SPE Reserves, Resources and Definition Workshop

15 – 18 August 2016 | Kuala Lumpur, Malaysia

Who Should Attend
Professionals in / interested in:
• Reserve Managers
• Portfolio Managers
• Resource Analyst/Evaluators
• Reservoir Engineers
• Petroleum Engineers
• Geologists/Geophysicists
• Petroleum Economists

Sign up before 24 June 2016 for Super Early Bird Discount!

Session Highlights
Participants of this workshop will have the opportunity to:
■ Examine the PRMS and the Application Guidelines in detail
■ Discuss example applications covered in the PRMS Application Guidelines
■ Discuss the SPE’s ongoing support for PRMS and upcoming updates
■ Highlight synergies with other initiatives, such as the United Nations Expert Group on Resource Classification
■ Discuss future directions in reserves and resources evaluation and reporting, including Unconventionals and Enhanced Oil Recovery processes
■ Consider reserves assessment issues during times of low and volatile oil prices

The petroleum industry is a major component of the global economy. It requires clearly defined standards to evaluate reserves and resource development to support internal company asset management, government inventory management, project financing, and disclosures for investors under applicable regulatory guidelines. Ongoing collaboration amongst industry professionals ensures that the classification systems and estimation methods are periodically revised to accommodate requirements of all major stakeholders.

Pre & Post Training Courses:

Pre-Workshop Training Course (A): Recoverable Volumes Approach, Classification and Risk Factor Determination using PRMS
15 August 2016 • Kuala Lumpur, Malaysia

Post-Workshop Training Course (B): Insights into Global Petroleum Resources Classification Systems and Evaluation Methodologies
18 August 2016 • Kuala Lumpur, Malaysia

To find out more about group registrations, please contact us at spekl@spe.org

CHAIRPERSONS
Norbashinatun Salmi
Muhd Nordin
PETRONAS
Doug Peacock
Gaffney, Cline and Associates

MEMBERS
Antony Corrie-Keilig
RISC Advisory
Barbara Pribyl
Santos Limited
Ikram Iskandar Abdul Rahim
SapuraKencana Energy Inc
Li Yan
Beijing SDZX Mineral Resources Technology Consulting Company
Malvinder Bandal
MB Energy Limited
Marut Lekkhian
PTTEP
Narendran Ramakrishna
IHS Energy
Sanjeev Rajput
Baker Hughes
Uzaymee Mohd Yusof
JX Nippon Oil & Gas Exploration (Malaysia) Limited
Yang Hua
Research Institute Petroleum Exploration/Development (RIPED)

WORKSHOP ADVISORS
John Lee
Texas A&M University
Mohamad Kamal Hamdan
PTTEP
Henricus Herwin
Total E&P Indonesia

www.spe.org/go/17WM02
Preliminary Daily Activities and Technical Agenda

**MONDAY, 15 AUGUST 2016**

0900 – 1700  **Pre-Workshop Training Course:** Recoverable Volumes Approach, Classification and Risk Factor Determination using PRMS

1700 – 1800  Discussion Leaders and Session Managers Briefing

**TUESDAY, 16 AUGUST 2016**

0800 – 0850  Arrival of Delegates and Registration

0850 – 0900  Safety Announcement by Hotel

0900 – 0930  **Welcome and Introduction by Workshop Co-Chairpersons**

Co-Chairs: Norbashatin Salmi Muhd Nordin, PETRONAS; Doug Peacock, Gaffney, Cline and Associates

0930 – 1000  **Session 1: Keynote Address**

1000 – 1030  Group Photo / Coffee and Tea Break

1030 – 1230  **Session 2: Overview of the PRMS and Application Guidelines**

Session Chairs: Doug Peacock, Gaffney, Cline and Associates; Yang Hua, RIPED

The PRMS is the most widely used international standard for petroleum reserves and resources classification. It is used within the oil and gas community and is referenced by many regulatory bodies, stock exchanges and government agencies. Representatives of the Oil and Gas Reserves Committee will provide an overview of the PRMS and outline its main features. The two main documents: the PRMS issued in 2007, and the Application Guidelines, issued in 2011, will be outlined. The session will also provide an overview of the planned updates to the revised PRMS, due for release in 2017. The expected timeline for public consultation, feedback and final delivery will also be presented.

