Flow assurance in the oil and gas industry refers to the systems put in place to guarantee an uninterrupted flow of hydrocarbons from the reservoir to surface facilities and, ultimately, to refineries. Historically, these systems were put in place for producing mature fields as a reactive mechanism to the impedance of flow. However, now is the critical time to be proactive and have flow assurance strategies designed at the field development stage to address the challenges anticipated during the different production stages as the field matures. In other words, flow assurance strategies need to prevent, rather than cure, production problems. This change will result in exploiting previously uneconomical fields, produce oil and gas from hostile environments, and, finally, develop unconventional oil fields with complex fluid properties.

Developing a robust flow assurance strategy requires the integration between many engineering disciplines including petroleum, chemical, mechanical, process, software and instrumentation engineers; collecting representative samples; having good quality data; and understanding fluid behaviour, and the ability to accurately predict it.

The industry should recognise flow assurance as an essential building block of a field development plan that can influence architecture, cost and schedule. Hence this workshop will discuss the best flow assurance management systems and solutions required to allow for successful uninterrupted, profitable, and sustainable production of hydrocarbons from first oil to the abandonment of a field.

Committee members:

Chairperson
Dalia Abdallah
ADCO

Ghada Bassioni
Ain Shams University

Thibaut Charpentier
Leeds University

Zaharia Cristea
Schlumberger

Gordon Graham
Scaled Solutions

Myles Jordan
Nalco Champion, an Ecolab company

Karsten Krueckert
Nalco Champion, an Ecolab company

Eric Mackay
Heriot-Watt University

Paul Mundill
AqSens

Sameer Punnapala
ADCO

John Ratulowski
Schlumberger

Luis Remisio
National Drilling Company

Alistair Strachan
Nalco Champion, an Ecolab company

Catherine Strachan
REDA Oilfield

Andrey Troshko
ExxonMobil Upstream Research Company
The global average recovery factor for a typical oilfield is approximately 40%. To ensure successful long-term recovery, engineers try to find new technologies that are opening new opportunities to respond to the increasing demand for more oil. The need to improve the recovery factor and acceleration of the associated production is the main driver behind the many EOR schemes in practice around the world. The challenge to EOR lies in the complex interaction of injected agents with the existing reservoir fluids in an ever-changing downhole environment. This is particularly true of chemical EOR (e.g. polymer, surfactant, ASP) or EOR processes where brine chemistry is affected (e.g. CO2-WAG, low salinity). These complex interactions with reservoir fluids will have an impact not only deep within the reservoir, but also as fluids are produced, affecting flow assurance.

This session will present a variety of applications of new and emerging technologies and address questions on benefits. It will feature the most recent experimental studies, modelling techniques, and workflows for a wide range of EOR/IOR methods and mature fields, aiming to increase recovery factors and improve productivity.

Flow assurance addresses the issues that impact our ability to flow reservoir fluids from the reservoir to the refinery. Solids formation and deposition, hydrodynamic problems associated with complex multiphase flow, erosion, corrosion and separation are just some of the challenges commonly assigned to the flow assurance team. The behaviour of fluids in wells bores, flow lines, facilities and export lines involves a complex interdependence between thermodynamics, heat and mass transfer and hydrodynamics. It is impacted by fluid composition, pressure, temperature, geometry, and flow rate. Robust models, thermodynamic, multiphase flow, heat and mass transfer, help us address these issues proactively through both the design and operation of the system.

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1500–1600 | Session 3: R&D is the Key—Latest Technologies for Flow Assurance Challenges

Session Chairs: Thibaut Charpentier, Leeds University; Paul Mundill, Aqsense

With the oil industry facing an uncertain future in the wake of low oil prices, technological innovation is the best way to increase the profitability of mature fields. This session will explore how novel technological developments can be applied to arising flow assurance challenges, such as the formation of hydrates, waxes, asphaltenes, scale, and corrosion. With the dependence on EOR approaches increasing, so do the flow assurance challenges. This session will focus on the potential for new approaches such as nanoengineering as well as the development of technology that enhances the efficacy of current practices (e.g. squeeze treatments).

1600–1630 | Panel Discussion

1630 | End of Day 1

1900–2100 | Evening Activity

TUESDAY, 16 FEBRUARY 2016

0830–1000 | Session 4: All About Chemistry—Cost-Effective Management of Organic and Inorganic Scale: Analysis, Remediation, Prevention, and Chemical Solutions

Session Chairs: Dalia Abdallah, ADCO; Karsten Krueckert, Nalco Champion, an Ecolab company

Deposition of organic and inorganic scale is a widespread problem in the oil and gas industry. Formation of scale can occur in every part of the production system, from the reservoir to the export lines, and poses a severe threat to the total operation. The adverse effects caused by scale include operational reliability as well as other economic aspects.

Thus, the prevention of scale is a major consideration in the design and operation of oil and gas production facilities. Starting in the design phase of a project, a comprehensive analysis of fluids and environmental conditions can be used to predict the occurrence of scale. Certain scale-related problems can be directly engineered out, for e.g. by thermal insulation. Other problems can be treated by arranging for installation of preventive measures like pigging facilities and/or chemical injection equipment. Production chemicals take a special position in the effective management of scale-related problems, because they allow for successful mitigation of problems that cannot be addressed by engineering only. Understanding the true nature of a scale problem is essential to develop a successful and cost-effective strategy for prevention or mitigation.

This session will cover different aspects of scale management. It will particularly look at best practices in actual applications and also set a focus on cost-effectiveness.

