

Society of Petroleum Engineers

# SPE Latin American and Caribbean Petroleum Engineering Conference

X|LACPEC|07

April 15-18, 2007  
Buenos Aires, Argentina

Volume 1 of 3

**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: 978-1-60423-009-3

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 Latin American and Caribbean Petroleum Engineering 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](mailto:pdf@spe.org) or mail to the SPE Americas Office, attention Technical Paper Administrator.



Society of Petroleum Engineers

SPE Latin American and Caribbean Petroleum Engineering Conference  
2007

**TABLE OF CONTENTS**

**Volume 1**

<b>DTS Transient Analysis: A New Tool to Assess Well-Flow Dynamics</b> .....	1
<i>D. Johnson, J. Sierra, D. Gualtier, J. Kaura</i>	
<b>Multicomponent OBC (4C) Imaging Over Pamperi, LRL Block, Offshore Trinidad</b> .....	12
<i>T.D. Johns, C. Vito, R. Clark, R. Sarmiento</i>	
<b>Foam Drilling Simulator</b> .....	17
<i>Amir Paknejad, Jerome J. Schubert, Mahmood Amani</i>	
<b>Liquid Cement: Changing the Paradigm</b> .....	32
<i>Ramy N Eid, Patrick Mays</i>	
<b>The Application of Expandable Tubulars in Casing While Drilling</b> .....	40
<i>Yash Gupta, Sudeepo N. Banerjee</i>	
<b>Determination of Free-Water Levels in Low-Permeability Chalk Reservoirs From Logged Saturations</b> .....	48
<i>N. Bech, P. Frykman, O.V. Vejbæk</i>	
<b>Innovative Ultralightweight Spacer for Cementing Jobs Without Nitrogen or Diesel</b> .....	55
<i>Rafael Zepeda G., José Antonio Martínez R., Reinaldo Maldonado, José Luis Bustillos G.</i>	
<b>Staircase Lifting of Oil Using Venturi Principle: A New Artificial-Lift Technique</b> .....	62
<i>Siddhartha Gupta</i>	
<b>Successful Experiences for Water and Gas Shutoff Treatments in North Monagas, Venezuela</b> .....	73
<i>Lenin Perdomo, Héctor Rodríguez, María Llamedo, Luis Oliveros, Edwin González, Osmel Molina, Claudio Giovingo</i>	
<b>Application of Rock Strength in Drilling Evaluation</b> .....	86
<i>R. Nygaard, G. Hareland</i>	
<b>Bati Raman Field Immiscible CO2 Application: Status Quo and Future Plans</b> .....	93
<i>Secaeddin Sahin, Ulker Kalfa, Demet Celebioglu</i>	
<b>Maximizing Well Productivity Through Water and Sand Management: A Combined Treatment</b> .....	106
<i>Philip D. Nguyen, Stephen R. Ingram, Mauricio Gutierrez</i>	
<b>Simulation Study of Drilling Horizontal Wells in One of Iranian Oil Fields</b> .....	116
<i>Abbas Azarkish, Elham Khaghani</i>	
<b>Permeability Upscaling Techniques for Reservoir Simulation</b> .....	128
<i>M.O. Salazar, J.R. Villa</i>	
<b>The Beta Distribution and Its Application to Petrophysics</b> .....	145
<i>Robert Gullco, Malcolm Anderson</i>	
<b>Viscosity Prediction of Crude Oils With Genetic Algorithms</b> .....	160
<i>Yasin Hajizadeh</i>	

