Introducing unique XPLOR™ dry emulsifiers from Georgia-Pacific Chemicals.

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- Creates a stable and strong diesel-, mineral oil- or synthetic-based drilling fluid

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Dear Colleagues

We are pleased to welcome you to the 2015 SPE International Symposium on Oilfield Chemistry at The Woodlands Waterway Marriott Hotel. This venue has been our location of choice for the last several symposia.

Chemistry governs both the properties and behavior of all oilfield fluids, and chemical additives and their applications play a critical role in all phases of oil and gas operations.

This symposium serves a fundamental role as a key event designed to disseminate sound oilfield chemistry technologies.

Focused on new and emerging chemical technologies with papers that cover laboratory studies, simulations, and field applications; technical sessions will consist of oral presentations and knowledge sharing ePosters, supplemented by full manuscripts of the symposium proceedings in PDF format.

Monday’s keynote luncheon speaker is Professor Eric Mackay of the Institute of Petroleum Engineering at Heriot-Watt University. Eric’s presentation, “Subsurface Water Management: Past, Present, and Future” will discuss the past growth of water production, the changing constraints in the present, and the future use of water in the subsurface. Oilfield chemistry will play an important role in determining the outcome.

Join us on Monday evening for the networking welcome reception. It will be a great opportunity to establish relationships with new colleagues and re-enforce existing relationships with friends.

Exhibits will be open during the symposium for you to explore innovative products and services that support oilfield chemistry requirements.

On behalf of the program committee, we hope you enjoy the 2015 SPE International Symposium on Oilfield Chemistry!

Mingdong Yuan
Program Committee Chairperson
Chevron
Program Committee

Mingdong Yuan
Chairperson
Chevron

Gary Jenneman
Vice Chairperson
ConocoPhillips

Syed Ali
Schlumberger

Edward Burger
EB Technologies Inc.

Dave Burnett
Texas A&M University

Julie Fidoe
Nalco Champion

Gary Funkhouser
Halliburton

Carmen Garcia
Repsol

Andre Gokool
BP

Gordon Graham
Scaled Solutions

Aly Hamouda
University of Stavanger

Jamal Jamaluddin
NEXT, a Schlumberger Company

Myles Jordan
Nalco Champion

Bayram Kalpakci
Anadarko

Cornelis Kuijvenhoven
Shell

Robert Lane
Texas A&M University

Stan McCool
University of Kansas

Anthony Mitchell
Statoil

Javad Paktinat
Anadarko

Arvind Patel
Retired Advisor

Sunder Ramachandran
Aramco Services Company

Mathew Samuel
Weatherford

Tom Strom
University of Texas at Arlington

Jonathan Wylde
Clariant

Greta Zornes
ConocoPhillips

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THIS IS CLARIANT OIL SERVICES:
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Clariant Oil Services provides well service additives, production and pipeline chemicals and specialty services to the international oil and gas industry. Innovation is the means by which we satisfy the unmet needs of our customers.

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OIL.CLARIANT.COM/INNOVATION
General Information

Registration
Registration will be available in the Waterway Foyer beginning Sunday, 12 April at 1400.

Registration Hours
- Sunday, 12 April: 1400–1800
- Monday, 13 April: 0700–1700
- Tuesday, 14 April: 0730–1700
- Wednesday, 15 April: 0730–1000

Speaker Check-In
Speaker check-in is located in Cochran’s Crossing. Speakers are requested to check in prior to reporting to their assigned session room.

Speaker Check-In Hours
- Sunday, 12 April: 1400–1800
- Monday, 13 April: 0700–1700
- Tuesday, 14 April: 0730–1700
- Wednesday, 15 April: 0730–1200

Monday Keynote and Tuesday Networking Luncheons
The keynote luncheon will be held from 1200 to 1315 hours on Monday in Waterway 4. The networking luncheon will be held from 1200 to 1315 hours on Tuesday in Waterway 4. All registration types include access to the keynote and networking luncheons.

Monday Night Reception
We invite you to the welcome reception with complimentary drinks and hors d’oeuvres, scheduled from 1700 to 1830 hours on Monday in Waterway 5. All registration types include access to the reception.

Exhibition Hours
Located in Waterway 5
- Monday, 13 April: 0930-1200, 1300-1830
- Tuesday, 14 April: 0930-1530

Consent to Use of Photographic Images
Attendance at or participation in SPE meetings and other activities constitutes an agreement by the registrant to SPE’s use and distribution of the registrant’s image or voice in promoting future SPE meetings in any way SPE deems appropriate.

Copyright Information
All symposium sessions are protected by US copyright laws. Photography and audiovisual recording of any kind are strictly prohibited in the sessions and throughout the exhibition area.

Proceedings
One copy of the proceedings is included in the full symposium registration fee. Additional copies of proceedings can be purchased at the registration counter.
- Members: USD 50
- Nonmembers: USD 75

Papers
Papers are available at OnePetro, an online library of technical literature for the E&P industry; with contributions from 18 publishing partners and providing access to over 160,000 items. To find more visit www.onepetro.org.

Parking
Parking:
- Note: Please do not park in the movie theater parking lot nearby as it is a tow away zone for non-patrons. It is not a parking lot for The Woodlands Waterway Marriott Hotel and Convention Center.
Increase production and reduce maintenance costs with our unique proppant-delivered scale inhibition treatment

SCALEGUARD® proppant-delivered scale-inhibiting technology is an encapsulated ceramic proppant infused with scale inhibiting chemicals to maintain optimum production and recovery rates from scale-prone wells, while reducing production maintenance costs.

SCALEGUARD technology can be blended with any product from our high performance proppant portfolio, without compromising the high conductivity of the proppant pack.

Now you can avoid the downtime and cost associated with scale cleanup, removal and disposal, all from a single, cost-effective treatment while you frac.

