SPE INTERNATIONAL
Oilfield Scale
CONFERENCE AND EXHIBITION
20 – 21 June 2018 | Aberdeen, UK | www.spe.org/go/18oss
WELCOME FROM THE CONFERENCE CHAIR

Dear Colleague,

On behalf of the Society of Petroleum Engineers (SPE) and the Programme Committee, it gives me great pleasure in welcoming all delegates to the 14th SPE International Conference and Exhibition on Oilfield Scale.

The event has a reputation for being the leading global event pertaining to scale. It offers an unrivalled opportunity to share scale expertise, from the latest research into fundamental principles onwards to cutting edge developments through your hands on experience of the field. I would like to thank and acknowledge all authors who submitted proposals to the conference. There was, yet again, a record number of abstracts submitted which made selection of papers and posters particularly challenging and has led to a rich and exciting programme of presentations. To the authors and presenters I wish to extend my congratulations and gratitude for helping to make this event a success.

While our understanding of the factors that influence inorganic scale formation and control are constantly improving, more extreme environment for hydrocarbon recovery continue to emerge. These environmental challenges include physical properties such as high pressure/temperature, high total dissolved solids and high pH, location in the form of Deepwater wells with complex subsea architecture to unconventional long reach horizontal wells are now combined with the current challenge of reducing operational costs at a relatively low oil price.

Now held every two years along with a workshop during alternate years, the event offers an unrivalled opportunity to share your scale expertise, from the latest research into fundamental principles onwards to cutting edge developments through your hands on experience of the field.

We look forward to meeting you in Aberdeen in June 2018.

Myles Jordan, Nalco Champion, an Ecolab Company

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Reasons to attend

**ENHANCE** your knowledge through the industry expert keynote and technical sessions with high-level speakers from oil and gas industry operators and service providers

**INCREASE** your network by connecting with E&P professionals working on developments in inorganic scale control chemicals and application programmes

**UNDERSTAND** the current and future challenges presented by brown and green field developments both onshore and offshore

**EMBRACE** new ideas and adopt new approaches to doing business in the current lower oil price environment

**INVEST** in yourself and be a part of a selected group of influencers and decision makers

Who should attend

- Academics and students
- Chemical vendors and manufacturers
- Process and project engineers
- Production chemists and engineers
- Consultants
- Researchers and scientists

ATTENDEE JOB CLASSIFICATION*

- Engineer 35%
- Senior Manager 25%
- Operations/Production Chemist 12%
- Technical Manager 9%
- Academic/Research 8%
- Consultant 6%
- Scientist 4%
- Student 1%

*Based on attendees from the 2016 SPE International Oilfield Corrosion Conference and Exhibition
Schedule of Events

**Wednesday 20 June 2018**

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<td>0830 – 0900</td>
<td><strong>Keynote Address:</strong> Rigorous Carbonate and Sulphide Scale Predictions: What Really Matters?</td>
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<td>Technical Session 1: Sulphide Scale Formation and Control</td>
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<td>1030 – 1100</td>
<td>Coffee Break and Poster Session</td>
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<td>1100 – 1230</td>
<td>Technical Session 2: New Inhibitor Test Methods and Molecules</td>
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<td>1230 – 1330</td>
<td>Lunch and Poster Session</td>
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<tr>
<td>1330 – 1500</td>
<td>Technical Session 3: Developments in Scale Predictions</td>
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<td>1500 – 1530</td>
<td>Coffee Break and Poster Session</td>
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<td>1530 – 1700</td>
<td>Technical Session 4: Produced Water Sample Handling and Analysis Methods</td>
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**Thursday 21 June 2018**

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<tr>
<td>0800</td>
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<tr>
<td>0830 – 0900</td>
<td><strong>Keynote Address:</strong> Halite Challenges and Mitigation In The Bakken- Experience of Managing High Saline Produced Water from Hydraulic Fractured Wells</td>
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<td>0900 – 1030</td>
<td>Technical Session 5: Halite and Other Exotic Scale Challenges</td>
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<td>1100 – 1230</td>
<td>Technical Session 6: Scale Management Methods</td>
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<td>1330 – 1500</td>
<td>Technical Session 7: Squeeze Simulation and Application of Reservoir Simulation Methods</td>
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<tr>
<td>1500 – 1530</td>
<td>Coffee Break and Poster Session</td>
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<tr>
<td>1530 – 1700</td>
<td>Technical Session 8: Scale Management in Carbonate Reservoirs and MEG Regeneration Systems</td>
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Programme Committee

