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# SPE Workshop: Flow Assurance - Breaking New Grounds in Challenging Hydrocarbon Exploitation

13-14 March 2023 | Kuala Lumpur, Malaysia



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## Who Should Attend

Professionals involved in:

- Academia
- Asset Management
- Data Science
- Downstream Operations
- Flow Assurance
- Front End Engineering
- Operations
- Petroleum Engineering
- Process Engineering
- Production Chemistry
- Production Engineering
- Project Management
- Research
- Reservoir Engineering

The energy industry heavily depends on flow assurance, with a heavy volume of fluids flowing from one location to another to be captured, processed, and monetised. The process has its challenges, from slugging and flow instabilities, plugging of tubular with hydrates, waxes and asphaltenes, scale or sands, amongst others, and dealing with complex fluids and impurities. Due to complex flow assurance sampling and laboratory testing requirements, these challenges started from the field development stage.

Themed "Breaking New Grounds in Challenging Hydrocarbon Exploitation", this SPE workshop will discuss current flow assurance challenges in the minds of energy professionals. In addition, the workshop provides an opportunity for us to deep-dive into strategies, best practices, and technology developments to ensure our operating assets' production remains uninterrupted, maximising productivity while producing sustainably and profitably for years to come.

## Session Highlights

Operational Excellence: Digitalisation | CO<sub>2</sub> Flow Assurance and Cost Optimisation

Fluid Chemistry and its Uncertainties | Deepwater Field Development

Liquid Handling and Managing Solids in Production | Predicting and Managing Contaminants

## Technical Programme Committee

### CO-CHAIR

Zalina Ali  
Principal (Process Engineering)  
**PETRONAS**

Amir Sani  
Senior Manager,  
Flow Assurance  
**PETRONAS Carigali Sdn. Bhd.**

Saleh Ahmed  
Process Engineering and  
Flow Assurance Manager  
**Shell**

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Chris Cooper  
Project Director  
**Agile Energy Sdn. Bhd.**

Mohamed Farouk Ibrahim  
Lead Services Specialist -  
Technical Support  
**Baker Hughes**

Adil Pottayil  
Regional Manager and Senior  
Consultant  
**Calsep Asia Pacific Sdn. Bhd.**

Amran Abdul Hamid  
Sales Director  
**Clariant Oil Services (M)  
Sdn. Bhd.**

Jay Ee Lee  
Senior Production Engineer  
**One Subsea, SLB**

Astriyana Anuar  
Head (UK Research and  
Technology)  
**PETRONAS**

Bishop Falope  
Head (UK Research and  
Technology)  
**PETRONAS**

Lakshmi Narayana Koyyalamudi  
Staff, Production Technology  
(Flow Assurance/Production  
Chemistry)  
**PETRONAS**

Raihan Rozlee  
Staff Process Engineering  
**PETRONAS**

Tuan M Yusof Tuan Mahmud  
Head, Upstream Process and  
Flow Assurance  
**PETRONAS**

Abigail Lian De Cruz  
Executive Reservoir Engineer  
**PETRONAS Carigali Sdn.  
Bhd.**

Suzalina Zainal  
Principal Scientist (Production  
Chemistry)  
**PETRONAS Research Sdn.  
Bhd.**

Nor Arman Busri  
Production Chemistry  
Manager  
**Sarawak Shell Berhad**

Kanthavel Renganathan  
Business Manager -  
Upstream Services  
**SGS (Petrotechnical  
Inspection (M) Sdn. Bhd.)**

Edwin Lawrence  
Technical Solution Sales -  
Production  
**SLB**

Sulaimon Aliyu Adebayo  
Senior Lecturer  
Universiti Teknologi  
**PETRONAS**

Jeff Zhang  
Lead Flow Assurance  
Consultant  
**Wood Plc.**

Sung-Oh Yang  
Flow Assurance Regional  
Manager - ASIA  
**Wood Plc.**

GROUP REGISTRATION AVAILABLE

Contact us at [apweb@spe.org](mailto:apweb@spe.org) to arrange your group.

[go.spe.org/23WM13W](http://go.spe.org/23WM13W)

### WORKSHOP ADVISOR

Sekhar Sathyamoorthy  
General Manager  
**PETRONAS Carigali Sdn. Bhd.**

Bazlee Mat Zain  
Advisor  
**Wood Plc.**

# Workshop Objectives

This workshop aims to engage professionals in diverse areas, from industry to academia, to interact and find common ground for discussion to unlock potential synergies and create new flow assurance technology solutions of today and tomorrow.