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Keynote Luncheon
Subsurface Water Management: Past, Present, and Future
Monday, 13 April | 1200-1315 | Waterway 4 Ballroom

Keynote Speaker:
Eric Mackay, Foundation CMG Chair, Reactive Flow Simulation
Institute of Petroleum Engineering Heriot-Watt University

Water management has always had its place in hydrocarbon production. It is becoming increasingly important as basins mature and water cuts increase, as water becomes a more precious commodity, and as the environmental impact of the hydrocarbon production industry comes under greater scrutiny. Oilfield chemistry plays an important role in the outcome.

The appropriate use of water chemistry may hold the key to extending current production and unlocking new resources. Even with these new opportunities, consideration must be given to the optimal and sustainable use of resources in a balanced way. This presentation will reflect on the past growth and management of water production, the current, changing constraints, and the future use of water in the subsurface.

Knowledge Sharing ePosters

Monday, 13 April
1000–1030 and 1500–1530

Tuesday, 14 April
1000–1030 and 1500–1530

Wednesday, 15 April
1000–1030

Session Chairpersons: Edward Burger, EB Technologies Inc.; Carmen Garcia, Repsol; Aly Hamouda, University of Stavanger; Jamal Jamaluddin, Next, a Schlumberger Company; Gary Jenneman, ConocoPhillips; Stan McCool, University of Kansas; Mathew Samuel, Weatherford; and Mingdong Yuan, Chevron.

Society of Petroleum Engineers

The Society of Petroleum Engineers (SPE) is a not-for-profit organization. Income from this event will be invested back into SPE to support many other society programs. When you attend an SPE event, you help provide even more opportunities for industry professionals to enhance their technical and professional competence. Find more at www.spe.org.
Global Knowledge, Local Application, World-Class Performance.

Nalco Champion, an Ecolab company, provides safe, sustainable chemistry programs and services to the upstream and midstream oil and gas industry, refineries and petrochemical operations. Through onsite problem solving and the application of innovative technologies, we maximize production, optimize water use and overcome complex challenges in the world’s toughest energy frontiers.

Together, We’re Taking Energy Further.

950+
INDUSTRY PATENTS

450+
GLOBAL RD&E ASSOCIATES

13
TECHNOLOGY CENTERS

nalcochampion.ecolab.com
# Schedule of Events

## Monday, 13 April

<table>
<thead>
<tr>
<th>Time</th>
<th>Waterway 6-8</th>
<th>Montgomery Ballroom</th>
</tr>
</thead>
<tbody>
<tr>
<td>0830-1200</td>
<td>Session 1 - Chemistry and Additives in Drilling, Cementing, and Completion</td>
<td>Session 2 - Inorganic Scales I</td>
</tr>
<tr>
<td>0930-1830</td>
<td>Exhibition (Waterway 5)</td>
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<tr>
<td></td>
<td>(Closed from 1200-1300)</td>
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<tr>
<td>1000-1030</td>
<td>Coffee in Exhibition (Waterway 5)</td>
<td>Knowledge Sharing ePosters (Waterway 6-8 Foyer)</td>
</tr>
<tr>
<td>1200-1315</td>
<td>Keynote Luncheon - Professor Eric Mackay, Heriot-Watt University</td>
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<tr>
<td></td>
<td>(Waterway 1-4)</td>
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<tr>
<td>1300-1330</td>
<td>Session 3 - Improved Oil Recovery Using Surfactants and Polymers</td>
<td>Session 4 - Inorganic Scales II</td>
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<tr>
<td>1330-1700</td>
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<tr>
<td>1500-1530</td>
<td>Coffee in Exhibition (Waterway 5)</td>
<td>Knowledge Sharing ePosters (Waterway 6-8 Foyer)</td>
</tr>
<tr>
<td>1700-1830</td>
<td>Welcome Reception (Waterway 5)</td>
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## Tuesday, 14 April

<table>
<thead>
<tr>
<th>Time</th>
<th>Waterway 6-8</th>
<th>Montgomery Ballroom</th>
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</thead>
<tbody>
<tr>
<td>0830-1200</td>
<td>Session 5 - Hydraulic Fracturing and Acidizing Fluid Chemistry and Additives I</td>
<td>Session 6 - Asset Integrity Management</td>
</tr>
<tr>
<td>0930-1530</td>
<td>Exhibition (Waterway 5)</td>
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<tr>
<td>1000-1030</td>
<td>Coffee in Exhibition (Waterway 5)</td>
<td>Knowledge Sharing ePosters (Waterway 6-8 Foyer)</td>
</tr>
<tr>
<td>1200-1315</td>
<td>Networking Luncheon (Waterway 1-4)</td>
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<tr>
<td>1330-1700</td>
<td>Session 7 - Hydraulic Fracturing and Acidizing Fluid Chemistry and Additives II</td>
<td>Session 8 - Flow Assurance</td>
</tr>
<tr>
<td>1500-1530</td>
<td>Coffee in Exhibition (Waterway 5)</td>
<td>Knowledge Sharing ePosters (Waterway 6-8 Foyer)</td>
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## Wednesday, 15 April

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<tr>
<th>Time</th>
<th>Waterway 6-8</th>
<th>Montgomery Ballroom</th>
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<tbody>
<tr>
<td>0830-1200</td>
<td>Session 9 - Water Treatment and Management</td>
<td>Session 10 - New Chemical Technologies and Applications</td>
</tr>
<tr>
<td>1000-1030</td>
<td>Knowledge Sharing ePosters and Coffee Break (Waterway 6-8 Foyer)</td>
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Introducing
Lubrizol Oilfield Solutions

Lubrizol’s acquisition of Weatherford’s Engineered Chemistry and Integrity Industries brings together the industry’s leading developers of specialized chemical solutions for the oil and gas markets.

Our technological advancements and complex fluid formulations are the result of close collaboration with our oilfield customers, optimizing their performance in the following applications:

- Stimulation Chemicals
- Cementing Chemicals
- Drilling Fluids and Chemicals
- Biocides
- Corrosion Inhibitors
- Scale Inhibition Solutions
- Flow Assurance Chemicals
- Industrial Chemicals
- Pipeline Flow Improvers
- Phase Separation Chemicals
- Sand Control Chemicals
- Water Conformance Solutions
Technical Program  (As of 23 February 2015 | Subject to Change)

Monday | 13 April | 0830–1200

01 Chemistry and Additives in Drilling, Cementing, and Completion

Topics include new fluid loss materials for drilling and cementing, organic clay stabilizers, additives to improve cementing in horizontal wells and to improve cement-to-shale bonding, and water-based drilling fluid for extremely high temperature wells.

