

Society of Petroleum Engineers

9<sup>th</sup> International Conference  
on Oilfield Scale  
2008

“Managing Scale Through the Field Lifetime”

May 28-29, 2008  
Aberdeen, UK

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571  
[www.proceedings.com](http://www.proceedings.com)

ISBN: 978-1-60560-341-4

Some format issues inherent in the e-media version may also appear in this print version.

Copyright (2008) by the Society of Petroleum Engineers  
All rights reserved.

For permission requests, please contact the Society of Petroleum Engineers  
at the address below.

Society of Petroleum Engineers  
PO Box 833836  
Richardson, TX 75083-3836

Society of Petroleum Engineers

9<sup>th</sup> International Conference on Oilfield Scale  
2008

**TABLE OF CONTENTS**

<b>Simulation and Experimental Studies of Mineral Scale Formation Effects on Performance of an Iranian Carbonate Oil Reservoir Under Water Injection</b> .....	1
<i>A. Taheri, R. Masoudi, M. Zahedzadeh, A.R. Ataei, H. Fakhri</i>	
<b>Scaling Mitigation and Strategy for First Full Field Steam Injection X Field Oman: History Matching and Modelling</b> .....	14
<i>A. Nengkoda, J. Walsh, D. Ahmed, A. Busaidy, N. Shuely, S. Sariry, P. Putra</i>	
<b>Detection of Scale Deposition Using Distributed Temperature Sensing</b> .....	25
<i>F.H. Almutairi, D.R. Davies</i>	
<b>Innovative Use of Kaolinite in Downhole Scale Management: Squeeze Life Enhancement and Water Shutoff</b> .....	38
<i>N. Fleming, K. Ramstad, A.M. Mathisen, A. Nelson, S. Kidd</i>	
<b>Impact of Successive Squeezes on Treatment Lifetime and Well Productivity: Laboratory and Field Evidence</b> .....	53
<i>N.I Fleming, K. Ramstad, A. Nelson, G. Graham</i>	
<b>Managing Radioactive Scale: Strategic Approach and Success Story</b> .....	66
<i>B. Ghosh, A.S. Al-Bemani, K. Najim, S. Al-Hajri, J. Clark, F.H. Boukadi</i>	
<b>Deployment of Real-Time Scale Deposition Monitoring Equipment to Optimize Chemical Treatment for Scale Control During Stimulation Flowback</b> .....	77
<i>D. Emmons, S.A. Smith, T. Weathers, M.M. Jordan, N.D. Feasey</i>	
<b>Scale Inhibitor Solutions for High Temperature ESP Lifted Wells in California: A Case History Of Failure Followed By Success</b> .....	88
<i>J.J. Wylde, D.A. Fell</i>	
<b>Development of a New Polymer Inhibitor Chemistry for Downhole Squeeze Applications</b> .....	100
<i>H. Montgomerie, P. Chen, T. Hagen, O. Vikane, R. Matheson, V. Leirvik, C. Frøytlog, J.O. Sæten</i>	
<b>Understanding Trends in Sulphate Concentrations in Produced Water Within Oilfields Under Seawater Flood and With Calcium-Rich Formation Water</b> .....	111
<i>R. Wright, R.A. McCartney, E. Sørhaug</i>	
<b>Experimental Study and Field Implementation of Scale Inhibitor Squeeze Treatments in ShengLi Oilfield of China</b> .....	123
<i>J. Zuo, S. Ren, Z. Fan, F. Yan, L. Xu, K. Hu, X. Wang, H. Chen</i>	
<b>Thermodynamic Modelling of Naphthenate Formation and Related pH Change Experiments</b> .....	134
<i>M.A. Mohammed, K.S. Sorbie, A.G. Shepherd</i>	
<b>Study of BaSO<sub>4</sub> Formation Kinetics and Inhibition Effect of Polyphosphino-Carboxylic Acid (PPCA) With Synchrotron X-Ray Diffraction (SXR) D</b> .....	145
<i>E. Mavredaki, A. Neville, K.S. Sorbie</i>	
<b>Control of Silicate Scales in Steam Flood Operations</b> .....	151
<i>D.L. Gallup, C.J. Hinrichsen</i>	

