

Society of Petroleum Engineers

15th Middle East Oil & Gas Show and Conference

MEOS 2007

March 11-14, 2007
Bahrain

Volume 1 of 3

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571
www.proceedings.com

ISBN: 978-1-60423-797-9

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

Copyright and Use Restrictions

Copyright 2007, Society of Petroleum Engineers

Material included in this *Proceedings* is copyright protected. Electronic reproduction, distribution, or storage of any part of an 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 2007 SPE Middle East Oil & Gas Show and Conference was produced by SPE. This product contains Adobe® Reader® Software. 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 or mail to the SPE Americas Office, attention Technical Paper Administrator.

Society of Petroleum Engineers
15th Middle East Oil & Gas Show and Conference
2007

TABLE OF CONTENTS

Volume 1

Overcoming the Challenges of Building 3D Stochastic Reservoir Models Using Conceptual Geological Models—A Case Study	1
<i>Mohammad A. Al-Khalifa, Tobias H.D. Payenber, Simon C. Lang</i>	
Reservoir Management Ingredients for Optimizing the Water-Injection Performance in Small and Medium-Sized Fields	13
<i>Raj Deo Tewari, Mohd Razib Bin Abd Raub, Wang Yin Xi, Fahmi Abdallah</i>	
Porosity and Permeability Estimation by Gradient-Based History Matching Using Time-Lapse Seismic Data.....	32
<i>M. Dadashpour, J. Kleppe, M. Landrø</i>	
A Correlation Approach for Prediction of Crude-Oil PVT Properties	45
<i>M.N. Hemmati, R. Kharrat</i>	
Verification and Proper Use of Water/Oil Transfer Function for Dual-Porosity and Dual-Permeability Reservoirs	60
<i>A. Balogun, H. Kazemi, E. Ozkan, M. Al-Kobaisi, B. Ramirez</i>	
Transient Behavior of Multilateral Wells in Numerical Models: A Hybrid Analytical-Numerical Approach	72
<i>C. Aguilar, BP Alaska, E. Ozkan, H. Kazemi, M. Al-Kobaisi, B. Ramirez</i>	
Simultaneous Estimation of Aquifer Parameters and Original Hydrocarbons in Place From Production Data Using Numerical Inversion of Laplace Transform.....	86
<i>Noaman El-Khatib</i>	
On the Flow Performance of Velocity Strings To Unload Wet Gas Wells	96
<i>P. Oudeman</i>	
Permeability Damage Due to Water Injection Containing Oil Droplets and Solid Particles at Residual Oil Saturation	106
<i>Mohammad A.J. Ali, Peter K. Currie, Mohammad J. Salman</i>	
Performance Evaluation of a Reservoir Under EOR Recovery: Intisar 'D' Reef, Concession 103, Libya.....	114
<i>M.J. Vilela, Mohammed Gharsalla, Mohammed ElGhmari, Abdulhamid Majdoub</i>	
Underbalanced Drilling Successfully Implemented on First Dual Lateral Well in Libya	124
<i>Hussein Safar, Sadek Azhary, Ahmad Hijazi, Hani Qutob, James Chopty, Chau Pham</i>	
The Effect of Pore-Scale Heterogeneities on Carbonate Stimulation Treatments	133
<i>Murtaza Ziauddin, Emmanuel Bize</i>	
Managing Production in Maturing Assets: Increasing Intervention Success by Combining Production Logging With Nodal Analysis	147
<i>R. North, C.P. Lenn, I. Stowe</i>	