Session Chairperson(s): Robert Lane, Texas A&M University; Arvind Patel, Retired Advisor

<table>
<thead>
<tr>
<th>TIME</th>
<th>PAPER #</th>
<th>PRESENTATION</th>
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</table>
| 0830  | 173796  | Temperature-Induced Changes in the Solved Conformation of Cement Fluid Loss Polymers and the Consequences for Their Performance  
J. Plank, T. Hurnaus, C. Tiemeyer, T. Echt, Technische Universität München |
| 0900  | 173725  | Delayed-Release Suspending Aid Provides Cement-Slurry Stability in High-Temperature, Horizontal Wells  
G.P. Funkhouser, L.M. Leotaud, J. Bratcher, Halliburton |
| 0930  | 173731  | Selection and Application of Organic Clay Inhibitors for Completion Fluids  
S.L. Gomez, A. Patel, M. Ke, M-I SWACO, a Schlumberger Company |
| 1030  | 173773  | High Temperature, High Performance Water-Based Drilling Fluid for Extreme High Temperature Wells  
K. Galindo, W. Zha, H. Zhou, J.P. Deville, Halliburton |
| 1100  | 173802  | Zonal Isolation Improvement through Enhanced Cement-Shale Bonding  
X. Liu, University of Texas at Austin; S.D. Nair, University of Texas At Austin/ Cmssm; K. Cowan, E. van Oort, University of Texas At Austin |
| 1130  | 173758  | Diblock Copolymers: A New Class of Fluid Loss Control Additives for Oilfield Cementing  
A. Cadix, J. Wilson, C. Barthet, C. Phan, SOLVAY Novecare; C. Poix-Davaine, P. Dupuis, Solvay; S. Harrisson, SOLVAY Novecare |

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| 173741 | Formate Brines and Their Crystallization Temperatures – New Insight into Fluid Behavior and Measuring Methodology  
S.K. Howard, Cabot Specialty Fluids; M. Chrenowski, Robert Gordon University |
| 173715 | Development and Application of a State of the Art Fully Synthetic Single Filtration Control Additive Providing Optimum Rheology in WBM: An Innovation for the Medium Temperature Drilling Market  
C.W. Kayser, Clariant Production (D) GmbH; T. Trellekkamp, Clariant Produkte Deutschland GmbH; G. Botthof, Clariant GmbH; M. Schaefer, D. Fischer, C. Diemel, Clariant Produkte Deutschland GmbH; J.J. Wylde, Clariant Oil Services |
| 173764 | Salt Cementing Systems: Effect of Specific Ions on the Performance of High Temperature Cement Fluid Loss Polymers  
T. Echt, T.O. Salami, T. Hurnaus, J. Plank, Technische Universität München |
Technical Program

Monday | 13 April | 0830–1200

02 Inorganic Scales I

Inorganic scale formation during hydrocarbon production can present significant flow assurance challenges. As the industry explores deeper reservoirs with higher temperatures and higher salinity brines, and develops unconventional onshore fields, the scale issues can become more of a challenge to manage effectively. Papers will be presented that investigate the control of scale within high temperature/high pressure fields, fluids with high TDS, and some of the more exotic sulphide scales.

Session Chairperson(s): Myles Jordan, Nalco Champion, An Ecolab Company; Julie Fidoe, Nalco Champion, An Ecolab Company

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<th>TIME</th>
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<tr>
<td>0830</td>
<td>173761</td>
<td>Development and Qualification of New Zinc and Lead Sulphide Scale Inhibitors for Application under Harsh Conditions S. Baraka-Lokmane, Total E&amp;P; C. Hurtevent, Total S.A.; O. Tillement, L’Université de Lyon; C. Simpson, G.M. Graham, Scaled Solutions Limited</td>
</tr>
<tr>
<td>0930</td>
<td>173714</td>
<td>Carbonate Scale Control under High Level of Dissolved Iron and Calcium in the Bakken Formation Y. Peng, Z.D. Yue, C.Q. Ozuruigbo, C. Fan, Halliburton Energy Services</td>
</tr>
<tr>
<td>1030</td>
<td>173771</td>
<td>Mechanisms of Environmentally Acceptable Inhibitors for Zinc Sulphide Scale Inhibition C. Tortolano, Nalco Champion; T. Adenuga, Robert Gordons University</td>
</tr>
<tr>
<td>1100</td>
<td>173769</td>
<td>Interaction between Scale Inhibitors and Shale and Sandstone Formations F. Yan, F. Zhang, N. Bhandari, Y. Liu, L. Wang, Z. Dai, Z. Zhang, V. Bolanos, A.T. Kan, M.B. Tomson, Rice University</td>
</tr>
<tr>
<td>1130</td>
<td>173730</td>
<td>Iron Sulfide Inhibition: Field Application of an Innovative Polymeric Chemical J.J. Wylde, Clariant Oil Services; C. Okocha, Clariant Oilfield Services; M. Bluth, A.J. Savin, B. Adamson, Clariant Oil Services</td>
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<tr>
<td>173770</td>
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<td>Ferrous Iron Impact On Phosphonate And Polymeric Scale Inhibitors At Temperature Ranging From 25 To 70oc Z. Zhang, Rice University; F. Zhang, Rice University Executive Education; Q. Wang, GE Global Research Oil and Gas Technology Center; N. Bhandari, F. Yan, Rice University Executive Education; Y. Liu, Z. Dai, Rice University; L. Wang, Royal Dutch Shell Technology Center; A.T. Kan, M.B. Tomson, Rice University</td>
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</table>
# Technical Program

**03 Improved Oil Recovery Using Surfactants and Polymers**

The presentations of the technical papers will address aspects of improving reservoir oil recovery using surfactants and/or polymers. Topics for surfactant flooding are: surfactant formulations for viscosity enhancement without using polymers; salt-tolerant surfactant formulations; mechanisms of low-salinity waterflooding on surfactant flooding; and the role of low IFT on wettability alteration treatments in oil-wet formations. Topics for polymer flooding are flow and retention properties of polyacrylamide and xanthan solutions, and the effect of low-salinity waterflooding on polymer gel performance.