1230 – 1330  **Session 3: Uncertainties in Reserves Estimations**

Session Chair: Antony Corrie-Kellogg, RISC Advisory; Marut Lekkhian, PTTEP

This session will present technical uncertainties with respect to reserves reporting that exist in the static and dynamic analysis. In static analysis, the uncertainties largely relate to the hydrocarbons in place, which may be impacted by factors including: structural interpretation, fluid contacts, depositional model, reservoir properties and reservoir architecture. Estimating appropriate ranges of uncertainty is an important consideration especially during exploration and appraisal when little or no dynamic data is available to calibrate our interpretations. In dynamic analysis, the maturity of the asset with respect to production governs the technique that is most suited i.e. empirical / analogue, analytical/material balance, numerical simulation

The initial focus is usually on characterising the Best Case on which investment decisions are typically made, with Low and High cases generated considering static and dynamic sensitivities to the Best Case. Potential topics for discussion include: challenges and pitfalls of relying solely on numerical dynamic modelling; selecting the most appropriate decline curve method, etc.

1530 – 1545  Coffee and Tea Break

1545 – 1745  **Session 4: Improved and Enhanced Oil Recovery Projects**

Session Chair: Malvinder Bandal, MB Energy Limited; Sanjeev Rajput, Baker Hughes

IOR/EOR processes are commonly conducted after recovering oil from primary recovery methods, which typically account for less than a third of the oil initially in place. While the current low oil price has put a damper on certain EOR projects, many IOR projects are still viable. This session will focus on reserves/resources assessment for ongoing IOR/EOR projects. Potential topics for discussion include how operators have phased projects or revised development plans so the project remains viable. Participants are welcome to share examples.
### Preliminary Daily Activities and Technical Agenda

#### 1745 - 1845
**Session 5: Unconventional Reservoirs**
Session Chair: Barbara Pribyl, Santos Limited; Narendran Ramakrishna, IHS Energy
This session will focus on the status of unconventional exploration and development projects within the Asia Pacific region. Emphasis on sharing of experience from China, Australia, Indonesia, and Japan market incorporating a discussion on which projects and reservoir types are still relevant and which have dominated activity in recent times. Emphasis will also be placed on the applicability of PRMS to the management of these projects and highlight key issues in usage.

#### 0830 – 0945
**Session 6: Interactive Session (Real-Time Voting)**
Session Chairs: Ikram Iskandar Abdul Rahim, SapuraKencana Energy Inc., Narendran Ramakrishna, IHS Energy
This interactive session will present various scenarios and allow participants to "vote", by mobile phone, on what they believe are appropriate answers, solutions or outcomes. The voting will be anonymous. Scenarios will include various real-life examples where issues of reserves assessment such as classification or uncertainty have been encountered. Each scenario will be briefly introduced and discussed after the voting.

#### 0945 – 1000
Coffee and Tea Break

#### 1000 – 1200
**Session 7: Commercial Considerations and Impact of Oil Price on Reserves**
Session Chairs: Sanjeev Rajput, Baker Hughes; Uzaymee Mohd Yusof, JX Nippon Oil & Gas Exploration (Malaysia) Limited
The performance of major projects worldwide shows that despite the importance of performance, a high percentage of projects fail to deliver on time or meet approved budgets. However, there are areas of commercial challenges and considerations that need to be addressed during the development of these projects. This session will provide an overview on uncertainties in oil price forecasts, impact of oil price on costs assumptions and project decisions and the impact of climate change policy and the rise of new technologies (batteries, solar etc.) on oil price, reserves (stranded assets, projects not going ahead - especially high CO2 reservoirs) and the long-term viability of the industry. This session will also provide an overview of commercial considerations for portfolio and project commercial context, project development, project delivery and key challenges in terms of reserves.

#### 1200 – 1300
SPE Luncheon

#### 1300 – 1500
**Session 8: Challenges facing the PRMS in the Era of Low Oil Prices - Case Histories and Examples**
Session Chairs: Antony Corrie-Kellog, RISC Advisory; Ikram Iskandar Abdul Rahim, SapuraKencana Energy Inc.
The PRMS has only existed since 2007 and seen only one era of low oil prices, albeit briefly during the GFC. It now faces a potentially sustained low price environment and the challenges associated with this. This session will look at challenges facing the PRMS such as de-booking of reserves, costs uncertainties and escalation in current oil price environment, production beyond the economic limit, reasonable price forecasts, effects of price hedges and the potential in a low price environment for markets not having had time to respond to costs giving rise to situations where if current cost/pricing forecast assumptions are used, it may result in reserves being underestimated.