Reservoir Management Ingredients for Optimizing the Water-Injection Performance in Small and Medium-Sized Fields Shielding on the Performance of Supercritical CO₂ Flooding for Carbonate Formation	156
<i>Abdulrazag Y. Zekri, Shedid A. Shedid, Reyadh A. Almehaideb</i>	
Validation of Splitting the Hydrocarbon Plus Fraction First Step in Tuning Equation-of-State	171
<i>Ali A. Al-Meshari, Sudi Aramco, William D. McCain</i>	
Case Study in Water Shutoff Fluid Placement Using Straddled Through-Tubing Inflatable-Packers Technique.....	190
<i>Redha Kelkouli, Maen Razouqi, Saeed Al-Shaheen, Abdul Rasool Al-Khamees, Abdulaziz Abdulla Dashti</i>	
Ultradeep Drilling Pushes Drillingstring Technology Innovations	203
<i>Michael J. Jellison, R. Brett Chandler, Mike L. Payne, Jeff S. Shepard</i>	
Flow Rate Effect on Two-Phase Relative Permeability in Iranian Carbonate Rocks.....	217
<i>A.H. Alizadeh, A.R. Keshavarz, M. Haghghi</i>	
Calculation of Flowing Bottomhole Pressure Constraint Based on Bubblepoint-Pressure-vs.-Depth Relationship.....	223
<i>T.A. Obeida, Y.H. Mosallam, Y.S. Al-Mehairi</i>	
Porosity Partitioning and Flow Unit Characterization From an Integration of Magnetic-Resonance and Borehole-Image Measurements	227
<i>Aditi Pal, Kapil Seth, Udit Guru, R.R. Tiwari, D. Dasgupta</i>	
Devising Knowledge-Based Decision Tree for Detection of Fracture Corridors From Dynamic Data in a Carbonate Reservoir in Oman	234
<i>S.I. Ozkaya, S. Gordon, A. McFarlane, S. Siyabi, S.M. Al-Busaidi, M.F. Kramer, S.B. Coskun, L. Bolle</i>	
Effective Matrix Acidizing in Carbonate Reservoir—Does Perforating Matter?	250
<i>Kirk M. Bartko, Saudi Aramco, Frank F. Chang, Larry A. Behrmann, Ian C. Walton</i>	
Constant-Pressure Analysis of Infinite-Conductivity Fractured Gas Wells Influenced by Non-Darcy Flow Effects.....	260
<i>Ibrahim Sami Nashawi,</i>	
Research and Field Application of Water-Coning Control With Production-Balanced Method in Bottomwater Reservoir.....	272
<i>Xingwan Tu, Xiaolong Peng, Zhaohui Chen</i>	
The Evolution of Advanced Well Completions To Enhance Well Productivity and Recovery in Saudi Aramco's Offshore Fields	277
<i>A.H. Sunbul, D. Hembling, D.S. Al Qudaihy, N.A. Al Harbi, Saudi Aramco, G. Salerno</i>	
A Quantitative Model for the Effect of Wettability on the Conductivity of Porous Rocks.....	283
<i>Bernard Montaron</i>	
Constant-Pressure Analysis of Oil Wells Intercepted by Infinite-Conductivity Hydraulic Fracture Using Rate and Rate-Derivative Functions.....	297
<i>Adel Malallah, Ibrahim Sami Nashawi, Meshal Algharaib</i>	
Revealing the Real Picture Behind Safety Performance Statistics.....	314
<i>Robert S. Cram</i>	
Streamline Simulation for Reservoir Management of a Super Giant: Sabiriyah Field North Kuwait Case Study	321
<i>Muhammad N. Ibrahim, Robert A. Clark Jr., Bader S. Al-Matar</i>	

Parametric Investigations of a Modified SWAG Injection Technique	328
<i>Meshal Algharaib, Ridha Gharbi, Adel Malallah, Wafaa Al-Ghanim</i>	
The Wafra First Eocene Reservoir, Partitioned Neutral Zone (PNZ), Saudi Arabia and Kuwait: Geology, Stratigraphy, and Static Reservoir Modeling	341
<i>W. Scott Meddaugh, Dennis Dull, Raymond A. Garber, Stewart Griest, David Barge</i>	
Performance Evaluation of Acid Treatments in Seawater Injectors With Reference to Two Cleanup Techniques.....	352
<i>F.I. Beheiri, H.A. Nasr-El-Din, M.K. Rahman, S.A. Shedad</i>	
New Choke Correlations for Sabryiah Field, Kuwait	367
<i>M. Alrumah, M. Bizanti</i>	
Prediction of Permeability Reduction Rate Due to Calcium Sulfate Scale Formation in Porous Media	371
<i>H.A. Tahmasebi, R. Kharrat, R. Masoudi</i>	
Incorporating Multiphase Behaviours in Dynamic Simulation Models Using In-Situ-Generated Pseudofunctions	377
<i>Bader Al-Busafi, Zaid Al-Siyabi, Quentin Fisher</i>	
Kinetic Study of Crude-Oil Combustion in the Presence of Carbonate Rock	393
<i>S. Saraji, R. Kharrat, S. Razzaghi, V. Taghikhani</i>	
Reserves Estimation and Classification Challenges in a Mature Oil Field	400
<i>Hisham K. Zubari, K. Kumar</i>	
Fifty Years of Wettability Measurements in the Arab-D Carbonate Reservoir.....	408
<i>T.M. Okasha, J.J. Funk, H.N. Al-Rashidi</i>	
Enhanced Coalbed Methane Recovery Using Microorganisms.....	418
<i>Madhavi Vithal Jadhav</i>	
Wettability Evaluation of the Unayzah Reservoir in Central Saudi Arabia.....	425
<i>T.M. Okasha, S.H. Al-Saleh, W.S. Al-Khudair</i>	
A New Analytical Model of Geomechanics During Nonisothermal Injection.....	431
<i>I. Kocabas</i>	
Innovation in Drilling Using Replaceable Drilling Bit	437
<i>S.N. Banerjee, Yash Gupta</i>	
A Novel Stimulation Technique for Horizontal Openhole Wells in Carbonate Reservoirs: A Case Study in Kuwait	446
<i>Shahab Uddin, Hai Liu, Chad Coston, Mohamed Yassin, Fahad Al-Dhafeeri</i>	
Lessons Learned From Energy Models: Iraq's South Rumaila Case Study	457
<i>C.S. Kabir, N.I. Al-Khayat, M.K. Choudhary</i>	
Challenges Encountered During a Comprehensive Test Analysis for a Horizontal Well in a Thin, Carbonate Reservoir of the Greater Burgan Field, Kuwait.....	468
<i>A.K. Ambastha, M. Anderson, H. Gandhi, P.-D. Maizeret</i>	
Field Trial of an Acoustic Downhole Monitoring System Retrofitted in an Existing Completion.....	481
<i>D. Fyfe, L. Jarvis, Tiang Ting Ing, Mohammad A. Farooqui</i>	
Fully Upscaled Saturation-Height Functions for Reservoir Modeling Based on Thomeer's Method for Analyzing Capillary Pressure Measurements	485
<i>J.J.M. Buiting</i>	
MRC Wells Performance Update: Shaybah Field, Saudi Arabia.....	499
<i>S.P. Salamy, H.K. Al-Mubarak, M.S. Ghamsi, D. Hembling</i>	

