

**Society of Petroleum Engineers
Distinguished Lecturer 2005-06 Lecture Season**

**SPE/WPC/AAPG Reserve and Resource Definitions –
A Work in Progress**

Elizabeth J. Hunt
Hunt, Wallace and Associates

Abstract:

For decades, the terminology used in the classification of petroleum reserves and resources has been the subject of study and ongoing revision. As part of this process, the Society of Petroleum Engineers (SPE) and the World Petroleum Congresses (WPC) developed a set of petroleum reserves definitions, which were published in March 1997. These represented a major step forward in their mutual desire to improve the level of consistency in reserves estimation and reporting on a worldwide basis. As a further development, the SPE and WPC recognized the potential benefits to be obtained by supplementing those definitions to cover the entire resource base, including those quantities of petroleum contained in accumulations that are currently sub-commercial or that have yet to be discovered. These other resources represent potential future additions to reserves and are therefore important to both countries and companies for planning and portfolio management purposes. In February 2000 the two organizations in conjunction with the American Association of Petroleum Geologists (AAPG) developed resource definitions that encompassed the entire range of petroleum reserves and resources. These two documents construct a framework to use in resource assessment for the full life cycle of recoverable hydrocarbon projects, from exploration, discovery, and development, through production and abandonment.

Biography:

Elizabeth J. (Libby) Hunt is an independent consultant with Hunt, Wallace & Associates with extensive experience in reserve/resource classification. She is a member of the SPE Oil and Gas Reserves Committee 2001-2004, serving as Committee Chairperson 2003-2004. Accepted as an expert in the industry, she has published on reserve estimation methodologies in JPT and lectured at four SPE Applied Technology Workshops on Probabilistic Reserves (1999-2002). During 23 years at Mobil Oil Corporation, she worked as a reserve estimation specialist for 10 years, consulting with company exploration and production personnel worldwide on reserve and resource estimates. As a consultant, she has worked with clients to modify and augment internal company definitions to include integrated deterministic/probabilistic methodology and contingent resources, consistent with SEC and SPE definitions.

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Operating with Integrity and Excellence

R. Scot Buell
ChevronTexaco

Abstract:

Demands on the petroleum and energy industry have changed in the 21st century. To grow the industry and to retain permission to operate, communities, governments, and NGO's (non-governmental organizations) require that national, public, and private oil companies operate with integrity and excellence. Integrated and structured management systems have been developed and adopted by most companies to deliver oilfield operations that are safe, healthy, reliable, efficient, and minimize environmental impacts. This lecture explores the evolution and the current state of the management systems being used in oilfield operations, with a focus on the roles and interaction of leadership, processes, and strategies.

Influences on and aspects of the operational integrity and excellence management systems that are analyzed and compared include:

- Development of leadership behaviors for integrity and excellence
- Affecting workforce culture change – the role of leadership
- Common features of operational integrity and excellence management systems
- Strategies used with these systems
- Reliability and efficiency as it relates to HSE performance
- Use of ISO, API, and other standards for HSE and quality performance
- The role of government regulations and legislation in driving improvement
- Effects of international banking requirements and NGO's

The key takeaways from the lecture will be an improved understanding of the:

- The role of leadership in delivering integrity and excellence
- Understanding of the common features of these systems
- Understanding of the external drivers for improvement and continuing evolution of these systems

Biography:

R.S. Buell is a senior advisor for petroleum engineering and operational excellence at ChevronTexaco. He holds BSc and MS degrees in petroleum engineering and a MS degree in Mineral Economics. He has 23 years of diverse experience of increasing responsibility in North America, Asia, and Africa. The last 8 years have been spent deploying and utilizing environmental, safety, health, and operational management systems that enhance operational integrity and excellence. He has authored 8 SPE papers and holds one US Patent. He currently serves as a technical editor for SPE Production and Facility Engineering and has served as a co-chairman for SPE Forums and Applied Technology Workshops.

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**Investing in Oilfield Technologies –
Why Rig Count Doesn't Matter Anymore**

Richard B. Spears
Spears & Associates, Inc.

