

Society of Petroleum Engineers

# SPE Western Regional and Pacific Section AAPG Joint Meeting 2008

“Adding Reserves Through Collaboration, Innovation,  
and Technology Transfer”

March 31 – April 2, 2008  
Bakersfield, California, USA

**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: 978-1-60560-149-6

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

# Copyright and Use Restrictions

Copyright 2008, Society of Petroleum Engineers

Material included in this *Proceedings* is copyright protected. Electronic reproduction, distribution, or storage of any part of a SPE-copyrighted paper for commercial purposes without the written consent of the Society of Petroleum Engineers is prohibited. Permission to reproduce in print is restricted to an abstract of not more than 300 words; illustrations may not be copied. The abstract must contain conspicuous acknowledgment of where and by whom the paper was presented. For photocopying beyond the above permissions, libraries and other users dealing with the Copyright Clearance Center (CCC) Transactional Reporting Service must pay a base fee of \$3 per copyrighted article plus \$0.25 per page to CCC, 222 Rosewood Drive, Danvers, Massachusetts 01923 U.S.A. For other permissions, contact Librarian, SPE, 222 Palisades Creek Drive, Richardson, Texas 75080-2040 U.S.A. Use of SPE member or author contact information included on this CD for commercial purposes or reproduction of that information in whole or in part, in any form or medium, is strictly prohibited and subject to legal action. Contact SPE to inquire about rental of mailing lists.

This CD of the 2008 SPE North Africa Technical Conference and Exhibition was produced by SPE. Permission to print and distribute content from this product must be obtained from SPE. Duplication of replication products is absolutely prohibited without written permission from SPE and Adobe. Adobe, the Adobe logo, and Reader are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States and/or other countries. Material on the CD was reproduced from original papers and/or electronic files provided by the authors. Some discrepancies are inevitable. Please advise SPE of errors so corrections can be made to the electronic versions of the article. Send corrections by e-mail to [pdf@spe.org](mailto:pdf@spe.org) or mail to the SPE Americas Office, attention Technical Paper Administrator.

Society of Petroleum Engineers

SPE Western Regional and Pacific Section AAPG Joint Meeting  
2008

**TABLE OF CONTENTS**

<b>Liquid Petroleum Confinement System</b> .....	1
<i>R.M. Pierson, J.E. Lucken and H.W. Shaver</i>	
<b>The Application of Expandable Tubulars in Casing While Drilling</b> .....	11
<i>Yash Gupta, Sudeep N. Banerjee</i>	
<b>Engineering Workflows for Production Surveillance and Optimization</b> .....	18
<i>Kemal Farid, José A. Cheo Alvarez</i>	
<b>Advanced Heated Annulus Drive Technology: An Emerging Technology Compatible With Directional Drilling To Improve Recovery From Tar-Sand Reservoirs</b> .....	22
<i>Wajid Ali</i>	
<b>Convective Heat Transfer for Laminar, Steady-State Flow of Bingham and Power Law Fluids between Vertical, Parallel Plates</b> .....	29
<i>Yildiz Bayazitoglu, Paul R. Paslay, Paul Cernocky</i>	
<b>A Simple Analytical Model for Predicting Gas Productivity of Horizontal Drain Holes with High-Friction</b> .....	40
<i>Boyun Guo, Chi Ai, Ling Zhang</i>	
<b>Cement Bond Evaluation</b> .....	48
<i>Eddie H. Shook, Gary J. Frisch, Tony Lewis</i>	
<b>Enhanced Net-to-Gross Understanding for Horizontal-Development Drilling in Complex Mature Reservoirs</b> .....	58
<i>Arve K. Thorsen, Tor Eiane, Holger Thern, Asbjørn Kroken, Marianne Iversen, Frank Antonsen</i>	
<b>The Effect of Pressure Decline Rate and Pressure Gradient on the Behaviour of Solution Gas Drive in Heavy Oil</b> .....	74
<i>Hussain Sheikh and Mehran Pooladi-Darvish</i>	
<b>Future Projection of Energy Prices: A Predictive Model</b> .....	86
<i>Hadi A. Belhaj, T. Lay</i>	
<b>How Integrated Field Studies Help Asset Teams Make Optimal Field Development Decisions</b> .....	97
<i>L. Saputelli, L. Lujan, L. Garibaldi, J. Smyth, A. Ungredda, J. Rodriguez, A.S. Cullick</i>	
<b>Building a Reservoir Model with Problematic Faults</b> .....	113
<i>K.S. Hoffman, J.W. Neave, and E.H. Nilsen</i>	
<b>Pulsed Neutron Logging Through Multiple Casings</b> .....	119
<i>O. Desport, J. Crowe</i>	
<b>Limits on Sweep Efficiency for Solvent Injection into Heavy Oil Reservoirs at Grain-Scale</b> .....	131
<i>O. Taghizadeh, K. Sepehrnoori, and S.L. Bryant</i>	
<b>Innovative Gas Shutoff Method Using Heavy Oil-in-Water Emulsion</b> .....	140
<i>K. Zeidani, M. Polikar</i>	
<b>The PUT River, Appraisal and Development of a Minor Reservoir Within the Prudhoe Bay Field, North Slope, Alaska</b> .....	156
<i>Manmath Panda, James Dean, Jeff Pietras, Tammy Wheeler, Roger Sels</i>	