Microfine Particles—An Alternative to Heavy Brines	504
<i>Christopher Steele, William L. Hart, Douglas Oakley</i>	

Wellbore Stability Analysis in UBD Wells of Iranian Fields	510
<i>S. Salehi, G. Hareland, K. Khademi Dehkordi</i>	

Volume 2

Pore Network Modeling: Analysis of Pore Size Distribution of Arabian Core Samples.....	518
---	-----

Hu Dong, Mustafa Touati, Martin J. Blunt

Determination of Water-Producing Zones While Underbalanced Drilling Horizontal Wells—Integration of Sigma Log and Real-Time Production Data	523
<i>P.J. Gauthier, H. Hussain, J. Bowling, J. Edwards, B. Herold</i>	

Haradh-III: Industry's Largest Field Development Using Maximum-Reservoir-Contact Wells, Smart-Well Completions and I-Field Concept	537
---	-----

Abdulaziz O. Al-Kaabi, Nabeel I. Al-Afaleg, Tony Pham, Ali S. Al-Muallem, Fahad A. Al-Bani, Richard G. Hart, Drew E. Hembling

Accelerating Technical Competency Development To Meet Future Challenges: The Saudi Aramco Approach	542
---	-----

J. Ricardo Solares

Scale Control in Chalk Reservoirs: The Challenge of Understanding the Impact of Reservoir Processes and Optimizing Scale Management by Chemical Placement and Retention—From the Laboratory to the Field	551
---	-----

M.M. Jordan, E.J. Mackay

The Optimization of Gas/Steam Injection Using Numerical Simulation	566
---	-----

Kamil Moussine, Nail Ibragimov, Rais Khisamov

Innovative Methods To Improve Carbonate Reservoirs Modeling Accuracy and Reliability.....	571
--	-----

David Foulon, Louise den Boer, Florence Vieban, Rashed Noman, Mohamed Labiadh

Application of Global Optimization Methods for History Matching and Probabilistic Forecasting—Case Studies	582
---	-----

M.K. Choudhary, S. Yoon, B.E. Ludvigsen

Underbalanced Drilling of a Horizontal Well in Depleted Reservoir: A Wellbore Stability Perspective	594
--	-----

Kaibin Qiu, Schlumberger; Yousef Gherryo, Chee Phuat Tan, Rob Marsden

Smart Cementing Solutions for Low BHCT-Wells—Case Studies for Successful Field Implementation	606
--	-----

Satinath Banerjee, Debasish Dasgupta, K.M. Suyan, V.K. Jain

Innovation in Coiled Tubing Tractor Technology Extends the Accessibility of Coiled-Tubing in Horizontal Wells, Allowing Better Possibilities for Well Intervention	613
---	-----