Abstract:

Since the Hughes Tool Company began counting drilling rigs 70 years ago, the oil and gas industry has used rig count to gauge the health of the industry – a climbing rig count pointed to better times ahead and a declining rig count signaled growing caution. Industry leaders, however, are beginning to notice that some oilfield equipment and service companies are continuing to grow and prosper despite periods of declining rig count. Although we work in an industry that will always rely on the drilling rig, drilling and completion technologies have advanced so rapidly that 2 rigs can now do the work that 3 rigs did just 5 years ago. The dollars that an operator used to spend with the drilling contractor are now being spent on downhole drilling systems and bits, completion products and services, leading to declining fortunes for the contractor and record-breaking quarters for the smartest service companies. Mr. Spears will point out the winners and the losers in this drilling and completion technology race and will identify the products and services most likely to spur the next round of investment. As a bonus, Mr. Spears will also show how the maturing of the world's oilfields is driving the sales of certain production technologies to heights never before imagined.

Biography:

Richard Spears is a Managing Director of Spears & Associates, a 40 year old firm specializing in measuring and forecasting oilfield equipment & service markets around the world. Current clients include most major oil companies, service companies and investment firms worldwide. Spears' research and data is used to support most mergers and acquisitions that occur in the oilfield's service and equipment sector. The firm has been providing the industry's only commercial drilling forecast since 1982. In addition to the firm's conventional work, Richard led World Bank missions to Russia's West Siberia (1992) and to Romania (1995) seeking lending and partnering opportunities in the upstream oil & gas sector. Richard has a BS in engineering from Oklahoma State University and did graduate studies in Industrial Engineering. He is a member of SPE. With the firm 20 years, Richard previously worked as a field engineer for Halliburton. Richard is a popular speaker in the industry and gives 12-15 talks to SPE, API and financial conferences each year on market trends and technology forecasts.

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Integrating Resource Assessment and Portfolio Management

J.R. Etherington
PRA International Ltd.

Abstract:

Energy companies are increasingly adopting stochastic-based portfolio management applications to support long term business planning. However, their resource inventory systems that document the underlying hydrocarbon assets are often deterministic-based and incompletely populated. For many, reserve reporting is a perfunctory annual regulatory disclosure process. However, a consistent, and unbiased characterization of the full resource distribution is required to support business decisions. Companies are encouraged to re-engineer their systems and processes to expand and merge resource assessment with planning functions. The common underlying framework is the 2000 SPE/WPC/AAPG resource classification system. Analysts must clearly separate the technical uncertainty distribution of recoverable volume from the risks of discovery and commercialization. Integrated deterministic/probabilistic methods can be used to create a hybrid system with quantified uncertainty for each resource class that supports flexibility in aggregation. Defining and tracking project status classes allows clear allocation of commerciality risks for portfolio management. In such a merged system, estimates of remaining recoverable hydrocarbons for each project have an associated production and cash flow schedule. A single database can then be interrogated to report production profiles and asset value under specific funding scenarios and to evaluate portfolio options including asset acquisitions and dispositions.

Biography:

John Etherington is Managing Director of PRA International Ltd., a Calgary-based consulting firm advising industry on resource assessment, reserve disclosure obligations, and portfolio management processes. He holds BSc and MS degrees in geology. He previously spent over 30 years with Mobil Oil in both Exploration and Producing assignments including five years in their central resource audit group. He has conducted training on risk, uncertainty and resource assessment techniques for both multinational and state-owned oil and gas companies; attendees include over 550 geoscientists and engineers from 30 countries. Mr. Etherington has presented papers on the subject at AAPG, CIM, and SPE conferences. He was appointed to the SPE Oil and Gas Reserves Committee in 2003.

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Reservoir Surveillance Planning and Evaluation

Jitendra Kikani

Chevron Texaco Overseas Petroleum

Abstract:

Rapid improvements in measurement, instrumentation and interpretation technologies have created a plethora of opportunities to assess the uncertainties, learn quickly about the reservoirs and implement monitoring plans to leverage the information. These opportunities are challenged by the trend towards minimal appraisal programs with expensive deep water and deeper and hotter developments.