**Session Chairperson(s):** Stan McCool, University of Kansas; Cornelis Kuijvernhoven, Shell Global Solutions International BV

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<tr>
<th>TIME</th>
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</table>
| 1330  | 173738  | **Formulation of Surfactants for Very Low/High Salinity Surfactant Flooding without Alkali**  
G. Zhang, J. Yu, C. Du, R.L. Lee, New Mexico Petroleum Recovery Research Center |
| 1400  | 173732  | **A New Chemical Enhanced Oil Recovery Method?**  
S. Hosseini Nasab, Delft University of Technology; S. Mirhaj, University of Stavanger; M. Simjoo, Sahand University of Technology; P.L. Zitha, Delft University of Technology |
| 1430  | 173801  | **Low Salinity Surfactant Flooding – A Multi-Mechanistic Enhanced Oil Recovery Method**  
S. Tavassoli, A. Kazemi Nia Korrani, G.A. Pope, K. Sepehrnoori, University of Texas At Austin |
| 1530  | 173797  | **Surfactant-Enhanced Oil Recovery from Fractured Oil-wet Carbonates: Effects of Low IFT and Wettability Alteration**  
P. Chen, K.K. Mohanty, University of Texas At Austin |
| 1600  | 173749  | **Low Salinity Chase Waterfloods Improve Performance of Cr(III)-Acetate HPAM Gel in Fractured Cores**  
B. Brattekas, The National IOR Centre of Norway, Dept. of Petroleum Technology, University of Stavanger; A. Graue, University of Bergen; R.S. Seright, New Mexico Inst-Mining & Tech |
| 1630  | 173728  | **Hydrodynamic Retention and Rheology of EOR Polymers in Porous Media**  
G. Zhang, R.S. Seright, New Mexico Inst-Mining & Tech |

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| 173763  | **Laboratory Investigation on Impact of Reservoir Salinity Variation and Crude Oil Polar Components on Low-Salinity Waterflooding**  
A.M. Shehata, H.A. Nasr-El-Din, Texas A&M University |
| 173760  | **A Field Case Study of Inter-Well Chemical Tracer Test**  
M.L. Sanni, M.A. AlAbbad, S.L. Kokal, Saudi Aramco PE&D; S.K. Hartvig, Restrack AS |
| 173716  | **Investigation on a Novel Polymer with Surfact Activity for Polymer Enhanced CO2 Foam Flooding**  
X. Xu, A. Saeedi, R. Rezaee, Curtin University; K. Liu, Research Inst Petr Expl & Dev |
| 173750  | **Minimizing Surfactant Adsorption Using Polyelectrolyte Based Sacrificial Agent: a Way to Optimize Surfactant Performance in Unconventional Formations**  
K. He, Z. Yue, C. Fan, Halliburton; L. Xu, Multi-Chem, A Halliburton Service |
Technical Program

Monday | 13 April | 1330–1700

04 Inorganic Scales II

This second session of inorganic scaling follows on from the previous themes with a mix of subjects related to advances in scale threat assessment and management. The modeling and assessment of scaling risks continues to be a key focus area for the industry and is well represented in this session. The management of scale in challenging environments is another key theme of the session, with three papers addressing this topic. Finally, several new analytical techniques are presented which have the potential to improve the assessment and management of scaling risks.

Session Chairperson(s): Jonathan Wylde, Clariant Oil Services; Andre Gokool, BP Exploration Operating Co

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<tr>
<th>TIME</th>
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| 1330  | 173739  | Reservoir Simulation and Near-Well Bore Modelling to Aid Scale Management in a Low Temperature Development with Multilateral Wells  
O. Ishkov, E.J. Mackay, O. Vazquez, Heriot-Watt University; M.M. Jordan, Nalco Champion, An Ecolab Company |
| 1400  | 173768  | How To Monitor Scale Inhibitor Squeeze Using Simple Time Resolved Fluorescence Tracers  
M. Martini, O. Tillement, T. Brichart, A. Moussaron, A. Marais, Université Claude Bernard Lyon 1; C. Hurtevent, Total S.A.; S. Baraka-Lokmane, Total E&P |
| 1430  | 173759  | Scale Modeling in Reservoirs: a new Simulation Capability and its Validation with Field Data  
H.J. Chen, W. Shi, Chevron ETC |
| 1530  | 173747  | Selection of Calcite Scale Critical Values for Deepwater Productions  
P. Zhang, BP America Production Co.; K.J. Allan, BP America Inc.; H.M. Bourne, BP Exploration Operating Co |
| 1600  | 173744  | Application of Advanced Mass Spectroscopy Techniques for Improved Scale Management in Conventional and Subsea Fields  
S.M. Heath, B. Juliussen, C. Johnston, A. Thompson, Nalco Champion, An Ecolab Company; T.E. Gundersen, T. Bjellaas, Vitas Analytical Services |
| 1630  | 173712  | Alkalinity in The 21St Century: An Improved Methodology for Carbonate Determination in Oilfield Brines  
R. Fisher, J.M. Palkowetz, C.J. Combes, Baker Hughes |

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| 173803|        | Scale Prediction and Control at Ultra HTHP  
A.T. Kan, Z. Dai, Rice University; F. Zhang, Rice University Executive Education; N. Bhandari, Y. Liu, F. Yan, Z. Zhang, M.B. Tomson, Rice University |
| 173779|        | Application of a Novel Method for Real-Time Monitoring of Scale Control Products at the Site of Use  
Technical Program

Tuesday | 14 April | 0830–1200

05 Hydraulic Fracturing, Acidizing Fluid Chemistry and Additives I

This session has a diverse set of papers which deal with cleanup of fracturing fluid in shale reservoirs, physiochemical interaction of shales with fracturing fluids, crosslinking of guar and guar derivatives with ZrO2 nanoparticles, effect of pressure and temperature on borate-crosslinked fluids, proppant transport properties of guar-based fracturing fluids, and biocides for long-term protection of fracture.