**Conference Chair**
Myles Jordan, Nalco Champion, an Ecolab Company

Hamad Al-Saiani, Saudi Aramco
Salima Baraka-Lokmane, Total
Stuart Brice, Maersk Oil
Ping Chen, Halliburton
Stephanie Edmunds, Solvay UK
Hua Guan, OneSubsea
Stephan Hatcher, Wintershall
Stephen Heath, Baker Hughes, a GE Company
Michael Jensen, Hess
Amy Kan, Rice University
Marija Kilibarda, Aker BP
Ji-Young Lee, Shell
Haiping Lu, Baker Hughes, a GE Company

SPONSORSHIP/EXHIBITING OPPORTUNITIES

Sponsorship and exhibiting at this prestigious international gathering provide a cost-effective opportunity to gain maximum exposure to professionals from the oilfield scale community who will be looking to short-list potential suppliers and consultants for their own projects. As well as being a great way to gain exposure to your target market, sponsorship and exhibiting revenues contribute significantly to the work of the SPE helping to cover event costs and keep the delegate fee low.

**Sponsorship**
Sponsorship options are available at the conference to enable you to maximise your presence in the industry and strengthen your brand identity. Packages are designed to offer branding both in the run-up to and at the event itself as well as including a number of complimentary delegate places.

**Exhibiting**
A limited number of exhibition spaces are available at the event. The exhibition will be located in the area where teas, coffees, lunches and the poster sessions will take place.

A 15% discount applies to sponsors and exhibitors at both the SPE Oilfield Scale Conference AND the SPE Oilfield Corrosion Conference.

Please contact us to find out more about the options available:
Dean Guest
Sales Manager–Events, Europe
Tel + 44 (0) 207 299 3300
Email: dguest@spe.org
CONFERENCE PROGRAMME

June 20

Keynote Address: Giulia Verri Ness, Heriot-Watt University

Rigorous Carbonate and Sulphide Scale Predictions: What Really Matters?

Predicting the formation of pH-dependant scales such as carbonates and sulphides requires a full study of all hydrocarbon and aqueous phases present to determine the distribution and speciation of CO₂ and H₂S in the system. Several commercially available software packages combine PVT calculations with scale predictions, but packages more targeted to aqueous systems have limited hydrocarbon capabilities. Likewise, PVT modelling software focusing on the hydrocarbon phase does not always fully model the aqueous phase or can only predict a limited number of scales/complexes. Moreover, within each software a large number of different Equations of State (EOS), activity models, parameters etc., which ultimately impact the final carbonate and sulphide scale prediction profile can be selected by the user.

The results to be presented will show that despite the large number of modelling options available, there are two parameters that play a key role in pH-dependant scale predictions: partition coefficients of CO₂ and H₂S between gas, oil and water and the relative mole (and volume) distribution between each phase at selected temperature and pressure. The final scale prediction results can be accurate only when these values are accurate, irrespective of how they are obtained.

Technical Session 1

Sulphide Scale Formation and Control

Session Chairs: Caroline Simpson, Scaled Solutions, Helen Williams, Nalco Champion

Sulphide scales are an ever increasing challenge in the oil and gas production, with some more challenging than others to mitigate with chemicals. In addition, removal of sulphide scales can be extremely difficult, and as such there is a real need for industry focus for new understanding and technologies in this area. It is recognised that there is a knowledge gap in comparison to the more conventional scales, in the understanding of the scale formation, deposition and mitigation aspects. This session explores advancements made in the understanding of sulphide scale precipitation, deposition and mitigation, as well as chemical development methods, and the effect of testing in multiphase conditions and the potential of surface coatings in combating adhesion of scale.

Technical Session 2

New Inhibitor Test Methods and Molecules

Session Chairs: Stephanie Edmunds, Solvay UK and Eric Mackay, Heriot-Watt University

This session recognises the ongoing scale inhibition challenges faced by production chemists and a desire to investigate new solutions to existing scale problems. Papers presented relate to a new test method and its applicability to specific field applications, performance of a new molecule to prevent calcium carbonate/sulphate scale whilst meeting environmental compliance (OECD306) and the evaluation, including field trial, of iron tolerance for a scale inhibitor used in conventional production and also fracturing completions.