Mazen Al Omari, Hans Plessing

Estimating Optimum Well Spacing in a Middle East Onshore Oil Field Using a Genetic-Algorithm-Optimization Approach	620
---	-----

S.A. Tabatabaei Nejad, A.V. Aleagaha, S. Salari

Formation Evaluation While Drilling of a Complex Khuff-C Carbonate Reservoir in Ghawar Field, Saudi Arabia.....	629
--	-----

Abdullah Al-Fawwaz, Nedhal Al-Musharfi, Parvez Butt, Abdul Fareed

Reservoir Modeling With Global Scaleup	639
<i>X.H. Wu, M.T. Stone, R.R. Parashkevov, D. Stern, S.L. Lyons</i>	
Smart Tool System Boosts Performance of Intervention Operations	652
<i>Jim McNicol, Mark McGurk, Gerald Heisig, Brian Donadieu</i>	
Success Story of a Waterflood Project in a Geologically Complex, High-Viscosity Oil Reservoir in a Major Brownfield in South Oman.....	658
<i>Biswajit Choudhuri, Mahir Al-Rawahi</i>	
A Streamline-Based Model for Potentiality Prediction of Enhanced-Oil Recovery.....	677
<i>Jian Hou, Shun-kang Zhang</i>	
In-Situ Combustion Technique to Enhance Heavy-Oil Recovery at Mehsana, ONGC— A Success Story.....	692
<i>A. Doraiah, Sibaprasad Ray, Pankaj Gupta</i>	
A Practical Approach for Preventing Lost Circulation While Drilling.....	698
<i>K.M. Suyan, S. Banerjee, D. Dasgupta</i>	
Using the Low-Frequency Observation Data in Automatic History Matching	704
<i>Majid Mohammadpour Faskhoodi, Mohan Kelkar</i>	
An Integrated 3D Volume Interpretation Approach Is Successfully Used To Characterize Barriers to Flow Within a Carbonate Reservoir.....	718
<i>Shakir Al Khawaildi, William L. Soroka, Yousuf Al Mehairi</i>	
Permeability and Microscopic Displacement Efficiency of M_1 Bimodal Pore Systems in Arab-D Limestone	723
<i>Edward A. Clerke</i>	
Property Modeling: An Aid to Exploration of Deep Jurassic Reservoirs in North Kuwait.....	735
<i>Arun Kanti Dey, Sunil Kumar Singh, Meshari Ameen Al-Awadi, N. Srinivasa Rao</i>	
Successful Innovative Water-Shutoff Operations in Low-Permeability Gas Wells.....	742
<i>Hassan Chaabouni, Philippe Enkababian, Keng Seng Chan, Pascal Cheneviere, Philippe Falxa, Christophe Urbanzik</i>	
Linking Well-Test Interpretations to Full Field Simulations	750
<i>Faisal M. Al-Thawad, Jim S. Liu, Raj Banerjee, Dominic Agyapong</i>	
Permeability and Water Saturation Distribution by Lithologic Facies and Hydraulic Units: A Reservoir Simulation Case Study	760
<i>Shamsuddin H. Shenawi, Jerry P. White, Emad A. Elrafie, Khaled A. Kilany</i>	
The Event Solution—A New Approach for Fully Integrated Studies Covering Uncertainty Analysis and Risk Assessment	767
<i>Emad Elrafie, Jerry White, Fatema Awami</i>	
Development of a Dual Media Full-Field Simulation Model To Optimize Injection/Production Strategy for Two Communicating Mature Carbonate Reservoirs	774
<i>Yann Chiffolleau, Shamsuddin Shenawi, Bevan Yuen, Saad A. Al-Garni, Stig Lyngra, Methgal A. Al-Shammari, Turky M. Al-Shammary</i>	
Improved Understanding of Reservoir Fluid Dynamics in the North Sea Snorre Field by Combining Tracers, 4D Seismic, and Production Data	782
<i>O. Huseby, M. Andersen, Norsar; I. Svorstøl, Ø. Dugstad</i>	
Integrating Drilling-Fluid Optimization and New Technology Improves Carbonate-Reservoir Evaluation.....	792
<i>Moyosore Okuyig, Ahmed Berrim, Sammy Haddad, ChengGang Xian, Majed Abu Lawi, Jamil Al-Naser</i>	