Session Chairperson(s): Syed Ali, Schlumberger; Bayram Kalpakci, Anadarko Petroleum Corporation

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<tr>
<th>TIME</th>
<th>PAPER #</th>
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| 0830 | 173727  | Physicochemical Interactions of Source Rocks with Injected Water-Based Fluids  
Z.R. Abdulsattar, K.K. Agim, R.H. Lane, B. Hascakir, Texas A&M University |
| 0900 | 173778  | Crosslinking of Guar and HPG Based Fracturing Fluids Using ZrO2 Nanoparticles  
T. Hurnaus, J. Plank, Technische Universität München |
| 0930 | 173708  | Unusual High-Pressure Tolerance of Polyboronic Crosslinked Gel under High-Temperature Rheology Condition  
M. Legemah, Q. Qu, H. Sun, M.Q. Vo, L. Li, P.S. Carman, Baker Hughes |
| 1030 | 173726  | Effects of Crosslinking Chemistry on Proppant Suspension in Guar Networks  
T. Hu, Formerly Halliburton; T. Kishore, J. Maxey, Halliburton; D.M. Loveless, Halliburton Energy Services Group |
| 1100 | 173748  | Environmentally-Conscious Biocides for Long-Term Protection of the Fracture  
S.O. N’Guessan, FTS International; J. Raymond, The Dow Chemical Company; R.C. Navarrete, FTS International |
| 1130 | 173755  | Improved Fluid Technology for Stimulation of Ultrahigh-Temperature Sandstone Formation  
J. Rignol, T. Ounsakul, PTTEP; W. Kharrat, D. Fu, Schlumberger; K.T. Ling, Schlumberger WTA Malaysia Sdn Bhd; I. Lomovskaya, P. Boonjai, Schlumberger |

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<tr>
<th>TIME</th>
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| 173745 | 173745 | Viscoelastic Behavior and Proppant Transport Properties of a New High-Temperature Viscoelastic Surfactant-Based Fracturing Fluid  
D.V. Gupta, A.M. Gomaa, P.S. Carman, Baker Hughes |
| 173711 | 173711 | A Novel Emulsified Gelled Acid System Improves the Efficiency of Carbonate Acidizing  
A.S. Zakaria, H.A. Nasr-El-Din, Texas A&M University |
| 173776 | 173776 | Recent Advances in Viscoelastic Surfactants for Improved Production from Hydrocarbon Reservoirs  
K. Hull, M.A. Sayed, G.A. Al-Muntasher, ARAMCO Services Company |
Technical Program

Tuesday | 14 April | 0830–1200

06 Asset Integrity Management

This session has a diverse set of papers dealing with asset integrity. Papers include discussions on sour corrosion and control in HTHP environments, as well as control of H2S using a novel chemical scavenger, or the use of nitrate during produced water reinjection. Papers will also discuss new methods and tools to evaluate control of MIC and souring, corrosion mitigation in deep water, and novel chemicals for controlling corrosion in various oilfield settings.

Session Chairperson(s): Gary Jenneman, ConocoPhillips; Sunder Ramachandran, Aramco Services Company

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<th>TIME</th>
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| 0830  | 173721  | Development of Novel Anti-agglomerant Chemistries with Reduced Localized Corrosion Potential to Stainless and Duplex Steels  
| 0900  | 173713  | Corrosion and Scale Formation in High Temperature Sour Gas Wells: Chemistry and Field Practice  
S. Ramachandran, Aramco Services Company; G.A. Al-Muntasheri, Saudi Aramco PE&D; J. Leal, Q. Wang, Saudi Aramco |
| 0930  | 173740  | Tandem Acidizing-Corrosion Inhibition with Low Risk-Low Toxicity Chelant  
A. Beuterbaugh, A.L. Smith, E.A. Reyes, Halliburton |
| 1030  | 173804  | Development of a Novel Biofilm Testing Method  
C. Keller, B. Geissler, R.M. De Paula, V. Keasler, Nalco Champion, An Ecolab Company |
| 1100  | 173788  | New Hydrogen Sulfide Scavenger Development for Downhole Mixed Production Applications – Lab and Field Data  
| 1130  | 173805  | Advances in Tools for Monitoring Souring and Corrosion in Oil and gas Fields  
G. Voordouw, A. An, D. An, A. Elliott, P. Menon, Y. Shen, University of Calgary; D. Cote, K. Miner, Baker Hughes Canada |

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173777  
A Highly Effective Corrosion Inhibitor Based on Gemini Imidazoline  
J. Yang, RIPED, PetroChina & Xi’an Petroleum University; X. Liu, S. Jia, W. Qin, Xi’an Petroleum University; C. Yin, Tubular Goods R&D Center, PetroChina; C. Liu, Southwest Petroleum University
## Technical Program

**Tuesday | 14 April | 1330–1700**

### 07 Hydraulic Fracturing, Acidizing Fluid Chemistry and Additives II

Papers in this session span a broad range of topics covering new analytical techniques for monitoring scale inhibition, application of chelants in matrix stimulation, microemulsions for improved fluid recovery, and surfactant adsorption on shales.

