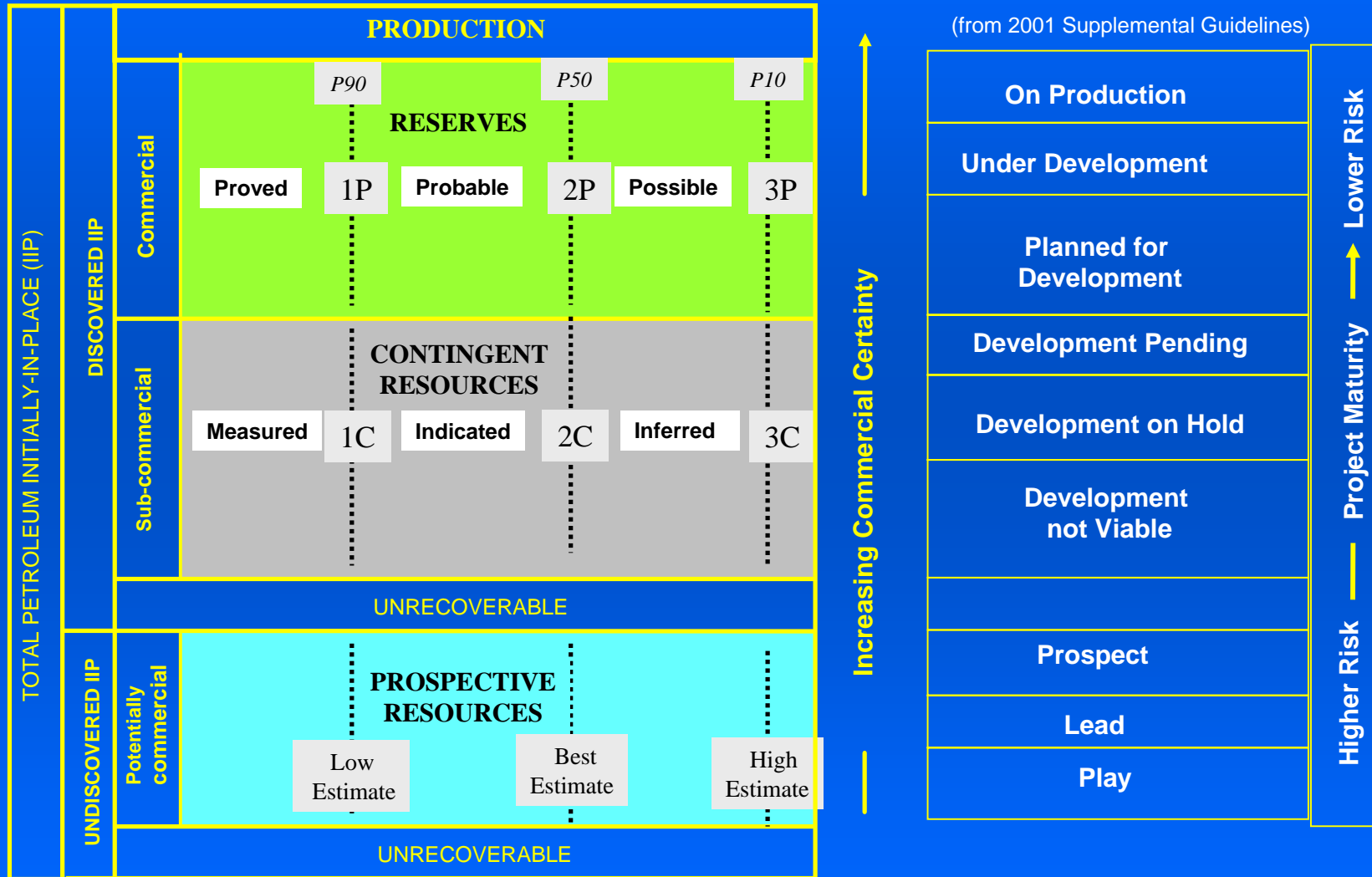
SPE/WPC/AAPG/SPEE "Classification System"