Technical Session 3

Developments in Scale Predictions

Session Chairs: Hua Guan, OneSubsea and Marija Kilibarda, Aker BP

This session gives an insight into the recent developments within scale predictions. Scale predictions are important tools to more accurately evaluate the scaling risk, design scale inhibitor treatments, and predict fresh water breakthrough. It is an essential tool to handle scale issues in increasingly harsher environments, such as ultra-high temperature, pressure and complex ion conditions. Challenges associated with the impact of very high calcium concentrations on sulphate scale predictions at high temperature is one of the focuses of this session; in addition, there will be an interesting presentation regarding the kinetic effects into the thermodynamic modelling of CaCO₃ scale.
1530 – 1700

Technical Session 4
Produced Water Sample Handling and Analysis Methods

Session Chairs: Stephen Heath, Baker Hughes, a GE Company and Eyvind Sørhaug, Repsol Exploration

To prevent scale formation and deposition in oil fields reliably and cost efficiently, it is imperative to know the correct water chemistry throughout the production system and the level of protection provided by scale inhibitors used in scale inhibitor squeeze treatments. This session addresses these issues by presenting improved as well as new methods for analysing scale inhibitors returning from scale inhibitor treatments more accurately, a new methodology for determining formation water compositions contaminated with drilling mud filtrate and a review of sample preservation techniques.

Thursday 21 June

0830 – 0900

Keynote Address: Nan Zhang, Statoil

Halite Challenges And Mitigation In The Bakken-Experience Of Managing High Saline Produced Water From Hydraulically Fractured Wells

Produced water from the Bakken and Three Forks formation in the Williston Basin is notably high in total dissolved solids, which leads to many well maintenance issues related to halite scaling. Freshwater is widely used to prevent halite scaling; however, an efficient and practical halite scale management program is highly desirable to manage operation and maintenance costs. The programme includes identification of wells that need freshwater injection; optimisation of the fresh water volumes; minimising deferred oil production; and preventing other scales associated with the presence of fresh water in the wellbore. Developing a reliable scaling prediction model was challenging due to inconsistency of produced water composition of individual wells, limited reservoir fluid composition data and high sensitivity of halite scaling risk to slight changes of halite saturation index.

The output of this study resulted in optimising both freshwater and chemical treatment programs to minimise halite scaling. Significant cost savings have been achieved from reduced freshwater usage, thereby resulting in lowered produced water disposal. Continuous freshwater injection systems were proven to actively control the ratio of freshwater to production water and achieve additional cost reductions.

0900 – 1030

Technical Session 5
Halite and Other Exotic Scale Challenges

Session Chairs: Myles Jordan, Nalco Champion, an Ecolab Company and Stephan Hatscher, Wintershall

Halite scale has come into focus increasingly over the last two decades, predominantly for gas and unconventional onshore hydrocarbon wells. Silicates as scaling species have entered our perception through enhanced oil recovery techniques, such as alkaline as well as steam flooding. With our awareness raised, both scale types are identified as flow assurance challenges that require effective control options.

This session will contain presentations on practical experiences, and laboratory testing of chemicals as well as some fundamental insights into the formation/control of exotic scales. There will be operational case studies on inhibitor applications, as well as new laboratory methodologies to evaluate scale inhibition and understand the scaling process for those unconventional scales.

1100 – 1230

Technical Session 6
Scale Management Methods

Session Chairs: Ross McCartney, Oilfield Water Services and Olav Martin Selle, Statoil

In this session, a broad range of scale management topics will be presented. The first covers the laboratory work undertaken to qualify a scale inhibitor to prevent scale formation when an operator had to change from low sulphate seawater (LSSW) mixed with produced water (PW) for injection source to a blend of LSSW/PW and seawater (SW). The second summarises an operator’s successful efforts to produce more water from their sulphate-reduction units, whilst optimising the quantity and type of scale inhibitors used (with a priority given to green chemicals). Finally, a comprehensive review of non-chemical methods for downhole scale control will be presented, including how they can minimise or alleviate the need for downhole chemical treatments.
Technical Session 7

Squeeze Simulation and Application of Reservoir Simulation Methods

Session Chairs: Ping Chen, Halliburton and Wei Wei, Chevron

Numerical simulation approaches have been widely used in various processes of the scale control management. In this session, three papers representing the recent technology development in this area cover three different processes as follows:

(i) Effect of Squeeze Treatment Stages Mixing during Injection on Lifetime
(ii) Simulating Squeeze Treatments in Wells Completed with Inflow Control Devices
(iii) Impact of Polymer EOR and Salinity on Barium Sulphate Scale Risk

On two alternate presenting papers, one presents scale inhibitor squeeze treatment simulation with tracer programme design and another shows a simulation study for scale management during shale gas production.

Regional and Knowledge and Sharing Poster Sessions

In addition to the papers which are presented at the conference, a number of additional papers are available and will be presented in poster format.

These technical poster cover a wide range of topics and represent multiple demographic areas. Poster presenters will be available for questions and discussion at their designated session, spread over the coffee breaks.