Evaluation of Steam Injection in a Fractured Heavy-Oil Carbonate Reservoir in Iran	802
<i>M. Bahonar, A. Ataei, R. Masoudi, S.M. Mousavi Mirkalaei</i>	
Fit-For-Purpose Laboratory Core Analyses and Their Impact on Log Processing.....	812
<i>S.M. Ma, A.A. Al-Hajari, D.G. Kersey, J.J. Funk, L. Bruno</i>	
Topdrive Casing Running and Drilling Tools Reduce Well-Construction Costs and Increase Safety	820
<i>Nazir Shahin, Tracy Cummins</i>	
Multiobjective Optimization With Application to Model Validation and Uncertainty Quantification	827
<i>Ralf Schulze-Riegert, Markus Krosche, Abul Fahimuddin, Shawket Ghedan</i>	
A Comprehensive Approach to Well-Integrity Management in Adma-OpcO	834
<i>Ihab Tarmoom, Hussain Bin Thabet, Saleh Samad, Khalid Chishti, Ashiq Hussain, Mohamed Arafat</i>	
Innovative Cutting Structure, With Staged ROP and Durability Characteristics, Extends PDC Bit Efficiency Into Chert/Pyrite/Conglomerate Applications.....	853
<i>Graham Mensa-Wilmot, Boktor Mikhail, M. Al-Saeedi, M. Souderajan, H. Al-Ajmi</i>	
New Injection-Allocation Tool Significantly Improves the Value of Water Injection in Large Clastic Reservoirs	862
<i>Dipak Mandal, Nik Nabilah Bt. Nik Ahmad</i>	
Horizontal-Well-Production Logging Experience in Heavy-Oil Environment With Sand Screen: A Case Study From Kuwait	867
<i>Ricardo U. Oosthuizen, Ahmed Al Naqi, Khalaf Al-Anzi, Ihsan Murat Gok, Murat Zeybek, Koksal Cig, Hashim Al Hashim</i>	
Openhole Stability Analysis of Horizontal Wellbores Under Production Scenarios in Jurassic Carbonate Reservoirs of West Kuwait	876
<i>Javier A. Franquet, Naveen K. Verma, Mohammed Azeemuddin, Adnan Al-Shamali, Rasha Al-Morakhi, E.C. Reji</i>	
Missed, Bypassed, and Underestimated Hydrocarbon Traps: Analysis of BHT Records Reveals “Undiscovery Wells” in North Arabia	886
<i>Muhammad W. Ibrahim</i>	
Permeability Modeling Using Neural-Network Approach for Complex Maaddud-Burgan Carbonate Reservoir	892
<i>W.H. Al-Bazzaz, Y.W. Al-Mehanna, A. Gupta</i>	
Foam Drilling Simulator	907
<i>Amir Paknejad, Jerome J. Schubert, Mahmood Amani</i>	
Long-Term Evaluation of Low-Density Cement: Laboratory Studies and Field Application	922
<i>A.S. Al-Yami, H.A. Nasr-El-Din, S.H. Al-Saleh, A. Al-Humaidi, C. Miller, H. Al-Yami, Y. El-Marsafawi</i>	
Estimation of Permeability From Wireline Logs in a Middle Eastern Carbonate Reservoir Using Fuzzy Logic	944
<i>A. Abdulraheem, E. Sabakhi, M. Ahmed, A. Vantala, I. Raharja, G. Korvin</i>	
Crosswell Electromagnetic Resistivity Tomography: Pushing the Limits.....	955
<i>M.L. Sanni, N. Yeh, N.I. Afaleg, A.O. Kaabi, S.M. Ma, C. Levesque, J.M. Donadille</i>	