<b>Casing Fatigue Life Prediction Using Local Stress Concept: Theoretical and Experimental Results</b> .....	168
<i>C. Teodoriu, V. Ulmanu, and M. Badicioiu</i>	
<b>Sensitivity Analyses of Production and Recovery Forecasts Using Variance-Based Methods</b> .....	175
<i>Azeez Adeyinka Lawal, Sanjay Srinivasan, Larry W. Lake</i>	
<b>Prediction of Effective Porosity Over the Field Using 3D Seismic Multiattributes, Seismic Acoustic Impedance, and Well-Driven Effective Porosity</b> .....	200
<i>Abdonabi Arianfar</i>	
<b>Hybrid Drilling Rig with Rotating Coiled Tubing</b> .....	217
<i>Arpit Choudhary, Richard Menezes, Konark Ogra, Rachit Garg</i>	
<b>Well Spacing and Recovery Optimization of One of Iranian Oil Fields by Using Streamline and Reservoir Simulation</b> .....	223
<i>V. Dehdari, B. Aminshahidy, A.Tabatabaei-nejad</i>	
<b>Reservoir Pressure Management Using Waterflooding: A Case Study</b> .....	235
<i>Anish Phade, Yash Gupta</i>	
<b>Long-Term Evaluation of Low-Density Cement, Based on Hollow Glass Microspheres, Aids in Providing Effective Zonal Isolation in HP/HT Wells: Laboratory Studies and Field Applications</b> .....	248
<i>A.S. Al-Yami, H.A. Nasr-El-Din, M.K. Al-Arfaj, S.H. Al-Saleh, A.S. Al-Humaidi, N.A. Al-Shuker</i>	
<b>Optimizing Downhole Fluid Production of Sucker Rod Pumps Using Variable Motor Speed</b> .....	267
<i>Krzysztof Palka, Jaroslaw A. Czyz</i>	
<b>A Critical Review of the Status of SAGD: Where Are We and What is Next?</b> .....	278
<i>A.M. Albahlani, T.Babadagli</i>	
<b>Oil-Microbe Detection Tool Using Nano Optical Fibers</b> .....	300
<i>Shruti Ravindra Jahagirdar</i>	
<b>A Sensitivity Analysis for Effective Parameters on Fracture Network Permeability</b> .....	307
<i>A. Jafari, T. Babadagli</i>	
<b>Evaluation of Intra-Molecular Cross-Linked Polymers</b> .....	324
<i>W. Wang, X.G. Lu</i>	
<b>Properties of Polymer Solution and Gel with Different Electrolytes</b> .....	333
<i>X.G. Lu, W. Wang, J.Sh. Li</i>	
<b>A New Diagnostic Analysis Method for Waterflood Performance</b> .....	341
<i>Zhengming Yang</i>	
<b>Use of Transient Data to Calculate Absolute Permeability and Average Fluid Saturations</b> .....	351
<i>Medhat M. Kamal and Yan Pan</i>	
<b>Improved Analysis of the Kinetics of Crude-Oil In-Situ Combustion</b> .....	359
<i>M. Cinar, L.M. Castanier, A.R. Kovscek</i>	
<b>Liquid Carrying Capacity of Gas in Underbalanced Drilling</b> .....	379
<i>Boyun Guo and Yuan Yao, Chi Ai</i>	
<b>New Advances and a Historical Review of Insulated Steam Injection Tubing</b> .....	386
<i>Michael S. Lombard, Roy Lee Jr., Paolo Manini, Mark. A. Slusher</i>	
<b>Research and Application of Mathematical Model for Foam Diversion Acidizing</b> .....	394
<i>Songyan Li, Zhaomin Li, Riyi Lin, and Benfei Li</i>	
<b>Direct Current Electrical Enhanced Oil Recovery in Heavy-Oil Reservoirs to Improve Recovery, Reduce Water Cut, and Reduce H<sub>2</sub>S Production While Increasing API Gravity</b> .....	405
<i>J. K. Wittle, D.G. Hill, V. Chilingar</i>	