**Session Chairperson(s):** Javad Paktinat, Anadarko Petroleum Corporation; Gary Funkhouser, Halliburton

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| 1330  | 173784  | Study on Abnormal Viscosity Development in High-TDS Produced Water  
H. Sun, L. Li, Baker Hughes Inc.; J. Mayor, Baker Hughes Solutions; P.S. Carman, Baker Hughes |
| 1400  | 173789  | An Alternative to the Capillary Suction Time Test  
R. Sethi, Schlumberger; J.J. Hinkel, Hinkel & Associates LLC; B.A. Mackay, Schlumberger |
| 1430  | 173751  | New Environmentally Friendly Acidizing Fluid for HP/HT Matrix Acidizing Treatments  
A.I. Rabie, M. Saber, H.A. Nasr-El-Din, Texas A&M University |
| 1530  | 173729  | Microemulsions as Flowback Aids for Enhanced Oil and Gas Recovery after Fracturing. Myth or Reality: A Turnkey Study to Determine the Features and Benefits  
A. Mahmoudkhani, J.J. Wylde, Clariant Oil Services; B. O’Neil, S. Kakadjian, Trican Well Service Ltd.; M. Bauer, Clariant Produkte Deutschland GmbH |
| 1600  | 173774  | Stimulation Of High Temperature Sagd Producer Wells Using A Novel Chelating Agent (glda) And Subsequent Geochemical Modeling Using Phreeqc  
Z. Ouled Ameur, Cenovus Energy Inc.; V. Kudraskou, H.A. Nasr-El-Din, Texas A&M University; J.P. Forsyth, Cenovus Energy Inc; J. Mahoney, Mahoney Geochemical Consulting; B. Daigle, AkzoNobel |
| 1630  | 173753  | Computational Modeling of Temporary Clay Stabilizers Supported by Performance Testing  
C.W. Aften, Q. Ma, ChemEOR |

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| 173794 | A Novel Approach to Crosslink Delay of Low-pH Fracturing Fluid  
P.S. Carman, H. Sun, J. Mayor, Baker Hughes; M. Legemah |
| 173752 | The Evaluation of Polycationic, Carbohydrate-Based Surfactants as Viscoelastic (VES) Fracturing Fluids  
L.L. Whitlock, A. Sanders, P. Knox, Stepan Co. |

Determination of the Reaction Rate of Methanesulfonic Acid Solutions with Calcite Using the Rotating Disk Apparatus  
S.M. Reyath, Texas A&M University Library; H.A. Nasr-El-Din, Texas A&M University
# Technical Program

## Tuesday | 14 April | 1330–1700

### 08 Flow Assurance

This session focuses on a broad range of organic and amorphous deposits including hydrates, asphaltenes, waxes, and schmoo. Advances in the chemical inhibition and factors controlling the formation of these deposits and their detection and characterization in production systems will be presented.

**Session Chairperson(s):** Edward Burger, EB Technologies Inc.; Gordon Graham, Scaled Solutions Limited

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<td>Use of Anti-Agglomerates for Sour Gases, High Water Cuts and its Performance Evaluation</td>
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<td>D.S. Treybig, R. Fowles, D.J. Stannard, C.S. Smith, Weatherford</td>
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<td>1400</td>
<td>173757</td>
<td>Solubility Characterization of Asphaltene Deposits</td>
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<td>E. Rogel, Chevron Corporation; C. Ovalles, M.E. Moir, J. Vien, H. Morazan, Chevron ETC</td>
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<td>1430</td>
<td>173733</td>
<td>Method for Rapid Assessment of Additives to Prevent Asphaltene Precipitation at Reservoir Conditions</td>
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<td>C. Ovalles, Chevron ETC; E. Rogel, Chevron Corporation; H. Morazan, M.E. Moir, Chevron ETC</td>
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<td>1530</td>
<td>173720</td>
<td>Development and Evaluation of Non-Ionic Polymeric Surfactants as Asphaltene Inhibitors</td>
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<td>173799</td>
<td>High Active Aqueous-Based Pour Point Depressants and Wax Inhibitors</td>
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<td>S. Potisek, K. Capaldo, D. Dermody, R. Moglia, K. Ender, Dow Chemical Co.</td>
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<td>1630</td>
<td>173719</td>
<td>Investigation, Classification and Remediation of Amorphous Deposits in Oilfield Systems</td>
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<td>V. Eroini, H. Anfindsen, A.F. Mitchell, Statoil ASA</td>
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<td>The Impact of Clay Type on the Asphaltene Deposition during Bitumen Extraction with Steam Assisted Gravity Drainage</td>
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<td>Y. Unal, T. Kar, A. Mukhametshina, B. Hasçakir, Texas A&amp;M University</td>
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<td>173710</td>
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<td>Development of a Numerical Scheme for Simulation of Asphaltene Dependent Phenomena in Porous Media</td>
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<td>V. Hematfar, Z. Chen, B.B. Maini, University of Calgary</td>
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<td>173775</td>
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<td>Targeting High Molecular Weight Wax</td>
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<td>W. Wei, E. Acosta, K. Gavas, P. Krishnamurthy, Halliburton Energy Services</td>
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Technical Program

Wednesday | 15 April | 0830–1200

09 Water Treatment and Management

Monitoring, sourcing, and treatment of water, both produced and used for primary and secondary recovery, remains a key issue for the industry. Focus on effective re-use and alternative water sources have encouraged progress in knowledge and technology development, which will be the theme of this session.

Session Chairperson(s): Greta Zornes, ConocoPhillips; Anthony Mitchell, Statoil ASA