<b>Phase Envelopes From Black-Oil Models</b> .....	165
<i>Miguel H. Schindler</i>	
<b>SAGD Optimization With Air Injection</b> .....	174
<i>J.D.M. Belgrave, B. Nzekwu, H.S. Chhina</i>	
<b>New Flow Regimes for Well Near-Constant-Pressure Boundary</b> .....	182
<i>W. Sui, J. Mou, L. Bi, J. Deng, C. Ehlig-Economides</i>	
<b>Calculating Seismic Attributes Within a Reservoir Flow Simulator</b> .....	194
<i>Alexandre Anozé Emerick, Rafael Jesus de Moraes, José Roberto Pereira Rodrigues</i>	
<b>New Clean up System for Gravel Pack Completions: A Synergy of a Unique Acid System and Special Rotating Jetting Tool</b> .....	206
<i>Jacqueline Aguiar, Jefferson M. PorDeus, João B. Almeida, Ricardo C.B. Melo, Ricardo S. Aboud, Luis Duque</i>	
<b>Variations in Structural Styles Across the Burgos Basin, Mexico</b> .....	214
<i>Esmer Orlando Rivas-Reyes, Genaro Ziga-Rodriguez, Trinidad Martinez-Vasquez, Lynne R. Goodoff</i>	
<b>Petroleum Facilities Reliability Assesment Model</b> .....	229
<i>Luis Palmieri, Pablo Alonso, Adrián Moreno</i>	
<b>Practical Interpretation of Pressure Tests of Hydraulically Fractured Wells in a Naturally Fractured Reservoir</b> .....	238
<i>Djebbar Tiab, Youcef Bettam</i>	
<b>Integrated Management in a Mature Field in the Brazilian Continental Margin</b> .....	249
<i>M.F. Silva, M.S. Malta, L.H. Zapparolli, P.M. Silva</i>	
<b>Feasibility Study of Ultrasound for Oilwell Stimulation Based on Wave Properties Considerations</b> .....	255
<i>Sergio Caicedo</i>	
<b>Results in Construction and Completion for Extend-Instrumented Horizontal Wells Into Low-Pressure Zone: Case History—Reservoir Miocene LI-03, Maracaibo Lake Venezuela</b> .....	261
<i>Sergio Pizzarelli, David Alter, Edwin Tillerio, Jose Luis Garcia, Tulio Leal</i>	
<b>Water Saturation in Tight Gas Reservoirs</b> .....	268
<i>M.A. Crotti</i>	
<b>Flow Assurance: Reliable and Accurate Prediction of the Viscosity of Natural Gas</b> .....	273
<i>V. Vesovic</i>	
<b>First Experience in the Application of Radial Perforation Technology in Deep Wells</b> .....	279
<i>Raúl Andrés Cirigliano, Juan Felipe Talavera Blacutt</i>	
<b>Past Technologies Emerge Due to Lightweight Proppant Technology: Case Histories Applied on Mature Fields</b> .....	292
<i>Ricardo S. Aboud, Ricardo C.B. Melo</i>	
<b>Casing and Liner Drag Forces as Design and Analysis Parameter for Complex Architecture Wells</b> .....	297
<i>Ciccola F. Vicente L.</i>	
<b>Openhole Horizontal Gravel Packing Offshore Brazil: Best Practices and Lessons Learned From 72 Operations</b> .....	306
<i>R. Farias, J. Li, A. Vilela, R. Aboud</i>	
<b>A General Approach for Asphaltene Modeling</b> .....	325
<i>Néstor L. Sánchez</i>	

<b>Porosity with Nuclear Magnetic Resonance in Naturally Fractured Clastics Reservoirs in the Devonian of the Bolivian Sub-Andean</b> .....	330
<i>Omar Aguirre, Juan Carlos Glorioso, Jeannette Morales, Jean François Mengual</i>	
<b>Free-Fall Gravity Drainage in Fractured Matrix Blocks: Experimental and Network Modeling Simulation Findings and Observations</b> .....	342
<i>Alireza Mollaei, M. Haghighi, B. Maini, A. Ataei</i>	
<b>Interpretation of Post Deep-Acidizing Pressure Tests in a Naturally Fractured Reservoir</b> .....	359
<i>Omar Bensalem, Djebbar Tiab</i>	
<b>Change in Patterns in the Application of a Vertical Drilling System (Stabilized Drilling System) VDS in the Basin of the Gulf of San Jorge</b> .....	373
<i>Hugo Marquez, Marcelo Croveto, Cameron Wallace</i>	
<b>Modeling Two-Phase Flow in Porous Media With Consideration of Jump Interfaces</b> .....	376
<i>Xiaolong Peng, Zhimin Du, Baosheng Liang, Zhilin Qi, Wei Wang</i>	
<b>Developing and Field Implementation of a State-of-the-Art BHA Program</b> .....	382
<i>David C-K Chen</i>	
<b>Dynamic Nodal Analysis in Well Testing Interpretation</b> .....	392
<i>Miguel H. Schindler</i>	
<b>Optimization of the Prediction of Hydrocarbon-Producing Zones Through Integration of Petrophysical Evaluation Methodologies in the Estancia Cholita Field, Gulf of San Jorge Basin</b> .....	403
<i>Franco Vittore, Javier Pompei, Oscar Ortiz, Anthony Pol</i>	
<b>Advances in After Closure Analysis for Naturally Fractured Reservoirs</b> .....	414
<i>O. Uribe, D. Tiab, D. Restrepo, S. Chipperfield</i>	
<b>Integration of Subsurface, Surface and Economics Under Uncertainty in Orocuai Field</b> .....	425
<i>Rosa Rodríguez, Karen Solano, Siulenna Guevara, María Velásquez, Luigi Saputelli</i>	
<b>Production Optimization With Intelligent Wells</b> .....	441
<i>Alexandre Anozé Emerick, Ricardo Cunha Mattos</i>	
<b>Classic Models of Calculation of Influx: A Comparative Study</b> .....	450
<i>J. B. Marques, O. V. Trevisan, S. B. Suslick</i>	
<b>Use of Self-Lubricated Plungers in Sucker Rod Pumps Producing Oil From Wells in North Santa Cruz</b> .....	462
<i>F. Bertomeu, N. Rodriguez</i>	
<b>Surveillance Planning: The Key to Managing a Mature Gas Reservoir</b> .....	474
<i>Kamal Samsundar, Roshni Moosai, Ronald Chung</i>	
<b>A Novel Improved Condensate-Recovery Method by Cyclic Supercritical CO2 Injection</b> .....	481
<i>Millán Arcia E., Y. Gerder, J. Gil</i>	
<b>A Case Study of Latest Technologies Enables Successful Completion of ERD Exploration Project Off the Coast of Tierra del Fuego</b> .....	487
<i>David Kulakofsky, Alessandro Oliveiro</i>	
<b>Monitoring and Controlling Paraffin Deposition by a Direct Assessment Technique</b> .....	498
<i>Carlos I. Gomez, D. Edgardo, J. Medina F.</i>	