New Labels in Contingent Resources



Option 1: Subclass by Project Decision Status



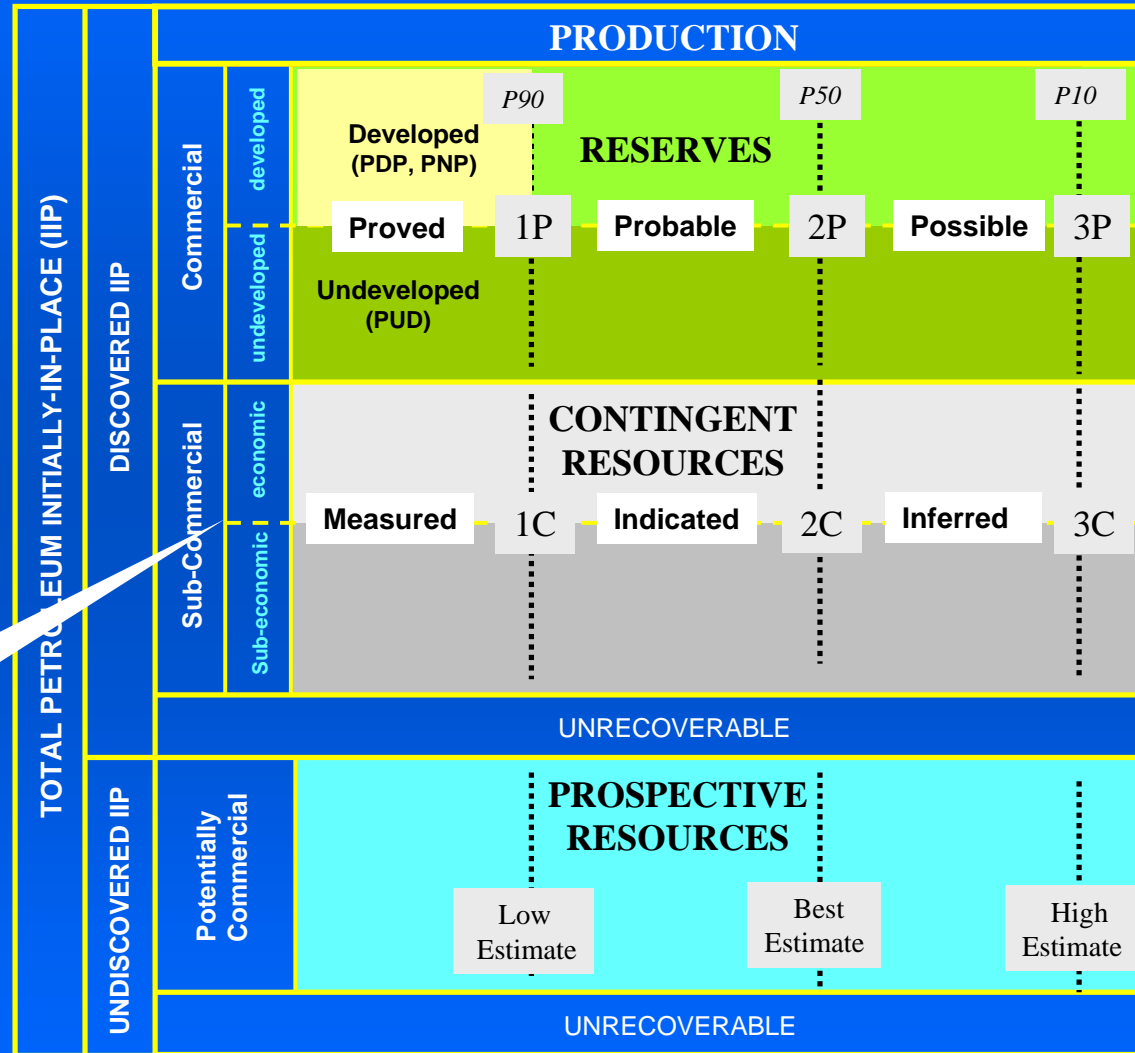
(from 2001 Supplemental Guidelines)

Not to scale

Option 2: Subclass by Project Operational/Economic Status

- project committed and funded/implemented
- project committed but not yet funded/implemented
- economic or near-economic but no project committed
- uneconomic (or analysis incomplete)