These challenges require careful planning and assessment of each component of data gathering plan and conscious conversion of the plan to information that can change decisions or meet specific objectives both during appraisal and production phases of a project.

This presentation discusses how asset strategies may be converted to data gathering objectives and appropriate utilization of value of information concepts to create an appropriate surveillance plan that is targeted towards the decisions to be made. The talk will be embellished with relevant examples and sample plans. Evaluation methodologies and available measurement techniques will be discussed at length.

Biography:

Jitendra Kikani is the Gas Asset Team Leader in the Angola Business Unit at ChevronTexaco Overseas Petroleum. Previously he was the Subsurface Manager for Block 0 Gas Projects. He holds a BS degree in Petroleum Engineering from Indian School of Mines, MS in Mechanical Engineering from UC Berkeley and MS in Mathematics and PhD in Petroleum engineering from Stanford University. He was the Team Leader for the Well Performance Team at ChevronTexaco Technology Company from 1999-2003. He has previously worked for Shell Research and Intera Information Technologies. He has authored more than 25 papers. He is the past Review Chairman of SPE Reservoir Engineering Journal, Program Chairman of SPE ATCE in 2000 and Section Chairman for Golden Gate Section in 2003. He was the 2003 recipient of the SPE Western North America Technical Achievement Award.

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Lessons Learned from Integrated Analysis of GOM Drilling Performance

R. A. Meize

Anadarko Petroleum Corporation

Abstract:

Offshore drilling continues to be extremely cost intensive where \$50-million wells are not uncommon. This paper discusses lessons learned and potential benefits from a comprehensive analysis of Gulf of Mexico historical data for drilling performance benchmarking and continuous cost reduction. The "Best Composite Time" (BCT) introduced in recent papers (Refs 1-3) was applied along with learning-curve analysis, and other investigative tools to examine drilling problems, and to challenge well planning and construction practices. Drilling operations were broken down into discreet activities and the best times were aggregated to form the BCT. The "Best Composite Cost" (BCC), the dollars equivalent, was also calculated and used for cost benchmarking. Correlative analyses of the wells, i.e. cross-plots of drilling events alongside mud log data, wireline logs, and geologic data, were used to elucidate major well problems and abnormal flat times that caused deviations from the BCT. Correlative analysis also helped explain why some wells were drilled relatively trouble-free.

From a more detailed trouble-time analysis of the wells, major drilling problems were found to be well-pressure related (lost circulation, well control, stuck pipe), supporting increased emphasis on improved planning and quantification of ECD, deepwater geopressures, and drilling margins. The BCT/BCC methodology is actually one element of the "Ten-Step Process" discussed exhaustively in Refs. 1 and 2. Experiences from two onshore areas so far have been very encouraging in drilling cost reduction. Applications to more complicated offshore GOM wellbores, cost components, and narrow geo-pressure margins are the focus of this paper.

Biography:

Bob Meize has over 25 years drilling and production experience in offshore and onshore operations. He has worked areas in West Texas, Rocky Mountain, Mid-Continent and Gulf Coast regions. He joined Anadarko in 1994 after a career with Arco and is currently Anadarko's Division Drilling Manager for Worldwide Deepwater Operations. He has been involved with developments in subsalt, deepwater and shelf drilling while at Anadarko. He has co-authored numerous technical papers on these subjects along with presentations to various industry groups. Bob holds a BS in Petroleum Engineering from New Mexico Tech and a Masters in Business Administration from Oklahoma City University.