#### Coffee and Tea Break

#### 1500 – 1515
1515 – 1715
**Session 9: NOC/IOC’s Reserves Management with PRMS/SEC**
Session Chairs: Yang Hua, RIPED; Li Yan, Beijing SDZX Mineral Resources Technology Consulting Company
This session will introduce global petroleum resources classification systems (e.g. COGEH) and focus on major stakeholder NOC/IOC’s reserves management with PRMS/SEC. As the requirements of National Oil Companies (NOCs) can differ from those of other oil companies, representatives of regional NOCs will share their practice experience and outline key requirements, with particular emphasis on highlighting areas in which PRMS might be further enhanced to meet those needs.

#### 1715 – 1745
**Session 10: Workshop Summary by Co-Chairpersons**
Co-Chairs: Norbashinatali Salmi Muhd Nordin, PETRONAS; Doug Peacock, Gaffney, Cline and Associates
Review of session summaries

#### 1745
Workshop Concludes

#### THURSDAY, 18 AUGUST 2016

#### 0900 – 1700
**Post-Workshop Training Course: Insights into Global Petroleum Resources Classification Systems and Evaluation Methodologies**

---

### Poster Solicitation & Information

All participants are encouraged to prepare a poster for the Workshop. Presentations on both research and field experience are welcomed. Posters, including unconfirmed/partial results, are accepted at an open deadline. Posters will be on display for the entire Workshop period.

When preparing your poster:
- Avoid commercialism. No mention of trademarks/product name
- Poster size should be approximately 0.8m x 1.2m (W x H) or size A0 in portrait layout
- Identify topic by title, affiliation, address, and phone number
- Include a brief abstract that summarises the technology to be addressed
- Make the display as self-explanatory as possible
- Place the information in sequence: beginning with the main idea or problem, method used, results, etc. (Draw a plan keeping the size and number of illustrations in mind)
- Keep illustrations simple by using charts, graphs, drawings, and pictures to create interest and visually explain a point
- Use contrasting colours
- Use large print for narrative materials. (We suggest a minimum of 24 points or 3” high letters for the title)

Note that the Workshop Programme Committee will review all poster abstracts/materials prior to display, and reserves the right to refuse permission to display any poster considered to be commercial in nature.

If you are interested to participate, please email your proposed topic with a short abstract (between 200-300 words) to SPE Event Coordinator, Hanna-Rose Abdul Jalil at hajaril@spe.org by 4 July 2016.

The Society of Petroleum Engineers (SPE) is a not-for-profit organisation. Income from this event will be invested back into SPE to support many other Society programmes. When you attend an SPE event, you help provide even more opportunities for industry professionals to enhance their technical and professional competence. Scholarships, certification, the Distinguished Lecturer programmes, and SPE’s energy education programmes Energy4me are just a few examples of programmes that are supported by SPE.
Pre-Workshop Training Course

Course Description
The course will outline the various methods available for recoverable volume estimation. The degree of uncertainty will be discussed considering the maturity of the asset and the evaluation technique used. The handling of costs associated with a development plan for a project will be suggested. The key elements and inputs for an economic limit test will be shared. The classification of the recoverable volumes into the various categories of Reserves and Resources will be outlined. The mechanism for Risking including Chance of Development will be shared. Finally, a template for Reporting with due consideration for uncertainty levels and risks will be presented and this includes populating at the appropriate degree of accuracy.

Why You Should Attend?
Participants attending this course will acquire and strengthen their skills in:
- Integration of Static and Dynamic Aspects
- Production Forecasting Techniques
- Recovery Factor Determination
- Subsurface Uncertainty Assessment
- Project Risking
- Reserves and Resources Reporting

Who Should Attend?
This one-day training course is designed for at least intermediate level upstream oil and gas professionals. These include reservoir engineers, production technologists, petrophysicists, senior geoscientists, economists, upstream managers and others involved in reserves and resources assessment.