New sub-classes for Contingent Resources



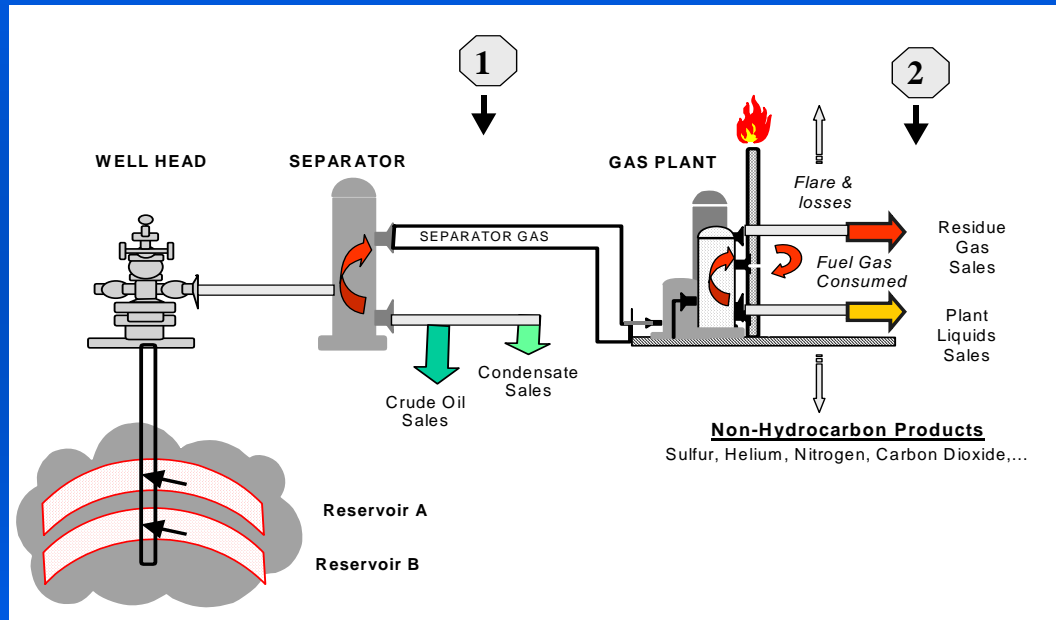
← Range of Technical Uncertainty →

Not to scale

Reference Point for Resource Measurement

Identify first custody transfer point after production

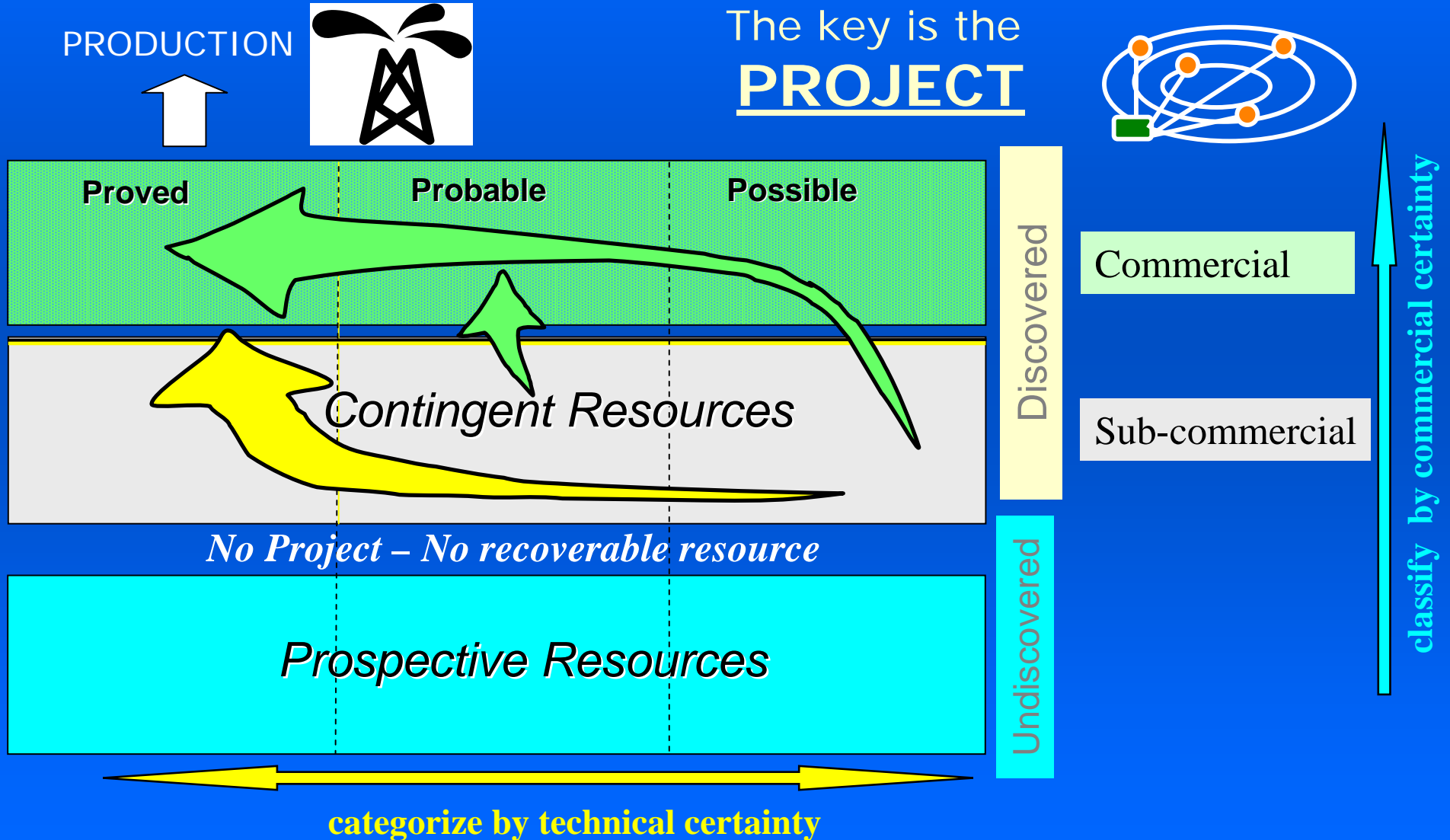
This becomes unclear in integrated production & processing complexes!