**Bespoke, expert-led technical topics**



**Knowledge sharing and technical discussions**



**Peer-to-peer networking opportunities**



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## Technical Programme Preview

### MONDAY, 13 MARCH 2023

08:15 – 08:50 Arrival of Delegates and Registration

08:50 – 09:00 Safety Announcement

09:00 – 10:00 **Welcome Remarks and Keynote Address**

10:00 – 10:30 **Group Photo / Coffee and Tea Break**

10:30 – 12:30 **Session 1: Panel Session - Operational Excellence: Digitalisation and Cost Optimisation**

Session Chairs: Amran Abdul Hamid, **Clariant**; Suzalina Zainal Abidin, **PETRONAS**

Flow assurance strategies are critical in reducing overall development costs as well as ensuring a safe and reliable production operation. It has a significant impact on field development and production system design hence it is important to establish at an early phase of project planning where flow assurance is needed. From the earliest stage, flow assurance operating philosophies should permeate each phase of field development engineering and project execution to effectively identify flow assurance design requirements.

This panel will discuss strategies for achieving operational excellence in flow assurance with digitisation and cost optimisation.

12:30 – 13:30 Networking Luncheon

13:30 – 15:30 **Session 2: CO<sub>2</sub> Flow Assurance**

Session Chairs: Tuan M Yusof Tuan Mahmud, **PETRONAS**; Adil Pottayil, **Calsep Asia Pacific Sdn. Bhd.**

Today, Carbon Capture, Utilisation and Storage (CCUS) is widely recognised as one of the key tools in mitigating climate change towards a net-zero carbon future. Due to the slow pace in the development of carbon pricing mechanisms, a major conundrum for Carbon Capture and Storage (CCS) projects is the recurring theme of regulating the project cost while maintaining safety and integrity. For a CCS project to be deployed successfully, it is vital that engineers have access to models that accurately capture CO<sub>2</sub>-rich fluid phase behaviour and thermodynamics, multiphase flow behaviour and other flow assurance aspects.

This session on CO<sub>2</sub> flow assurance in the context of CCS aims to provide a comprehensive overview of the key considerations involved in the safe and efficient transportation of CO<sub>2</sub> from capture to storage locations. The session will cover various topics including:

- Modelling CO<sub>2</sub>-rich systems with undersaturated water and its influence on fluid phase behaviour, hydrate formation, CO<sub>2</sub> solubility in brine, the effect of impurities in it, and other factors.
- Explore the challenges and considerations involved in CO<sub>2</sub> multiphase flow while transporting from capture to injection sites. As CO<sub>2</sub> can exist in gas, liquid, and in supercritical forms during transportation, modelling the phase transition can be crucial for ensuring the stability and safety of the system.
- Evaluate concern on corrosion while transporting CO<sub>2</sub>.
- CO<sub>2</sub> flow assurance design and operability strategy to improve project feasibility, reduce complexity, and enhance cost optimisation.

15:30 – 15:45 Coffee and Tea Break

15:45 – 17:45 **Session 3: Fluid Chemistry and its Uncertainties**

Session Chairs: Lakshmi Narayana Koyyalamudi, **PETRONAS**; Mohamed Farouk Ibrahim, **Baker Hughes**

Identification of petroleum reservoir fluid types, behaviour, characterisation and risk assessment of flow assurance and production chemistry aspects are the critical factors in many of the decisions that must be made in fluids production based on the holistic view of six lenses, namely from reservoir, wells, surface, transportation, terminal and up to export sales. Therefore, reservoir fluid properties will play a key role in the design and optimisation of injection and production strategies as well as surface facilities for efficient reservoir management.

This session will discuss and explore fluid chemistries and compositions that have a significant impact on flow assurance, including:

- The importance of fluids chemistry in hydrocarbon exploitation.
- Groundbreaking technology capable of identifying and characterising fluid chemistries in the deepwater environment.
- Advanced fluid sampling, testing, characterisation, and application for process stimulations.
- Geochemistry applications in fluid characterisation.
- Programme, tools and/or a system that can determine fluid uncertainties with respect to flow assurance.
- Case history, lessons learnt and industry best practices on managing the changes in fluid chemistries.