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<td>Investigation of Microorganisms in a West Texas Oilfield Using Growth and Genetic Testing</td>
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<td>J. Kilbane, Intertek Westport Technology Center; J.J. Wylde, Clariant Oil Services; A. Williamson, Occidental Petroleum Corp.</td>
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<td>0900</td>
<td>173782</td>
<td>Effect of Environmental Parameters on the Stability and Performance of Oil and Gas Biocides</td>
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<td>T. Williams, Dow Microbial Control; C.M. Schultz, The Dow Chemical Company</td>
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<td>0930</td>
<td>173737</td>
<td>Microbial and Formation Damage Assessment of Secondary Treated Sewage Effluent for a Low-Permeability Carbonate Reservoir Water Injection</td>
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<td>P.I. Osode, Saudi Aramco PE&amp;D; T.Y. Rizk, Saudi Aramco; M.A. Al-Obied, M. Alkhaldi, Saudi Aramco PE&amp;D</td>
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<td>1030</td>
<td>173787</td>
<td>Polyethersulfone (PES)/Cellulose Acetate Butyrate (CAB) Hybrid Hollow Fiber Membranes for Organic Matter Removal from Produced Water</td>
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<td>S. Zha, J. Yu, G. Zhang, N. Liu, R.L. Lee, New Mexico Institute of Mining and Technology</td>
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<td>1100</td>
<td>173762</td>
<td>Efficient Si Removal from Recycled Water for Steam Injection Using Unique Electrocoagulation Process</td>
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<td>J. Cao, Baker Hughes Oilfield Opns; S.P. Monroe, Baker Hughes Inc</td>
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<td>1130</td>
<td>173717</td>
<td>Achieving Water Quality Required for Fracturing Gas Shales: Cost Effective Analytic and Treatment Technologies</td>
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<td>D.B. Burnett, F.M. Platt, C. Vavra, Texas A&amp;M University GPRI</td>
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<td>ALTERNATE</td>
<td>173786</td>
<td>Magnetic Nanoparticles for an Efficient Removal of Oilfield Contaminants: Modeling of Magnetic Separation and Validation</td>
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<td>V. Prigiobbe, C. Huh, The University of Texas At Austin; M.V. Bennetzen, Maersk Oil Research &amp; Technology Centre; S. Bryant, Q. Wang, S. Ko, The University of Texas at Austin</td>
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<td>173746</td>
<td>173746</td>
<td>How Extremely High-TDS Produced Water Compositions Affect Selection of Fracturing Fluid Additives</td>
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<td>L. Li, Q. Qu, H. Sun, J. Zhou, M. Legemah, Baker Hughes</td>
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<td>173783</td>
<td>173783</td>
<td>First 100% Reuse of Bakken Produced Water in Hybrid Treatments Using Inexpensive Polysaccharide Gelling Agents</td>
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<td>B.W. McMahon, B.A. Mackay, A. Mirakyan, Schlumberger</td>
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<td>173742</td>
<td>173742</td>
<td>Treatment of Produced Water By Using Chelating Resins – Laboratory Case Study</td>
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## Technical Program

### Wednesday | 15 April | 0830–1200

### 10 New Chemical Technologies and Applications

The papers in this section range from reports on basic science research through field implementation of commercial processes using new chemical packages. Fundamental issues are addressed in basic science of brine oil interactions and in behavior of nanoparticles in porous media. Elsewhere, authors address inhibition of oxygen corrosion, scale prevention in field applications, use of delayed acid placement techniques, technology to crosslink guar in 100% produced water, and a new technology for biological control in fracturing operations.

**Session Chairperson(s):** Tom Strom, University of Texas Arlington; David Burnett, Texas A&M University

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| 0830 | 173734  | **Core-Shell Systems for Delayed Delivery of Concentrated Mineral Acid**  
L. Johnson, S. Shepherd, G. Rothrock, Research Triangle Institute International;  
A.J. Cairns, G. Al-Muntasheri, Aramco Services Company |
| 0900 | 173781  | **Propagation of Carbon Nanotube Hybrids through Porous Media for Advancing Oilfield Technology**  
M. Kadhum, D. Swatske, C. Chen, D. Resasco, J. Harwell, B. Shiau, University of Oklahoma |
| 0930 | 173792  | **Effective Scale Prevention Using Chemically Infused Proppant - A Uinta Basin Case History**  
J. Leasure, J. Hebert, R.J. Duenckel, CARBO Ceramics Inc. |
| 1030 | 173780  | **Development Of A Very Low Peroxide Containing Peracid Formulation As Superior Treatment Option For Water Reuse Applications.**  
R. Balasubramanian, R. Ryther, R.M. De Paula, B. Epps, V. Keasler, Nalco Champion, An Ecolab Company; J. Li, R. Staub, Ecolab |
| 1100 | 173754  | **A Novel, Rapid And Highly Efficient H2S Scavenger To Meet The Challenges Of Presalt Offshore Applications In Brazil. Development, Evaluation and Qualification for SubSea Umbilical Delivery.**  
G.N. Taylor, F.C. Bustamante, Baker Hughes; A. Magalhaes, A. Bonfim, Petrobras/CENPES |
| 1130 | 173723  | **Development of Novel Phosphate Based Inhibitors Effective for Oxygen Corrosion**  
O.J. Yepez, Clariant Oil and Mining Services; N. Obeyesekere, Clariant Oil & Mining Svcs BU; J.J. Wylde, Clariant Oil Services |

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| 173735 | Achieving a Stable Native Guar Boron Crosslink in 100% Produced Water  
E. Lopez, T. Nelson, D.M. Bishop, Chemplex Solvay Group |
| 173756 | Sandstone HF Acidizing up to 360°F Compatible with Na or K Brines and Carbonate-Laden Mineralogy  
E.A. Reyes, A.L. Smith, A. Beuterbaugh, T. Calabrese, Halliburton |
| 173767 | Proper Selection Of Surfactants For Enhanced Oil Recovery Applications Based On Interfacial Rheology Measurements Of Oil-water Interfaces  
J. Rane, L. Xu, Multi-Chem, a Halliburton Service |
| 173765 | Brine Crude Oil Interactions at Oil-Water Interface  
K.H. Chakravarty, P.L. Fosbøl, K. Thomsen, CERE, Department of Chemical and Biochemical Engineering, Technical University of Denmark (DTU) |
Knowledge Sharing ePosters

Monday, 13 April
1000–1030 and 1500–1530

Tuesday, 14 April
1000–1030 and 1500–1530

Wednesday, 15 April
1000–1030

Session Chairpersons: Edward Burger, EB Technologies Inc.; Carmen Garcia, Repsol; Aly Hamouda, University of Stavanger; Jamal Jamaluddin, Next, a Schlumberger Company; Gary Jenneman, ConocoPhillips; Stan McCool, University of Kansas; Mathew Samuel, Weatherford; and Mingdong Yuan, Chevron.

An ePoster is an electronic version of a traditional poster presented on a plasma screen. It offers the added benefit of animation, audio, and video, and enhances the visual experience to provide greater interactivity between the attendee and the ePoster author. Knowledge Sharing ePosters will be on display during coffee breaks, Monday through Wednesday.