1000–1030 | Coffee Break

1030–1200 | Session 5: Get the Drillers On Board—Selection of Optimal Completion Designs to Cater for Flow Assurance Solutions at Different Stages of the Well Life Cycle

Session Chairs: Dalia Abdallah, ADCO; Zaharia Cristea, Schlumberger

Completion is one of the critical activities that enables operators to reach the potential of wells throughout their life cycle. As wells are getting deeper, further, warmer, unconventional, the associated flow assurance challenges at the completion level are becoming more complex, pushing the limits of the technology currently available in the industry. Modern technologies, material and equipment, including reliable downhole sensors, data transfer and executive elements such as ICV/ICD, are available to the oil professional of today, enabling him or her to access productive zones that were inaccessible a few years ago. Therefore, optimal completion design, to account for current and future flow assurance challenges, is an immediate objective for today’s discerning operators. In this session, we shall look into some of the flow assurance challenges experienced at the completion level by operators in the Middle East and globally, and the proposed design solutions to address them.

1200–1300 | Luncheon

1300–1430 | Breakout Session: Mature vs. New Field Flow Assurance Challenges

Session Chairs: Gordon Graham, Scaled Solutions; Myles Jordan, Nalco Champion, an Ecolab company

In this breakout session, we will consider various challenges associated with mature and new field developments.

The session will consider, via open discussion, the evolving flow assurance challenges as existing mature fields are redeveloped or reutilised and will include examples of challenges often faced during different types of field redevelopment. One discussion will consider an existing offshore facility (platform wells) with a seawater flood which later has a new subsea field tied back to the existing process facility on the platform. The host facility has a range of flow assurance challenges including inorganic scale due to injection water breakthrough. The existing production challenges are made worse by the subsea development tie back that includes the risk of wax formation, changes in produced fluid composition leading to corrosion issues, and material selection related challenges to allow downhole chemical injection in the new subsea wells. The second discussion will consider the challenges of introducing artificial lift (such as gas lift and ESPs) coupled with more extensive pressure support such as infill drilling and increased voidage displacement. While the net result is to significantly increase hydrocarbon production, the impact of the measures taken to achieve this and the increased reliance on production chemistry will also be discussed in the workshop.

This session therefore serves to illustrate how the evolution of flow assurance challenges brings into focus the need to plan ahead during field redevelopment and utilise the latest technologies (both equipment and procedures) to enable more effective management during day-to-day operations. Although guided by industry experts, the breakout sessions are designed to bring together experiences from different regions and from a range of different disciplines to
Produced water management is sometimes the “elephant in the room” or rather the “elephant coming to the room” because produced water production scenarios and computer model generated predictions are often optimistically wrong (more real water than forecasted) but seemingly “right” at the time and date of prediction.

These “wrong” predictions create havoc in a system’s designed capacity for handling, treating and disposal/reutilisation of the produced water.

This session will address these four “cornerstones” of the Flow Assurance Produced Water Management “building” and its “roof”, Economics:

1. Production Water Scenarios/Predictions: What can and is being done to improve the forecasting methods and models?
2. Handling Capacities (Subsurface and Surface): What design guidelines are in place to ensure that enough capacity is installed throughout the project’s life cycle?
3. Treatment: What treatments are forecasted and applied to both downhole and surface to avoid and/or mitigate all the drawbacks effects of water production, like corrosion, scale depositions, emulsions, etc. and prepare the produced water for further usage?
4. Disposal and Reutilisation: What are the best methods of disposal and reutilisation and what are the required water qualities compatible with shallow or deep disposal or other surface utilisation?
5. Economics: What are the most economic methods and processes in the market to reduce, handle, treat and dispose the produced water onshore and offshore?
# REGISTRATION FORM

**SPE Flow Assurance and Production Chemistry Workshop: How to Minimise Downtime, Enhance Production and Improve Operations from Wells and Facilities**

15–16 February 2016  Jumeirah at Etihad Towers | Abu Dhabi, UAE  www.spe.org/events/16aab2

Attendance is limited and is not guaranteed. Early registration is recommended. Please print or type in black ink.

## IMPORTANT:
Registration fee MUST be paid in advance for attending the workshop.

## WORKSHOP FEE:

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**Workshop fee includes:**
Technical sessions, materials, daily coffee breaks and luncheons, certificate of Continuing Education Units (CEU), and welcome reception and dinner (if applicable). Accommodation is NOT included in the workshop registration fee.

## IMPORTANT:
All SPE Middle East rates are net of taxes. The fees in this form do not include any local or withholding taxes. All such taxes will be added to the invoice.

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**Online:** www.spe.org/events/16aab2

**Email to:** registrationdubai@spe.org

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**Visa:** SPE Middle East, North Africa, and South Asia will assist in providing a visa invitation letter, upon request in writing, to confirmed registrants after receiving full payment of registration fees. Visa invitation letters take five days to issue from the date of request and it is the delegate’s responsibility to obtain their own visa. SPE cannot issue the visa nor can we guarantee it will be obtained.

**Questions:** Contact Yasmin Shaikh, Event Manager, at yshaikh@spe.org.

### REGISTRATION FORM

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**DO YOU WISH TO PRESENT A POSTER? (SUBJECT TO SELECTION)**

| ○ Yes | ○ No |

**DO YOU WISH TO BE CONSIDERED A DISCUSSION LEADER? (SUBJECT TO SELECTION)**

| ○ Yes | ○ No |

If yes, please indicate the subject on which you would like to present:

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- No refund on cancellations received within seven (7) days prior to the workshop date, i.e. on or after 8 February 2016.
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