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Today's Oil Industry: High-Tech Tools Improve Your Quality of Life

Jeanne M. Purdue
IHRAC

Abstract:

The oil industry of 2005-2006 is not your grandfather's oil industry. Today's oil industry is high-tech and environmentally responsible. Innovations in oilfield technologies enable engineers and geoscientists to find and produce the hydrocarbons that make a good lifestyle possible. The Digital Oilfield is nearing reality. Rather than sending people in trucks out to take readings in the field, today electronic data is sent by satellite to the Web. Rather than filling out purchase orders in quadruplicate, we order online and have electronic field tickets to document receipt. Rather than drilling many vertical wells right next to each other to drain an oil reservoir, we drill horizontal and multilateral wells, resulting in a much smaller footprint. Today's oil operations are clean, protective of human safety and the environment, and very necessary to a pleasant standard of living. Oil is more than energy; it is also the main source of molecules used as building blocks for the plastics, polyester, nylon, fertilizers, paints, medicines and cosmetics we use every day. We cannot conserve our way out of the need for oil, and developing countries are going to demand more of it as their standard of living improves. SPE members need to help educate the public about our high-tech tools for finding and producing the hydrocarbons needed for useful products.

Biography:

Jeanne Purdue is President of JuMPstart Ventures in Houston. She calls herself a Petroleum Technology Evangelist, zealously preaching the good news about oilfield technologies by writing articles technical for the upstream oil and gas industry.

After earning a BS degree in Chemistry from the State University of New York at Albany in 1980, Purdue worked at the Texaco research labs, performing core analysis and heavy oil analysis. At the Texaco technical library, she conducted online literature searches for fellow scientists and engineers. She later joined Hart Publications as a technical editor for *Petroleum Engineer International* and *Hart's E&P* magazines. Purdue also gained experience in e-learning at IHRDC and in energy conference production with The Energy Forum prior to focusing on her own business.

An active member of the SPE, Purdue was the first woman to be appointed Review Chairman for the SPE Peer Review Committee. She helped develop the SPE Magic Suitcase and the SPE MasterDisc CD-ROM. She has also served on the SPE Public Energy Education Committee and acts as Implementation Coordinator for the Gulf Coast Region. She was a member of the Board of Directors of the Gulf Coast Section for three years, serving as Community Services Chairman in charge of 14 committees.

Purdue received the SPE Young Member Outstanding Service Award in 1992, was named one of 50 Key IT Women in Energy in 2003, and was honored as a 2004 Woman of Excellence by the Federation of Houston Professional Women.

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Assessing Dynamic Reservoir Uncertainty: Integrating Experimental Design with Field Development Planning

Mark A. Williams
Chevron Texaco Energy

Abstract:

Look-backs on major capital projects have suggested that technical teams did not fully assess the range of subsurface interpretations. Specifically, many projects did not provide the production rates and reserves that were promised ...the result of either biasing results to a more favorable outcome or anchoring on deterministic interpretations and development plans that did not take into account the full range of possible uncertainty values. This has ushered in the era of probabilistic subsurface assessments.

A key breakthrough in probabilistic assessments has been the adaptation of Design of Experiments to subsurface modeling on both the geologic and reservoir engineering disciplines. Since the list of subsurface uncertainties can be quite long, and the ranges of uncertainties themselves can be wide, a full assessment of reservoir performance outcomes would require hundreds or thousands of geologic and reservoir simulation models. Design of Experiments has provided a structure to this assessment process; but more importantly, DOE can significantly reduce the number of interpretations and runs needed to fully assess reservoir performance outcomes and the main effects of each of the uncertainties.

This talk will present a structured method employed by ChevronTexaco to create unbiased P10-50-90 models of reservoir performance, which are then used to assess field development concepts. Mark will also present some lessons learned and best practices related to using DOE and incorporating that into field development planning.

Biography:

Mark A. Williams is a Reservoir Management Consultant for ChevronTexaco Energy Technology Company. He holds a BS degree in Petroleum Engineering from the University of Louisiana at Lafayette, and has been employed with ChevronTexaco (formerly Chevron) since 1978. He has participated in over 150 reservoir studies, has co-developed 10 internal technical courses on reservoir management and reservoir simulation, and has conducted over 120 sessions of these courses. Mark was also a Lecturer at the University of Houston's MSPE program for 5 years, where he taught 2 courses on applied reservoir simulation. He has authored several SPE papers on reservoir simulation and history matching, and has chaired several SPE forums. Mark is considered to be one of ChevronTexaco's foremost practitioners of applied reservoir simulation. He currently works with a team of subsurface technical experts that conduct mandatory evaluations of the subsurface assessments and forecasts for all of ChevronTexaco's Upstream Major Capital Projects. These evaluations are conducted to ensure that a full range of development alternatives have been tested against unbiased probabilistic assessments of reservoir geology and reservoir performance.