<b>The MEG (Mono Ethylene) Injection Gas Dehydration Process Evaluation for the Margarita Field Development</b> .....	507
<i>Moises Alfredo Vergara Contreras, Nicolas Foucart</i>	
<b>Selection Slug Catcher Type</b> .....	512
<i>Moises Alfredo Vergara Contreras, Nicolas Foucart</i>	
<b>Maximization of the Exploration and Development Efforts in Petroleum Field and Its Impact on the Hotelling's Model</b> .....	517
<i>J. B. Marques, O. V. Trevisan</i>	
<b>Anisotropic PP and PSv Prestack Depth Migration of 4C (OBC) Seismic Data, Pamberi, Offshore Trinidad</b> .....	526
<i>T.D. JohnsC. Vito, R. Sarmiento</i>	
<b>Optimal Development Strategies to Different Scenarios of Reservoir Properties: Application to a Real Field</b> .....	533
<i>M.C. Salomão, F.P. Figueiredo Júnior</i>	
<b>On Equation of State</b> .....	539
<i>Tarek Ahmed</i>	
<b>Identifying, Correcting, and Allocating Geodetic Systems to Georeferenced Data in Hydrocarbon Exploration by Using High-Resolution Satellite Imagery</b> .....	560
<i>Gabriel Alvarez</i>	
<b>Recovery of Heavy Oil by Thermoelectric Stimulation With Cyclical Injection of a Liquid Solvent, Maracaibo, Venezuela</b> .....	565
<i>Carlos E. Colmenares O</i>	

## Volume 2

<b>A Multiphase Flow Correlation for Low-Rate and Low-GLR Gas Wells</b> .....	581
<i>Manuel Vidal, Guido Kuzanovich, Carlos Hoffmaister, Enap Magallanes, Carlos Gilardone, Juan Iervasi, Carlos Canel</i>	
<b>Strategic Plan of SCADA, Automation and Control Systems for Business Unit Las Heras</b> .....	593
<i>Gonzalo Diaz, Jorge Gonzalez del Port</i>	
<b>Applications of Electric Logs and Geomechanical Models to Optimize Drilling and Well Completions in the Burgos Basin</b> .....	602
<i>Norberto Monroy-Ayala, Antonio Hernández-Patiño, Eduardo Celis, Judith Sheridan, Chris Ward</i>	
<b>New Integrated Applications Using T1 and T2 Modes of Magnetic Resonance in Tight Gas Reservoirs: A Case Study From Northern Mexico</b> .....	611
<i>Norberto Monroy Ayala, Rogelio Muñoz, Raul Rico, Cesar Palacios, Juan Pablo Torne</i>	
<b>A Second-Order Mimetic Approach for Tracer Flow in Oil Reservoirs</b> .....	626
<i>J.M. Guevara-Jordan, J. Arteaga-Arispe</i>	
<b>Predictive Data-Mining Technologies for Oil-Production Prediction in Petroleum Reservoir</b> .....	634
<i>L.C.F. da Silva, R.C.M. Portella, A.A. Emerick</i>	
<b>Heavy-Oil Recovery Mechanisms During Steam Injection in Naturally Fractured Reservoirs</b> .....	639
<i>J. A. Mateo Hernandez , O. V. Trevisan</i>	