17:45 – 18:45 **Poster Session**

18:45 onwards Networking Dinner

## TUESDAY, 14 MARCH 2023

### 09:00 – 11:00 **Session 4: Panel Session - Deepwater Field Development: Emerging Technologies and System Integration**

Session Chairs: Raihan Rozlee, **PETRONAS**; Sung-Oh Yang, **Wood Plc.**

As offshore oil and gas developments move into deeper waters with harsher environments, technological challenges exist for operators and offshore engineering service providers. This session will review and discuss novel technologies that can provide a cost-effective development plan and ensure a safe and stable operation, including:

- Various emerging technologies in the deepwater environment.
- System integration between oil gas subsea umbilicals, risers flowlines (SURF) and topside systems.
- Long-distance subsea tiebacks.

### 11:00 – 11:15 **Coffee and Tea Break**

### 11:15 – 13:15 **Session 5: Liquid Handling and Managing Solids in Production**

Session Chairs: Astriyana Anuar, **PETRONAS**; Chris Cooper, **Agile Energy Sdn. Bhd.**

Liquid handling and solids management are among the most prevalent flow assurance issues present in both oil and gas production. This is further exacerbated in deepwater developments, flow assurance critical fields, and late-life operations. If left unattended, they are one of the main causes of production disruptions that could lead to serious HSE risks during operations and have the potential to shut in and/or even lose oil and gas assets. Liquid handling and solids production are onerous to operations and often leave operations debilitated if systematic and holistic mitigation and remediation strategies are not in place. The balance between CAPEX, OPEX, and risk needs to be evaluated with a good understanding of these inevitable issues and their implications.

This session will discuss the various flow assurance analysis, methodologies, lessons learnt, best practices, and available technologies required to ensure continuous and uninterrupted production whilst safely and efficiently managing liquids and solids production.

### 13:15 – 14:15 **Networking Luncheon**

### 14:15 – 16:15 **Session 6: Predicting and Managing Contaminants**

Session Chairs: Kanthavel Renganathan, **SGS**; Nor Arman Busri, **Sarawak Shell Berhad**; Aliyu Adebayo Sulaimon, **Universiti Teknologi PETRONAS**

This session will focus on how to accurately predict the behaviour and quantitative prediction of contaminants such as Carbon Dioxide (CO<sub>2</sub>), Hydrogen Sulfide (H<sub>2</sub>S), Mercury (Hg), Nitrogen (N<sub>2</sub>), Water (H<sub>2</sub>O), and other impurities concentration in reservoir fluids through reliable process engineering applications and design of mitigation strategies to reduce the potential risk of contaminations. The session will also explore the sampling technologies of multiphase systems and the application of online analysers for predicting contaminant behaviour.

### 16:15 – 16:30 **Coffee Break**

### 16:30 – 17:00 **Workshop Summary and Closing Remarks**

## 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 to be presented at an assigned time and are open for discussion. 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 Zalza Malik at [zamalik@spe.org](mailto:zamalik@spe.org) by Friday, 10 February 2023.

## GENERAL INFORMATION

### DOCUMENTATION

- Proceedings will not be published; therefore, formal papers and handouts are not expected from speakers.
- Work-in-progress, new ideas, and interesting projects are sought.
- Note-taking by attendees is encouraged. However, to ensure free and open discussions, no formal records will be kept.

### WORKSHOP DELIVERABLES

- The committee will prepare a full report containing highlights of the Workshop and the report will be circulated to all attendees.
- Powerpoint presentations will be posted online and provided to attendees after the Workshop. Provision of the materials by Discussion Leaders will signify their permission for SPE to do so.

### COMMERCIALISM

In keeping with the Workshop objectives and the SPE mission, excessive commercialism in posters or presentations is not permitted. Company logos must be limited to the title slide and used only to indicate the affiliation of the presenter.

### ATTENDANCE CERTIFICATE

All attendees will receive a Workshop digital attendance certificate.

### CONTINUING EDUCATION UNITS

This Workshop qualifies for SPE Continuing Education Units (CEU) at the rate of 0.1 CEU per hour of the Workshop.

### TRAVEL/VISA

Attendees are advised to book their airline tickets early. All travellers must be in possession of passports valid for at least six (6) months with proof of onward passage. Contact your local travel agent for information on visa requirements.

### DRESS CODE

Business casual clothing is recommended. The Workshop atmosphere is informal.

### PHOTOGRAPHY AND VIDEOGRAPHY

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