Monday | 13 April | 1000–1030 and 1500–1530

Station 1

1000–1015 173763 Laboratoy Investigation on Impact of Reservoir Salinity Variation and Crude Oil Polar Components on Low-Salinity Waterflooding
A.M. Shehata, H.A. Nasr-El-Din, Texas A&M University

1015–1030 173760 A Field Case Study of Inter-Well Chemical Tracer Test
M.L. Sanni, M.A. AlAbbad, S.L. Kokal, Saudi Aramco; S.K. Hartvig, Restrack AS

1500–1515 173741 Formate Brines and Their Crystallization Temperatures - New Insight into Fluid Behavior and Measuring Methodology
S.K. Howard, Cabot Specialty Fluids; M. Chrenowski, Robert Gordon University

C.W. Kayser, T. Trellempain, G. Botthof, M. Schaefer, D. Fischer, C. Diemel, J.J. Wylde, Clariant
## Knowledge Sharing ePosters

**Monday | 13 April | 1000–1030 and 1500–1530**

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<td>1000–1015</td>
<td>173716</td>
<td>Investigation on a Novel Polymer with Surfact Activity for Polymer Enhanced CO2 Foam Flooding</td>
<td>X. Xu, A. Saeedi, R. Rezaee, Curtin University</td>
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<td>1015–1030</td>
<td>173750</td>
<td>Minimizing Surfactant Adsorption Using Polyelectrolyte Based Sacrificial Agent: a Way to Optimize Surfactant Performance in Unconventional Formations</td>
<td>K. He, Z. Yue, C. Fan, Halliburton; L. Xu, Multi-Chem Group</td>
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<td>1500–1515</td>
<td>173770</td>
<td>Ferrous Iron Impact On Phosphonate And Polymeric Barium Sulfate Scale Inhibitor Performance At Temperature From 77° To 200° F</td>
<td>Z. Zhang, Rice University; Q. Wang, Rice University Executive Education; Y. Liu, Z. Dai, L. Wang, Rice University; F. Zhang, F. Yan, N. Bhandari, Rice University Executive Education; V. Bolanos Ellis, A.T. Kan, M.B. Tomson, Rice University</td>
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<td>1000–1015</td>
<td>173803</td>
<td>Scale Prediction and Control at Ultra HTHP</td>
<td>A.T. Kan, Rice University; F. Zhang, Rice University Executive Education; Z. Dai, N. Bhandari, F. Yan, F. Yan, Z. Zhang, Y. Liu, L. Wang, V. Bolanos Ellis, M.B. Tomson, Rice University</td>
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<td>1500–1515</td>
<td>173779</td>
<td>Application of a Novel Method for Real-time Monitoring of Scale Control Products at the Site of Use</td>
<td>R. Griffin, Kemira Chemicals Inc; S. Toivonen, J.R. Johnstone, B. Peltokoski, Kemira; P. Mundill, J. Siivonen, Aqsens Oy</td>
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## Knowledge Sharing ePosters

### Tuesday | 14 April | 1000–1030 and 1500–1530

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<td>1000–1015</td>
<td>173783</td>
<td>First 100% reuse of Bakken Produced Water as Frac Mixwater in Hybrid Treatments using Crosslinked Guar</td>
<td>B.A. Mackay, B.W. McMahon, Schlumberger; B.L. Williams, F.E. Beck, Statoil USA</td>
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<td>1500–1515</td>
<td>173711</td>
<td>Application of Novel Emulsified Gelled Acid System Improves the Efficiency of Carbonate Acidizing</td>
<td>A.S. Zakaria, H.A. Nasr-El-Din, Texas A&amp;M University</td>
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<td>1515–1530</td>
<td>173776</td>
<td>Recent Advances in Viscoelastic Surfactants for Improved Production from Hydrocarbon Reservoirs</td>
<td>K. Hull, M.A. Sayed, G.A. Al-Muntasheri, ARAMCO Services Company</td>
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<td>Achieving a Stable Native Guar Crosslink in 100% Produced Water</td>
<td>E. Lopez, T. Nelson, D.M. Bishop, Chemplex Advanced Materials LLC</td>
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<td>Sandstone HF Acidizing up to 360°F Compatible with Na or K Brines and Carbonate-Ladden Mineralogy</td>
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<td>Brine Crude Oil Interactions At Oil-Water Interface</td>
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Knowledge Sharing ePosters

**Wednesday | 15 April | 1000–1030**

**Station 1**

1000–1015  173710  **Development of a Numerical Scheme for Simulation of Asphaltene Dependent Phenomena in Porous Media**  
V. Hematfar, Z. Chen, B.B. Maini, University of Calgary

1015–1030  173794  **Determination of the Reaction Rate of Methanesulfonic Acid Solutions with Calcite Using the Rotating Disk Apparatus**  
S.M. Reyath, Texas A & M University Library; H.A. Nasr-El-Din, Texas A&M University

**Station 2**

1000–1015  173752  **A Novel Approach to Crosslink Delay of Low pH Fracturing Fluid**  
P.S. Carman, H. Sun, J. Mayor, Baker Hughes; M. Legemah

1015–1030  173791  **The Evaluation of Polycationic, Carbohydrate-Based Surfacants as Viscoelastic (VES) Fracturing Fluids**  
L.L. Whitlock, A. Sanders, P. Knox, Stepan Co.

**Station 3**

1000–1015  173795  **The Impact of Clay Type on the Asphaltene Deposition during Bitumen Extraction with Steam Assisted Gravity Drainage**  
Y. Unal, B. Hascakir, Texas A&M University

1015–1030  173775  **Exploring Different Chemistry Targeting High Molecular Weight Wax**  
W. Wei, E. Acosta, K. Gavas, P. Krishnamurthy, Halliburton
The exhibition is located in Waterway 5 and open to symposium registrants on Monday, 13 April and Tuesday, 14 April. Exhibition Closed for Keynote Luncheon on Monday, 13 April.

**EXHIBITION HOURS**
- Monday, 13 April: 0930–1830
- Tuesday, 14 April: 0930–1530

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**Exhibitors (As of 23 February 2015 | Subject to Change)**

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