Critically-Stressed-Fracture Analysis in Naturally Fractured Carbonate Reservoir—A Case Study in West Kuwait	960
<i>Naveen K. Verma, Fahed Al-Medhadi, Javier A. Franquet, Robert Maddock, D. Natarajan, Eman Al-Mayyas</i>	
An Integrated Approach To Efficiently Unlock the Resource Potential in a Large Cluster of Fields	967
<i>Martin A. Kraaijveld, Jon B. Hognestad, Ajay Samantray, Pius Udeh, Waleed Bulusher Al Kindy, Ayman Ibrahim, Norbert Janusz</i>	
Expert Determination in International Oil & Gas Disputes: The Impact of Lack of Harmonization in Reserves Classifications Systems and Uncertainty in Reserves Estimates.....	983
<i>S.P. Stultz-Karim</i>	
The Identification of Condensate Banking With Multiphase Flowmeters—A Case Study.....	997
<i>B.C. Theuveny, P.D. Maizeret, N.S. Hopman, S. Perez</i>	
Preventive Treatment for Enhancing Water Removal From Gas Reservoirs by Wettability Alteration	1004
<i>Mohan K.R. Panga, Suzylawati Ismail, Mathew Samuel</i>	
Improved Oil Recovery by Application of Ultrasound Waves to Waterflooding	1015
<i>M.M. Amro, M.A. Al-Mobarky, E.S. Al-Homadhi</i>	
Applications of Streaming Potential Transient Tests to Electrokinetic Characterization of Oil Reservoirs	1023
<i>Saad F. Alkafeef, Nab M. Alajmi, Abdullah F. Alajmi</i>	
Volume 3	
A Novel Approach of Detecting Water Influx Time in Multizone and Multilateral Completions Using Real-Time Downhole Pressure Data.....	1030
<i>G.H. Aggrey, D.R. Davies, L.T. Skarsholt</i>	
Recent Advances in the Understanding and Incorporation of the Multiphase Fluid Flow Properties of Fault Rocks Into Production Simulation Models.....	1041
<i>Suleiman M. Al-Hinai, Quentin J. Fisher, Carlos A. Grattoni, Simon D. Harris, Bader S. Al-Busafi</i>	
An Accurate Multiphase Upscaling for Flow and Transport in Heterogeneous Porous Media	1051
<i>Yan Li, Yalchin Efendiev, Richard E. Ewing, Guan Qin, Xiao-Hui Wu</i>	
Multiphysics and Multiscale Methods for Modeling Fluid Flow Through Naturally Fractured Vuggy Carbonate Reservoirs	1057
<i>Peter Popov, Linfeng Bi, Yalchin Efendiev, Richard E. Ewing, Guan Qin, Jianglong Li, Yulin Ren</i>	
Applications of Mechanical External Casing Packers.....	1066
<i>Miguel Armenta, Ali Al-Ghamdi, Ali Al-Hajji</i>	
Analyses of Wellbore Instability in Drilling Through Chemically Active Fractured Rock Formations: Nahr Umr Shale.....	1072
<i>Vinh Nguyen, Younane Abousleiman, Son Hoang</i>	
Application of Thermal Recovery Processes in Heavy Oil Carbonate Reservoirs.....	1087
<i>Swapan Das</i>	
Improving Injector Efficiencies Using Streamline Simulation: A Case Study in a Giant Middle East Field.....	1096
<i>S.G. Ghori, S.Z. Jilani, A.H. Al-Huthali, D. Krinis, A. Kumar</i>	

First Full Field Steam Injection in a Fractured Carbonate at Qarn Alam, Oman	1104
<i>R. Penney, S. Baqi Al Lawati, R. Hinai, O. van Ravesteijn, K. Rawnsley, P. Putra, M. Geneau, A. Ikwumonu, M. Habsi, H. Harrasy</i>	
Development of a New Artificial-Neural-Network Model for Predicting Minimum Miscibility Pressure in Hydrocarbon Gas Injection	1110
<i>Y. Birang, N. Dinarvand, S.F. Shariatpanahi, M. Edalat</i>	
An Empirical Saturation Modeling of a Complex Carbonate Abu Dhabi Reservoir Using the Routine High-Pressure Mercury and Oil/Water Capillary Pressure Data.....	1115
<i>R.E. Mahmoud Basoni, R.E.C. Shahin Negahban, S.R.E. Ahmed Dawood, S.R.E. Ahmed El Mahdi, T.L. Jamal Bahamaish</i>	
Implication of Properly Tuned EOS and Properly Measured SCAL on Prediction of Rates, Reserves, and Field Performance using a Full-Field, Fully Compositional Model for an Offshore Complex Carbonate Field in Abu Dhabi, UAE	1130
<i>Salma Al Hejeri, Ahmed El Mahdi, Shahin Negahban</i>	
An Integrated Approach for a Full-Field, Optimized Development of a Carbonate Reservoir on a Shallow Marine Environment, Abu Dhabi	1138
<i>Ahmed El Mahdi, Mohammed Ayoub, Samy Daif-Allah, Shahin Negahban, Maria Ribeiro, Jamal Bahamaish</i>	
Tight Reservoirs—A Development Challenge Example From a Carbonate Reservoir Offshore Abu Dhabi, UAE	1153
<i>Salma Al Hajeri, Abeer Al Shehhi, Maria Teresa Ribeiro, Mohamed Ayoub, Shahin Negahban, Jamal Bahamaish</i>	
Identification of High-Porosity Reservoir Sands From 3D-Seismic Attributes Using Neural Network Technique in South Umm Gudair Field, Kuwait	1160
<i>Ram Kumar Thakur, Frederic Duval, Claude Boibien, Gilles Pages</i>	
Improvement of Business Processes Through Knowledge Management	1168
<i>S.R. Gatta</i>	
Enhanced Oil Recovery by Hot CO₂ Flooding	1182
<i>Mahesh Shrichand Picha</i>	
A Novel Approach to Fracture Characterization Utilizing Borehole Seismic Data.....	1187
<i>Pradyumna Dutta, Sunil Kumar Singh, Jarrah Al-Genai, Azhar Akhtar, Mahmood Akbar</i>	
Cuttings Removal Simulation for Deviated and Horizontal Wellbores	1193
<i>S.A. Mirhaj, S.R. Shadizadeh, M. Fazaelizadeh</i>	
Reservoir Candidate Screening Is Critical To Ensure Successful Application of Underbalanced Drilling Technology—Case Study	1199
<i>Salar Babajan, Hani Qutob</i>	
State of the Art in Geophysics and Wells Imaging for Giving a New Lease on Life to Giant Brownfield	1204
<i>Zayda Sanchez-Perez, Emmanuelle Baud, Frederic Jeanjean, Gilles Cassou, Jean-Louis Lesueur</i>	
Characterization of Fractures and Faults From High-Resolution Image Logs To Optimize the Geological Model of a Fractured Carbonate Reservoir, Offshore Abu Dhabi.....	1210
<i>Sandeep Chakravorty, Jean-Louis Lesueur, Xavier Poirier-Coutansais, Jean-Yves Gory, Ashok Srivastava, Scott Reynolds</i>	
Rotary Steerable System Technology Case Studies in a High-Volume, Low-Cost Environment	1217
<i>G. Akinniranye, W.D. Kruse, A. Bautista Gomez, B. Poedjono, B. Dubose, R.B. Goobie, J. Hobin</i>	