<b>A Novel Corrosion Resistant Internal Coating Method Using Hollow Cathode PECVD Technology with Improved Hardness</b> .....	424
<i>Bill Boardman, Karthik Bonapolly, Deepak Upadhayaya, and Tom Casserly</i>	
<b>The Use of Pulsed Neutron Measurements for Determination of Bypassed Pay: A Multi-Well Study</b> .....	436
<i>Jeffrey Grant, Dale May and Keith Pinto</i>	
<b>Optimization of Asphaltene Deposition and Adsorption Parameter in Porous Media Search</b> .....	446
<i>M. Kariznovi, H. Nourozieh, M. Jamialahmadi, and A. Shahrabadi</i>	
<b>Develop a New Model for Saturation Calculation in Streamline Simulation</b> .....	455
<i>H. Nourozieh, M. Kariznovi, M. Jamialahmadi, and A. Shahrabadi</i>	
<b>A Quadratic Cumulative Production Model for the Material Balance of an Abnormally Pressured Gas Reservoir</b> .....	466
<i>F.E. Gonzales, D. Ilk, and T.A. Blasingame</i>	
<b>Optimized Foam Drilling Improves Drilling Performance in Iranian Carbonate Fields</b> .....	499
<i>F.Shirkavand, G. Hareland, R. Teichrob, S.M. Haeri Behbahani</i>	
<b>The Effect of Geologic Parameters and Uncertainties on Subsurface Flow: Deepwater Depositional Systems</b> .....	505
<i>William J. Milliken, Marjorie Levy, and Sebastien Strebelle, Ye Zhang</i>	
<b>Modeling of the Stability of Multibranch Horizontal Open Holes</b> .....	521
<i>Alberto Lopez Manriquez, Augusto L. Podio, and Kamy Sepehrnoori</i>	
<b>Reliability of Multiphase Flowmeters and Test Separators at High Water Cut</b> .....	528
<i>Kelechi Isaac Ojukwu, John Edwards</i>	
<b>Quantitative Analysis of Mud Losses in Naturally Fractured Reservoirs: The Effect of Rheology</b> .....	537
<i>R. Majidi, S.Z. Miska, M. Yu, SPE, and L.G. Thompson</i>	
<b>Assessment of Dynamic Filtration Formation Damage for Alaskan North Slope Drilling Fluids</b> .....	545
<i>Prasad B. Kerkar, Shirish L. Patil, Godwin A. Chukwu, Abhijit Y. Dandekar, Santanu Khatanar</i>	
<b>Applications of Ultra Low Density, Operationally Simple, Non-Foamed Cement Slurries — Case Histories</b> .....	560
<i>N. El Shaari, Scott H. Myers, Ragib Dajani, Dale Robert Doherty</i>	
<b>The Study and Application of Fracturing Optimization Technology for Complicated Fault Block Reservoir with Strong Water Sensitivity</b> .....	572
<i>Yongming Li, Jianchun Guo, Yingchun Yue, and Jinzhou Zhao, Cunyong Guo</i>	
<b>Alteration of Reservoir Diatomites by Hot Water Injection</b> .....	579
<i>C.M. Ross, M. Ikeda, G.-Q. Tang, A.R. Kavscek</i>	
<b>Northern California Gas Sands — Hydraulic Fracture Stimulation Opportunities and Challenges</b> .....	592
<i>N. El Shaari, W.A. Minner</i>	
<b>The Effect of Drillpipe Rotation on Pressure Losses and Fluid Velocity Profile in Foam Drilling</b> .....	602
<i>Mingqin Duan, Stefan Miska, Mengjiao Yu, Nicholas Takach, and Ramadan Ahmed, John Hallman</i>	
<b>Underbalanced Drilling: “Remedy for Formation-Damage, Lost-Circulation, and Other Related Conventional-Drilling Problems”</b> .....	613
<i>Maqsood Ahmad Rafique</i>	
<b>Development and Exploration Well Permitting</b> .....	624
<i>P.V. Rivera, G.N. Gough, W.H. Dixon, and B.J. Ashley</i>	

<b>Correlation of Cold Production Behavior with Acid/Base Number and Asphaltene Content of Heavy Oil</b> .....	632
<i>J. Peng, G-Q. Tang, A.R. Kovscek</i>	
<b>An Integrated Study of Mature Low Permeability Reservoir in Daqing Oil Field, China</b> .....	645
<i>Yunting Xu, Hui Pu, Lianjie Shi</i>	
<b>Field Practice of Improvement of Waterflooding Effect for a Naturally Fractured Low-Permeability Field</b> .....	653
<i>Hui Pu, Daiyin Yin</i>	
<b>Utilizing Organosilane with Hydraulic Fracturing Treatments to Minimize Fines Migration into the Proppant Pack — A Field Application</b> .....	671
<i>N. EL Shaari, A. Swint, L. Kalfayan</i>	
<b>A Method for Characterization of Flow Units Between Injection-Production Wells Using Performance Data</b> .....	676
<i>Kun-Han Lee , Antonio Ortega, Amir Mohammad Nejad, Iraj Ershaghi</i>	
<b>Micromechanics of Hydrate Dissociation in Marine Sediments by Grain-Scale Simulations</b> .....	688
<i>Holtzman Ran, Dmitriy B. Silin, Tad W. Patzek</i>	
<b>Consequence of Thermophysical Approximations on Upstream Calculations: A Case Study</b> .....	695
<i>Sangeetha Pasala, Sabyasachi Sen, Srividya Gummadi, Mike Kirchner</i>	
<b>Heat Management in Steam floods without the Use of Temperature Observation Wells</b> .....	704
<i>Muhammad Haroun, Iraj Ershaghi</i>	
<b>Case-Based Reasoning Approach for Well Failure Diagnostics and Planning</b> .....	715
<i>Andrei Popa, Carrie Popa, Mike Malamma, and John Hicks</i>	

## Author Index