<b>Kinetics of CaCO<sub>3</sub> Scale Formation During Core Flooding</b> .....	162
<i>T. Larsen, P. Randhol, M. Lioliou, L.O. Josang, T. Ostvold</i>	
<b>Development of a Viscosified Scale Inhibitor for Improving Placement in Acid Fractured Limestone Reservoirs</b> .....	174
<i>S.M. Heath, M. Sim, M. Archibald, R. Stalker</i>	
<b>Oil Field Data/Return Analysis: A Comparison of Scale Inhibitor Return Concentrations Obtained With a Novel Analytical Method and Current Commercial Techniques</b> .....	188
<i>A. Thompson, A. Gangstad, H.K. Kotlar</i>	
<b>Mechanistic Study of Chemicals Providing Improved Halite Inhibition</b> .....	202
<i>H. Guan, R. Keatch, C. Benson, N. Grainger, L. Morris</i>	
<b>Inhibitor Selection for Iron Scale Control in MEG Regeneration Process</b> .....	211
<i>H. Guan, G. Cole, P. Clark</i>	
<b>Enhanced Inhibitor Treatments With the Addition of Transition Metal Ions</b> .....	220
<i>A.T. Kan, G. Fu, D. Shen, H. Al-Saiari, M.B. Tomson</i>	
<b>Seawater Injection, Inhibitor Transport, Rock-Brine Interactions, and BaSO<sub>4</sub> Scale Control During Seawater Injection</b> .....	235
<i>D. Shen, G. Fu, H. Al-Saiari, A.T. Kan, M.B. Tomson</i>	
<b>Control Placement of Scale Inhibitors in the Formation With Stable Ca-DTPMP Nanoparticle Suspension and its Transport Porous Media</b> .....	249
<i>D. Shen, P. Zhang, A.T. Kan, G. Fu, J. Farrell, M.B. Tomson</i>	
<b>Iron (II)-Calcium Carbonate: Precipitation Interaction</b> .....	270
<i>H.A. Al-Saiari, S. Yean, M.B. Tomson, A.T. Kan</i>	
<b>A New Chemical Treatment to Inhibit Iron Sulfide Deposition</b> .....	286
<i>M. Lehmann, F. Firouzkouh</i>	
<b>Two Year Results of a Breakthrough Physical Water Treating System for the Control of Scale in Oilfield Applications</b> .....	317
<i>L. Rzezniak, M. Juenke, D. Stefanini, M. Clark, P. Lauretti</i>	
<b>Performance of Scale Inhibitors Under Carbonate and Sulfide Scaling Conditions</b> .....	328
<i>J.K. Smith, J. Hammons, G. Boyd, Q. Fu</i>	
<b>Scale Challenges in Talisman's Varg Field</b> .....	347
<i>E. Sorhaug, G.M. Graham, R. Stalker, I.J. Littlehales, S.L. Kidd</i>	
<b>The Challenges Associated With Performing and Combining Scale Dissolver and Squeeze Treatments in Kristin—A Subsea HP/HT Gas Condensate Field</b> .....	359
<i>R. Wat, K. Wennberg, R. Holden, B. Hustad, S. Heath, M. Archibald, K. Singdahlsen</i>	
<b>Using Nature to Provide Solutions to Calcareous Scale Deposition</b> .....	368
<i>W.C. Cheong, A. Neville, P.H. Gaskell, S. Abbott</i>	
<b>Scale Squeeze Evaluation Through Improved Sample Preservation, Inhibitor Detection and Minimum Inhibitor Concentration Monitoring</b> .....	379
<i>K. Ramstad, H.C. Rohde, T. Tydal, D. Christensen</i>	
<b>Veslefrikk Scale Control Strategy and Economic Implications: Revisited 7 Years Later—Did We Improve?</b> .....	398
<i>T. Tjomsland, J.O. Sæten, O. Vikane, M. Zettlitzer, P. Chen</i>	
<b>Precipitation of Iron and Calcium Carbonate in Pipelines at Varying MEG Contents</b> .....	418
<i>E.M. Flaten, G. Watterud, J.P. Andreassen, M. Seiersten</i>	

<b>Design and Field Deployment of Scale Inhibitors for Reducing the Risk for Chalk Influx Post Squeeze Treatments in Multiple Fractured Horizontal Wells in BP Valhall</b> .....	427
<i>T.T. Thingvoll, S. Heath, R. Flatebo, M. Madland, G. Clark, C. Strachan, K.A.N. Vorland, R.I. Korsnes</i>	
<b>Radial Core Flood Placement Tests</b> .....	440
<i>R. Stalker, I.J. Littlehales, G.M. Graham, G.F. Oluyemi</i>	
<b>Improvement of Scale Management Using Analytical and Statistical Tools</b> .....	446
<i>M. Scheck, G. Ross</i>	
<b>Modelling the Impact of Diesel vs Water Overflush Fluids on Scale Squeeze Treatment Lives Using a Two-Phase Near-Wellbore Simulator</b> .....	458
<i>O. Vazquez, E. Mackay, M. Jordan</i>	
<b>The Cost and Value of Field, Laboratory, and Simulation Data for Validating Scale Inhibitor Treatment Models</b> .....	473
<i>J.A.P. Zavala, E.J. Mackay, O. Vazquez, L.S. Boak, M. Singleton, G. Ross</i>	
<b>Coupled Adsorption/Precipitation of Scale Inhibitors: Experimental Results and Modelling</b> .....	494
<i>M. Kahrwad, K.S. Sorbie, L.S. Boak</i>	
<b>Evaluation of the Performance of Different Scale Inhibitors to Sulfate Removal Unit</b> .....	504
<i>T.N. Santos, F. Gorceix, M.C.M. Bezerra, K.R.S.A. Rosa, A.A. Rocha</i>	
<b>Scale Management in Espadarte Field</b> .....	514
<i>R. Hernandez, V.L.A. Melo, J.A.M. Santos, F.F. Rosario, M.C.M. Bezerra, K.R.S.A. Rosa</i>	
<b>Optimising Calcium Naphthenate Control in the Blake Field</b> .....	522
<i>K. Melvin, C. Cummine, J. Youles, H.L. Williams, G.M. Graham, S.J. Dyer</i>	
<b>Ferrous Carbonate Nucleation and Inhibition</b> .....	531
<i>S. Yean, H. Al Saiari, A.T. Kan, M.B. Tomson</i>	
<b>First Application of Scale Inhibitor During Hydraulic Fracturing Treatments in Western Siberia</b> .....	550
<i>K. Cheremisov, D. Oussoltsev, K.K. Butula, A. Gaifullin, I. Faizullin, D. Senchenko</i>	
<b>Author Index</b>	