Using GIS as a Data Access and Integration Platform.....	1228
<i>James R. Blaha</i>	
Development of a Deep-Penetrating Emulsified Acid and Its Application in a Carbonate Reservoir	1238
<i>Dilip Kumar Sarma, Pavan Agarwal, Eashwar Rao, Pradip Kumar</i>	
Case Studies of Emulsion Behavior at Reservoir Conditions.....	1245
<i>Sunil Kokal, Mohammed Al-Dokhi</i>	
First Application of Underbalanced Drilling in Fractured Carbonate Formations of Iranian Oil Fields Leads to Operational Success and Cost Savings	1251
<i>A. Hooshmandkoochi, M. Zaferanieh, A. Malekzadeh</i>	
Application of a Hybrid Dual-Porosity/Dual-Permeability Representation of Large-Scale Fractures to the Simulation of a Giant Carbonate Reservoir	1255
<i>Halilu M. Uba, Yann Chiffolleau, Tony Pham, Vincent Divry, Abdulaziz Kaabi, Jamil Thuwaini</i>	
Feasibility Study of In-Situ Combustion in a Carbonate Reservoir	1266
<i>S. Vahidreza Mostafavi, R. Kharrat, S. Razzaghi</i>	
Development Approach Appraisal: An Effective Way To Evaluate Employees' Performance	1272
<i>Moustafa AbouHeif</i>	
Clustering and Corridoring Project and Challenges	1296
<i>Amjad Elabed, Ihtisham Ur Rahim</i>	
Gas Blending for Miscible Gasfloods in South Oman.....	1305
<i>G. Deinum, B. Dindoruk, M. O'Dell</i>	
Nuclear Magnetic Resonance Logging: While Drilling, Wireline, and Fluid Sampling	1312
<i>Douglas J. Seifert, Ridvan Akkurt, Saleh Al-Dossary, Ramez Shokeir, Haluk Ersoz</i>	
A Systematic Approach To Remove Iron Sulphide Scale: A Case History.....	1322
<i>Jairo Leal, J. Ricardo Solares, H.A. Nasr-El-Din, Carlos Franco, Francisco Garzon, Hamad M. Marri, S.A. Aqeel, Guillermo Izquierdo</i>	
Pressure Transient Behavior of Horizontal and Slant Wells Intersecting a High-Permeability Layer	1332
<i>Harmohan Gill, Rayed Al-Zayer, Mohammed Ben Issaka</i>	
Smart Wells Experiences and Best Practices at Haradh Increment-III, Ghawar Field	1345
<i>Ibrahim H. Al-Amaout, Rashad M. Al-Zahrani, Suresh Jacob</i>	
A Case Study of the Application of Slimhole Passive Inflow-Control Devices To Revive Wells With Tubular Limitations in a Mature Field	1351
<i>Stig Lyngra, Drew Hembling, Tareq M. Al-Zahrani, Uthman F. Al-Otaibi, Hassan S. Al-Marhoun, Adam B. Anderson</i>	
Lessons Learned From Repickling Old/Sour Gas Wells	1357
<i>H.A. Nasr-El-Din, F. Garzon, S.H. Al-Mutairi, S. Al-Driweesh, A.M. Al-Harith</i>	
New Cement Formulation That Solves Gas Migration Problems in Iranian South Pars Field Condition	1368
<i>M. Mohammadi Pour, J. Moghadasi</i>	
Survey Accuracy Extends Well Displacement at Minimum Cost	1376
<i>Bart Landry, Benny Poedjono, Goke Akinniranye, Mike Hollis</i>	