Instructor Biography
Malvinder Bandal is a well-rounded Petroleum Engineer with 33 years of reservoir engineering studies, operations and project management experience obtained in various geographical areas but mainly in the Asia-Pacific region. Besides reservoir engineering he also has expertise in production technology and economics. He has worked for a significant period with oil companies, Chevron (WAPET, Australia), PETRONAS Carigali (Malaysia) and energy consultants such as Gaffney Cline & Associates. During his petroleum career, he has taught a variety of reservoir engineering courses in 7 countries and served as industry supervisor to two universities. In 1992, he led Australia’s first radioactive iodine tracer injection logging program. In 1994, he was the development drilling team leader for PETRONAS Carigali’s first operated field where the successful appraisal cum development of the turbidite field led to doubling of proved reserves. In 2005, he led a multi-company initiative to speed up IOR application to fields in Malaysia. He has been involved with Reserves Auditing for the last 10 years and is a signatory to several CPR/QPR reports filed with KLSE, SGX, AIM, TSX, etc.

Learning Level
Intermediate

Preliminary Daily Activities and Technical Agenda

MONDAY, 15 AUGUST 2016

0800 – 0900 Registration Opens and Welcome Coffee/Tea
0900 – 1030 Session 1: Introduction to Petroleum In-Place and Field Maturity
- In-place computation—oil and gas
- In-place uncertainties
- Dynamic data available for discoveries versus producing fields
- Analogue fields and recovery factor
1030 – 1045 Coffee and Tea Break
1045 – 1200 Session 2: Recoverable Volume Determination Techniques and Uncertainties
- Empirical determination of recovery factor
- Analytical/material balance analysis
- Decline curve analysis
- Reservoir simulation
1200 – 1300 SPE Luncheon
1300 – 1515 Session 3: Cost Handling and Economics Limit Test
- Selecting the best case cost scenario
- Applying contingencies to drilling/workover wells and surface facilities
- Applying cost, price and fiscal regime for economic model
- Determining economic limit year for low, best and high cases
- Net entitlement volumes
1515 – 1530 Coffee and Tea Break
1530 – 1700 Session 4: Resource Classification, Risking and Reporting
- Reserves classification – 1P, 2P, 3P
- Contingent resources classification – 1C, 2C, 3C
- Prospective resources – Low, Best, High
- Risking (chance of development and chance of geological success)
- Reporting – Aggregation, Degree of Accuracy, Template
Post-Workshop Training Course

Course Description

This course is designed to present participants with the integrated and updated knowledge of the global petroleum resources classification systems and petroleum resources/reserves evaluation methodologies. In the sessions of classification systems, major ones in the world, such as PRMS, SEC, COGEH, RF (Russian System)/CPCS (Chinese System), and UNFC will be introduced starting from reserves definitions, histories, new updates and development trends, and help participants recognise the different demands of different stakeholders on resources management.

Full project’s life cycle resources/reserves evaluation methodologies will be instructed by exploration and development stages, and focused on their integrated applications and cross-checks. Some new emerging technologies, such as Total Petroleum System (TPS), Resources Spatial Prediction (Fractal Theory), Integrated Modeling, and evaluation methodologies for unconventional plays will be discussed in the course as well.

To promote a better understanding of classification systems and further application of resources evaluation technologies, this intensive course is targeted to provide integrated views, comparisons, and practice experiences and advices on those selected topics.

Why You Should Attend?

This course will give an in-depth insight into the major classification systems in the world and share practice experiences on the integrated application of resources estimation methods. It will help participants to better extend vision, understand related standards, improve integrated applied skill and knowledge, and meet the requirements of petroleum resources managements.

This course also intends to provide a discussion or communication opportunity on harmonisation application of classification systems and estimation methods.

Who Should Attend?

- Reserve Managers
- Portfolio Managers
- Resource Analyst/Evaluators
- Reservoir Engineers
- Petroleum Engineers
- Geologists/Geophysicists

Instructor Biography

Yang Hua, Senior Petroleum Engineer, has more than 20 years of experience in research studies on petroleum field exploration and development, particularly on reserves evaluation and management. She is currently serving as a member of the SPE Oil & Gas Reserves Committee, and also a member of the Communication Subcommittee and E-axis Subgroup of United Nations Expert Group of Resources Classification.