We hope you enjoy this additional opportunity for learning.

To view the latest conference programme please visit:
Monday 18 and Tuesday 19 June 2018

Understanding Inorganic Scaling—Mechanisms, Control and Management

Description
This two-day course is an introduction to inorganic scaling. It includes an overview of the different types of inorganic oilfield scales encountered during production, and the various methods used to control them. Field examples will illustrate the importance of an effective scale management strategy.

Topics Include:
• Why scale forms and how to treat it, including both chemical and engineering solutions
• Conventional acid soluble scales (carbonates) and non-acid soluble scales (sulphates) as well as other less common scales such as sulphides
• The chemistry of scale inhibition as well as the benefits and limitations of different chemical inhibitors
• The squeeze process, the mechanisms involved, and the various chemical and reservoir factors that control the treatment lifetime, as well other chemical deployment methods such as continuous injection, etc.

Learning Objectives:
• Scale removal, including both mechanical and chemical methods
• The influence of initial field design and varying production conditions on the control of inorganic scales
• The use of modelling tools such as scale prediction software, reservoir simulators and near well-bore treatment models
• A technical, economic, and risk-based analysis process for estimating total field scale management costs for new field developments

Throughout the course extensive reference is made to real field case studies and other published works to illustrate the importance of the various aspects covered.
REGISTRATION DETAILS

All fees shown below are in pounds (GBP) and subject to 20% local tax. Prices exclude accommodation.

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<th>Full Conference</th>
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<tr>
<td>SPE Member</td>
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<tr>
<td>Non-Member</td>
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<tr>
<td>Author/Speaker/Committee/Session Chair</td>
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<td>Student</td>
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| JOINT SPE International Oilfield Corrosion and Scale Conferences and Exhibitions |
| SPE Member                      | GBP 990       |
| Non-Member                      | GBP 1150      |
| Student                         | GBP 500       |

Delegate Registration Fee

The registration fee includes: entry to all conference sessions, entry to the exhibition; access to all poster displays, a copy of the conference digital proceedings, coffee break refreshments and lunches, and attendance at the reception and dinner on 20 June.

The JOINT registration fee includes entry to both Oilfield Corrosion and Scale Exhibitions, conferences, poster sessions, coffee breaks, lunches and conference receptions (on 18 and 20 June). Joint registrants will also receive a copy of the Oilfield Corrosion and Scale digital conference proceedings.

Refunds

Cancellations must be submitted in writing to the SPE Office in London. Cancellations prior to 19 April 2018 will receive a refund less a GBP 50 handling fee. Cancellations received on or between 19 April 2018 and 21 May 2018 inclusive, will receive a 50% refund. For cancellations after 21 May 2018, no refunds will be paid although substitutions can be made.

This refund Policy applies to all refunds except in the event that the UK Foreign & Commonwealth Office issues or designates an “Advise against all travel” travel advisory for Aberdeen and/or the United Kingdom for the dates of the event. In the event of a Travel Advisory, (i) SPE may, at its sole option, change the location and/or dates of the event (“Relocated Event”) and, (ii) delegates may, at their sole option, request a full refund without penalty or, in the event of a Relocated Event, have the registration transferred to the Relocated Event.

In the unlikely case of cancellation of an event by SPE, SPE shall not accept liability for any consequential loss and shall have no liability to reimburse any other costs that may have been incurred, including transport costs, accommodation etc. SPE encourages delegates to take out travel insurance when making travel and accommodation arrangements.

Visa information

Attendees from countries that require a UK visa for entry are reminded that the process of obtaining a visa may take several months. Please contact FormsLondon@spe.org for a visa invitation letter you can use in obtaining a visa. Please note that this letter does not guarantee that you will be granted a visa, nor does it commit SPE to assist you in obtaining a visa.

Badge Pickup

Badges will be available for pick up on-site at the registration desk.

Questions?

If you have any questions, please contact FormsLondon@spe.org or +44(0) 20 7299 3300

Sustainability Statement

SPE is committed to ensuring that the environmental impact of our events is kept to a minimum. We aim to make progress in the field of sustainability through reducing energy usage, promoting eco-friendly mobility, reducing water consumption, and limiting waste, all core values in keeping with those of the oil and gas industry.

About SPE

The Society of Petroleum Engineers (SPE) is a not-for-profit professional association whose members are engaged in energy resources development and production.

SPE serves more than 158,000 members in 143 countries worldwide. SPE is a key resource for technical knowledge related to the oil and gas exploration and production industry and provides services through its publications, events, training courses, and online resources at www.spe.org.
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