A New Technique To Determine Horizontal and Vertical Permeabilities From the Time-Delayed Response of a Vertical Interference Test	1381
James J. Sheng	
Reservoir Candidate Screening: The SURE Way to Successful Underbalanced Drilling Projects—Case Study.....	1391
Ashraf Keshka, Ali Salem Al Rawahi, Rashed Abdulla Al Murawwi Khalid Al Yaqqeeb, Hani Qutob, Said Boutalbi, Jaime Villatoro	
A New Tool To Evaluate the Feasibility of Petroleum Exploration Projects Using a Combination of Deterministic and Probabilistic Methods	1402
Mohammed Siddiqui, Karam Al-Yateem, Abdulla Al-Thawadi	
Protecting Industrial Process Control, Automation, and SCADA Systems From Cyber Threats	1410
J. Lowe, J. Lasky, D. Gilbert, K. Sheil	
Support Vector Machines Framework for Predicting the PVT Properties of Crude-Oil Systems	1416
E. El-Sebakhy, T. Sheltami, S. Al-Bokhitan, Y. Shaaban, I. Raharja, Y. Khaeruzzaman	
Integrating Advanced Production Logging and Near-Wellbore Modeling in a Maximum-Reservoir-Contact (MRC) Well	1430
S. Mubarak, N.I. Al-Afaleg, T.R. Pham, M. Zeybek, A. Soleimani	
Solid Tubular Expansion in Horizontal Wells.....	1439
T. Pervez, A.C. Seibi, S.A. Al-Hiddabi, F.K. Al-Jahwari, S.Z. Qamar, F. Mrketz	
Intelligent-Well Technology Used for Oil Reservoir Inflow Control and Auto-Gaslift, Offshore India.....	1448
Michael Konopczynski, Mike Tolan	
Detecting and Analysing Fractures in the Subsurface: The Critical Steps in Modeling Fractured Carbonate Reservoir	1455
Mohamed Elhami Elsaied, Ghassan M. Al-Jafri, Gary Mercado, Yuki Sugawara	
Inflow Profile Control in Horizontal Wells in a Fractured Carbonate Using Swellable Elastomers.....	1462
Rudy W.F. Welling, Franz Marketz, Riyadh Moosa, Noha Riyami, Edward J. Follows, Gerbert de Bruijn, Khalid Hosny	
Optimization of High-Pressure, High-Rate (HP/HR) Gas Wells in a Giant Offshore Field	1472
J.M. Benesch, J.Z. Gahr, A.H. Al-Mohsin, M.H. Schmidt	
A Case Study of the World's First Maximum-Reservoir-Contact Well With Intelligent Well Systems and MultiPhase Flow Monitoring.....	1487
Fahad Al-Bani, Hassan Al-Sarrani, Ibrahim Arnaout, Adam Anderson, Yaser Aubed, E.S. Johansen	
A Step Change in Openhole Gravelpacking Methodology: Drilling-Fluid Design and Filter-Cake Removal Method	1496
Matthew Law, George W. Chao, Hafeez Ab Alim, Elsamma Samuel, Aziz Ejan, Abdul Hameed Mohsen, Mathew Samuel	
Cement Seal Units Eliminate Interzonal Communication	1505
S.Z. Elzeghaty, Holger Kinzel, R.L. Colvard	
Utilizing the Effect of Nitrogen To Implement Light Oil-Air Injection in Malaysian Oil Fields	1514
Zeeshan Mohiuddin, D.M. Anwar Raja, Ismail Mohd Saaid	

Accreditation of an Oil Company Training Scheme for Graduate Engineers 1520
Hisham Saadawi, Wathik Al Sammarai

**The Importance of Hole Quality for Effective Image Log Interpretation Clearly
Demonstrated in an Eight Well Program in Kuwait** 1524
Saud Jumah, Khaled Saleh, Haitham I. Al-Mayyan, Mike Turner

Author Index