She has led about 20 FDP studies of major fields for CNPC’s overseas projects, including ones in Venezuela, Azerbaijan, Kazakhstan, Iran, Oman, Sudan, and etc., and also has rich experience in new venture assessment and unconventional resources evaluation. From 2005 to 2009, she has served as the director of the Reserves Office of CNODC (CNPC International Ltd.), responsible for the resources and reserves evaluation and management on CNPC’s overseas projects.

Learning Level

Advanced

Preliminary Daily Activities and Technical Agenda

THURSDAY, 18 AUGUST 2016

0800 – 0900 Registration Opens and Welcome Coffee/Tea
0900 – 1030 Session 1: Global Petroleum Resources Classification Systems
   High-level introduction of global petroleum resources classification systems (PRMS/SEC, COGEH, Russian System, etc.), including definitions, histories, new updates and development trends. In this session, integrated comparison among global major classification systems and their mapping issues will be introduced and discussed.
1030 – 1045 Coffee and Tea Break
1045 – 1200 Session 2: UNFC - From Concept to Practice
   This session intends to disseminate UNFC related knowledge, and promote its further application in the Asia Pacific Region. This session is supported by the UN EGRC communication sub-committee.
1200 – 1300 SPE Luncheon
1300 – 1515 Session 3: Resources / Reserves Evaluation Methodologies
   Full project’s life cycle resources/reserves evaluation methodologies will be instructed with application advices in this session, including static and dynamic methods, determination and probability methods. Some new emerging technologies, such as Total Petroleum System, Resources Spatial Prediction, Integrated Modelling, and evaluation methodologies for unconventional plays will be discussed.
1515 – 1530 Coffee and Tea Break
1530 – 1700 Session 4: Petroleum Fiscal Regimes and Economic Analysis
   Emphasise the concept of reserves entitlement, and introduce related assessment methods and main impact factors.

www.spe.org/go/17WM02
Sponsorship support of the event helps offset the cost of producing workshops and allows SPE to keep the attendance price within reach of operation-level individuals, those who benefit most from these technical workshops.

Supporters benefit both directly and indirectly by having their names associated with a specific workshop. While SPE prohibits any type of commercialism within the workshop room itself, the Society recognizes that supporting companies offer valuable information to attendees outside the technical sessions.

**SPONSORSHIP CATEGORIES**

Support categories are offered on a first come basis. Please contact SPE to enquire and verify the availability of categories. Existing supporters have the opportunity to renew the same level of support for annual workshops.

**SPONSORSHIP BENEFITS**

In addition to onsite recognition; SPE will recognize sponsors on the SPE website and in all printed materials for the workshop. Based on the category selected, supporting companies also receive logo visibility on promotional workshop items.

**FOR MORE INFORMATION**

For a detailed list of available sponsorship opportunities, including benefits and pricing, contact Hanna-Rose Abdul Jalil at hajalil@spe.org.
Society of Petroleum Engineers

SPE Reserves, Resources and Definition Workshop and Training Courses
15 – 18 August 2016 | Kuala Lumpur, Malaysia

REGISTRATION FORM

SPE Member: ☐ Yes ☐ No

Membership No. __________________________

Name: [First / Forename] [Middle] [Last / Family Name]

Position: __________________________

Company: __________________________

Address: __________________________

Town/City: __________________________ Zip/PostalCode: __________________________ Country: __________________________

Tel: __________________________ Fax: __________________________ Email: __________________________

Would you be willing to give a brief [10-15 minutes] presentation _______(Yes/No)? If yes, please attach the topic with a short abstract of your proposed presentation. One of the Programme Committee members will contact you to discuss your presentation.

Important: Registrants for SPE Workshops are accepted on the basis of information submitted by each registrant.

Technical Disciplines (Check One)
☐ Drilling ☐ Completions ☐ Management and Information
☐ Projects, Facilities and Construction

Primary Responsibility (Check One)
☐ Drilling ☐ Economics ☐ Geology ☐ Geophysics ☐ Management
☐ Operation ☐ Production ☐ Reservoir ☐ Surveillance ☐ Other: __________________________

List background and experience. (Use additional paper if required).

List your expectation for the Workshop, so that the committee can tailor a portion of the Workshop to answering attendees’ concerns. (Use additional paper if required).

Payment by Telegraphic Transfer
d) No refund will be issued if a registrant fails to show up on-site.