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**The Crisis in International Contracting for Large Development Projects – Assessment
and Solutions**

E. W. Merrow

Independent Project Analysis, Inc. (IPA)

Abstract:

The relationships between oil companies and contractors on major upstream projects have been deteriorating rapidly for the past several years. The primary issues come down to the allocation of risk and reward on the projects that are crucial to future oil production.

This series of lectures is based on eight studies of contracting performed by IPA over the last 5 years. We examine the relationship between contracting strategy and project results for owners and the relationship between contract type and risk for contractors. The results are quite surprising to some. First, EPCI lump-sum contracting is substantially more costly to owners than other approaches. Contractors, perceiving themselves to be in a position of high-risk, charge a premium on such projects in an attempt to cover the risk. Those risk premiums have now escalated to the point where projects are being halted at sanction due to bids that are far higher than the expected cost of the project. Ironically, the contractors actually get stuck with the risk of large overruns on large projects only very rarely. The problem for the contractors is that when they do, the results can be catastrophic.

Part of the impasse in contracting for large petroleum development projects is the stance of host governments and their oil companies. Many of these governments, believing that fixed price contracts are more cost-effective, have rules that bar other contractual forms or have rules that generate the same effect. We are able to show that when these rules are relaxed, much better project outcomes result for project owners; many of the problems getting the projects under contract actually disappear.

Biography:

E.W. Merrow is the President and founder of Independent Project Analysis, Inc., a consulting firm that conducts extensive research studies for the petroleum industry on the drivers of capital effectiveness in oil development projects. Prior to founding IPA in 1987, Merrow spent 14 years with the RAND Corporation, where he directed the Energy Research Program and directed a series of revolutionary studies on project performance. Prior to joining RAND, he was Assistant Professor at the University of California, Los Angeles. Merrow is the recipient of a number of awards for service to the industry including the Carroll H. Dunn Award of Excellence, the highest award of the Construction Industry Institute. Merrow is a fellow of the National Academy of Construction.

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The Latest in Ways to Improve Asset Value Through Better Water Management

Steve K. Cheung

ChevronTexaco Energy Technology Company

Abstract:

Many wells and reservoirs are prematurely abandoned due to excess water production, resulting in lost production and recovery. We need ways to delay water production in new fields, and to maximize efficiency in mature producing fields. This talk highlights some of the latest technology in prevention, diagnosis, mechanical/chemical methods, and with supporting field case history. Specific applications for injector, producer, reservoir-wide, and facility-related will be communicated. New near-wellbore and reservoir in-depth treatments will be particularly detailed. There will be discussions on Best Practices/ Lessons Learnt to improve the success rates, and mention of challenges ahead.

Biography:

Steve Cheung is the Project Leader – Conformance Control at ChevronTexaco Energy Technology Company. He holds M.S. Petroleum Engineering from University of Southern California, and a Ph. D. in Chemistry from University of California, Irvine. He has worked in the industry for over 25 years, and was Team Leader – Produced Water Management, and Team Leader – Oilfield Chemistry. He teaches in-house Water Control Workshop worldwide and has consistently received the highest marks. Steve also organized in-house worldwide Subsurface Conformance Control conferences, and taught graduate-level Petroleum Engineer class at USC. He has authored papers in Well Stimulation, Conformance Control, EOR, Reservoir Monitoring, and Flow Assurance. He has been invited to speak in many meetings in USA, England, France, Denmark, Brazil, Oman, and Malaysia. He was a SPE Technical Editor, chaired many sessions in SPE Annual Conference, and co-chaired a 2004 SPE-ATW.