Measure at plant outlet if physical separation/purification!

Measure at plant inlet if extensive chemical processing required!

Summary - A "Project-Based" Resource System



WHAT DID NOT CHANGE?

- Both deterministic & probabilistic methodologies recognized –
- Reserves categories unchanged
- “Reasonable Certainty” retained but defined as expressing “a similar high degree of confidence” as quantities derived through a P-90 standard.
- LKH/HKO retained if contacts unknown

WHAT DID CHANGE THEN?

- Proved reserves definition phrase of “under current economic conditions” now reads “under defined economic conditions”.
- Clear preference for the 2P case as being the “best estimate” for most purposes
- Recognition of “Conventional Resources” as being those generally affected by hydrodynamic influences (aquifers) and “Unconventional Resources” being pervasive over large areas and are unaffected by hydrodynamic influences

WHAT CHANGED? – cont'd

- “It is intended that the reserves and resource definitions, together with the classification system, will be appropriate for all types of petroleum accumulations regardless of their in-place characteristics, extraction method applied, or degree of processing required”
- Guidance is provided toward the estimation (and reporting) of “net” reserves and resources to be recovered at a defined transfer point or sales meter.

EVALUATION GUIDELINES

- **Commercial conditions** – Economic cases, Economic limit
- **Resources measurement** – Reference point, Lease fuel, Wet or dry gas, Associated non-hydrocarbons, Gas re-injection, Gas storage, Production balancing
- **Entitlement & recognition** – Royalty, PSCs, Contract extensions

GUIDELINES – Continued

- **Estimation methods** – Analogy*, Volumetric, Material balance, Production decline
- **Deterministic & Probabilistic Methods** – Confidence factors, Aggregation methods, Aggregating resources classes

GUIDELINES – Continued

- **Estimation methods** – Analogy*, Volumetric, Material balance, Simulation, Production decline
- **Deterministic & Probabilistic Methods** – Confidence factors, Aggregation methods, Aggregating resources classes

ANALOGOUS RESERVOIRS ARE

- “Analogous reservoirs are formed by the same, or very similar, processes regarding sedimentation, diagenesis, pressure, temperature, chemical and mechanical history and structural deformation. Other features and characteristics considered include, but are not limited to, approximate depth, pressure, temperature, reservoir drive mechanism, original fluid content, oil gravity, reservoir size, gross thickness, pay thickness, net-to-gross ratio, lithology, heterogeneity, porosity and permeability (cont’d)

ANALOGOUS RESERVOIRS

(continued)

- “In general, the key properties of the reservoir being analyzed should be equal to or better than those of the analog. Comparison to several analogs may improve the range of uncertainty in estimated recoverable quantities from the subject reservoir. While reservoirs in the same geographic area and of the same age typically provide better analogs, such proximity alone may not be the primary consideration. In all cases, evaluators should document the similarities and differences between the analog and the subject reservoir/project.”

Who Else is interested in these “New Definitions”?



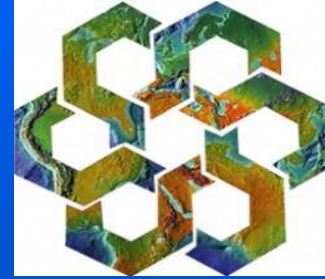
- SPE cooperating with IASB (more later)
- SPE is cooperating with major United Nations initiative to “populate” the UN Framework Classification (UNFC) with SPE/WPC/AAPG/SPEE Reserves and Resources definitions
- Reserves Evaluator Training Committee formed jointly by AAPG, WPC, SPEE and SPE at organizational meeting on July 19, 2006

More about IASB



- International Accounting Standards Board
- In cooperation with US FASB
- IASB created in 2001 following IASC experience in 1973 – 2001
- IASC included: US, UK, Australia, Canada, France, Germany, Japan, Mexico, Ireland & the Netherlands
- IASB now has “signed” 100+ countries
- “Convergence” with US SEC by 2009?