A processing fee of USD150.00 will be charged for cancellation received thirty (30) days prior to the first day of the workshop.

b) 25 % refund will be made for cancellation received between twenty nine (29) – fifteen (15) days prior to the first day of the workshop.

c) No refund on cancellation received fourteen (14) days prior to the first day of the workshop.

d) No refund will be issued if a registrant fails to show up on-site.

CANCELLATION POLICY:

This form may be used as a company invoice.

Mail completed registration form with remittance and any supporting material to:

Society of Petroleum Engineers
Level 35, The Gardens South Tower, Mid Valley City
Lingkaran Syed Putra, 59200 Kuala Lumpur, Malaysia.
Tel : 60.3.2182.3000      Fax : 60.3.2182.3030
E-mail: spekl@spe.org

Note: Fee includes workshop and/or training course sessions, workbook, certificate, daily luncheons and coffee breaks. Registration fees do not include accommodation.

Payment by Credit Card

Credit Card Payment will be in U.S. Dollars only
☐ American Express ☐ MasterCard ☐ Visa ☐ Diners Club

Card Number __________________________ Expiration Date (mm/yy) __________________________

Security Code (3 digits on back of card / 4 digits on the front of Amex) __________________________

Credit Card Billing Address & Zip/Postal Code __________________________________________________________________________________________

Name of Card Holder ________________________________________________________________________________________________________________

Signature _______________________________________________________________________________________________________________________

Note: Forms will not be processed and space cannot be guaranteed unless accompanied by payment for total amount due, unless accompanied by payment for total amount due.

<table>
<thead>
<tr>
<th>Registration Fees</th>
<th>Super Early Bird Registration on/before 24 June 2016</th>
<th>Early Bird Registration on/before 22 July 2016</th>
<th>Registration after 22 July 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SPE Member</td>
<td>Nonmember</td>
<td>SPE Member</td>
</tr>
<tr>
<td>Complete Series (15-18 Aug) (Workshop, Pre &amp; Post Workshop Training Courses)</td>
<td>☐ US$ 2,500.00</td>
<td>☐ US$ 2,860.00</td>
<td>☐ US$ 2,600.00</td>
</tr>
<tr>
<td>Workshop &amp; Pre-Workshop Training Course (A) Only (15-17 Aug)</td>
<td>☐ US$ 1,960.00</td>
<td>☐ US$ 2,320.00</td>
<td>☐ US$ 2,060.00</td>
</tr>
<tr>
<td>Workshop &amp; Post Workshop Training Course (B) Only (16-18 Aug)</td>
<td>☐ US$ 1,960.00</td>
<td>☐ US$ 2,320.00</td>
<td>☐ US$ 2,060.00</td>
</tr>
<tr>
<td>Workshop Only (16-17 Aug)</td>
<td>☐ US$ 1,500.00</td>
<td>☐ US$ 1,700.00</td>
<td>☐ US$ 1,600.00</td>
</tr>
<tr>
<td>Pre-Workshop Training Course (A) Only [15 Aug]</td>
<td>☐ US$ 500.00</td>
<td>☐ US$ 700.00</td>
<td>☐ US$ 600.00</td>
</tr>
<tr>
<td>Post-Workshop Training Course (B) Only [18 Aug]</td>
<td>☐ US$ 500.00</td>
<td>☐ US$ 700.00</td>
<td>☐ US$ 600.00</td>
</tr>
</tbody>
</table>

For group registrations, please contact us at spekl@spe.org

Note: Fee includes workshop and/or training course sessions, workbook, certificate, daily luncheons and coffee breaks. Registration fees do not include accommodation.

Payment by Telegraphic Transfer (Bank details will be provided on the tax invoice).

Payment by Credit Card

Credit Card Payment will be in U.S. Dollars only

Card Number __________________________ Expiration Date (mm/yy) __________________________

Security Code (3 digits on back of card / 4 digits on the front of Amex) __________________________

Credit Card Billing Address & Zip/Postal Code __________________________________________________________________________________________

Name of Card Holder ________________________________________________________________________________________________________________

Signature _______________________________________________________________________________________________________________________

Note: Forms will not be processed and space cannot be guaranteed unless accompanied by payment for total amount due, unless accompanied by payment for total amount due.