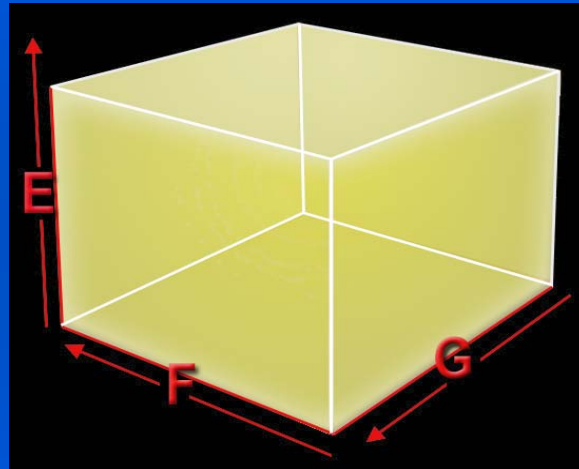
Purpose of IASB.....



- Develop a single set of high quality, understandable and enforceable global accounting standards to assist participants in world capital markets and other users to make rational economic decisions
- Particularly important to small and intermediate size entities and emerging economies.

THE UNFC “CUBE”

Principles

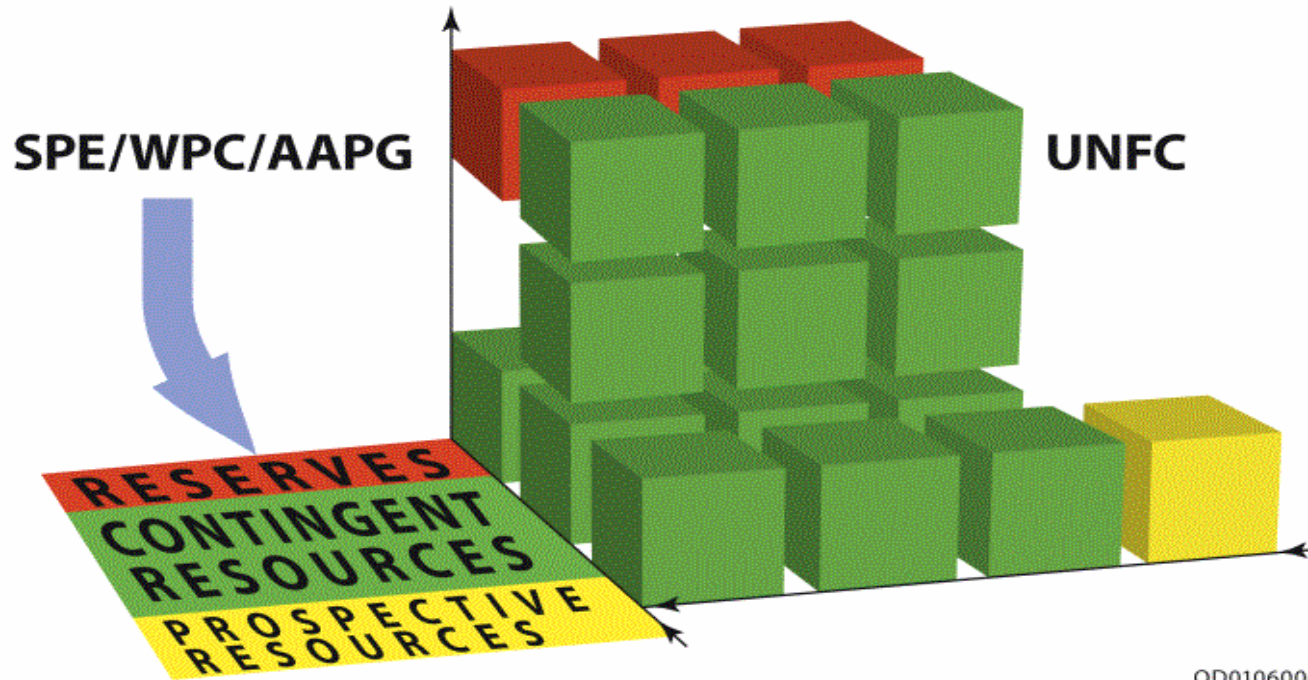


**Economic and
commercial
viability**

**Field project
status and
feasibility**

**Geological
knowledge**

The "UN Cube" Transformation



Thank you for listening.