<b>Production Optimization Using the Capillary Technology in the Loma La Lata Field</b> .....	650
<i>P. Cabral, C.R. Giérega</i>	
<b>Overview of H2S Souring Cases in Argentina Reservoirs: Origin and Mitigation Sceneries</b> .....	664
<i>A.N. Cavallaro, M.I. Alberdi, G.R. Galliano</i>	
<b>Static and Dynamic Models of Formation Water in Sincor Area, Orinoco Belt, Venezuela</b> .....	671
<i>J. Marcos, E. Pardo, J. Casas, D. Delgado, M. Rondon, M. Exposito, L Zerpa</i>	
<b>Radial Drilling in Argentina</b> .....	682
<i>M. Bruni, H. Biassotti, G. Salomone</i>	
<b>Biostimulation Treatments of Hydrocarbon-Contaminated Soil in Semiarid Patagonia, Argentina</b> .....	693
<i>P.A. Haro, J.D. Perez, A.F. Alvarez</i>	
<b>The Challenges of Developing a Deep Offshore Heavy-Oil Field in Campos Basin</b> .....	699
<i>F.P. Figueiredo Júnior, C.C.M. Branco, F. Prais, M.C. Salomão, C.C. Mezzomo</i>	
<b>Streamline-Based Simulator for Unstructured Grids</b> .....	707
<i>M. Pomata, A. Menéndez</i>	
<b>New Methodology of Effective Hydraulic Fracturing in High-Thickness Formation</b> .....	713
<i>Raul Sanchez, Regis Agut, David Coulon</i>	
<b>Are the Oil Recoveries Distributed Lognormally? If Not, There May Be Information in the Differences</b> .....	720
<i>G.S. Wattlely</i>	
<b>Estimation of Rock Properties Applying an Alternative Geostatistical Autocorrelation Tool</b> .....	730
<i>A.F. Saccomano, G.B. Savioli</i>	
<b>Offshore LNG Technology: A Comparative Study of Conventional and Futuristic Salt-Cavern-Based LNG Receiving Terminals</b> .....	739
<i>Sanchit Rai</i>	
<b>Effects of Stress on Fracture Properties of Naturally Fractured Reservoirs</b> .....	748
<i>Abel Chacon, Djebbar Tiab</i>	
<b>Validating the Use of Experimental Design Techniques in Exploratory Evaluations</b> .....	762
<i>T. Amorim, B. Moczydlower</i>	
<b>A Quadrilateral Element-Based Finite-Volume Formulation for the Simulation of Complex Reservoirs</b> .....	768
<i>F.S.V. Hurtado, C.R. Maliska, A.F.C. da Silva, J. Cordazzo</i>	
<b>Quebrache—A Natural CO2 Reservoir: A New Source for EOR Projects in Mexico</b> .....	778
<i>Heron Gachuz Muro, Sergio Berumen Campos, Luis O. Alcazar Cancino, José A. Rodríguez Pimentel</i>	
<b>Characterizing the Complex Shaly Sand Oil Reservoirs in San Jorge Basin, Argentina, Using Advanced Magnetic Resonance Techniques</b> .....	787
<i>Maged Y. Fam, Julio A. Vieiro</i>	
<b>Utilization of Artificial Neural Networks in the Optimization of History Matching</b> .....	799
<i>Asha Ramgulam, Turgay Ertekin, Peter B. Flemings</i>	
<b>Proven Synergistic Approach in Well Cementing Across Thief Zones: East Venezuela</b> .....	814
<i>N. Tranquini, J. Soto, V. Reveth, L. Prato, H. Williams</i>	

<b>Trust-Region Approach To Find Constants of Bourgoyne and Young Penetration Rate Model in Khangiran Iranian Gas Field</b> .....	823
<i>A. Bahari, A. Baradaran Seyed</i>	
<b>Case History: Application of CHI Modeling®* Using Pulsed Neutron to Create Pseudo Openhole Logs in Highly Deviated Wells Using Special Techniques for Logging and Perforating in Veracruz, Mexico</b> .....	829
<i>Skip Reed, Juan Pablo Torne, Erick Pacheco, Augusto Lara, Cesar Palacios, Juan Manuel Riaño, Alejandro Corral, Martin Casares, Jose D. Simon, Rafael Arteaga</i>	
<b>HPWBM as a Technical Alternative to Drill Challenging Wells Project: Lessons Learned in Deepwater Brazil</b> .....	841
<i>Mario A Ramirez, Eliabe Moura, Edgar Luna</i>	
<b>Swelling Packer Technology Eliminates Problems in Difficult Zonal Isolation in Tight-Gas Reservoir Completion</b> .....	852
<i>Luiz Antonio, Oscar Barrios, German Martinez</i>	
<b>Relative-Permeability Modifiers and Their Use in Acid Stimulation in HP/HT Low-Permeability Carbonate Formations: Offshore Mexico Cases</b> .....	856
<i>Eduardo Soriano Duverney, Fernando Robles</i>	
<b>Optimization of Stimulation Treatments in Medium-Permeability Gas/Condensate Reservoirs Using Real-Time Downhole Data Acquisition With Novel Technology of Permanent Sensors</b> .....	864
<i>Arturo Santillan, Antonio Inda, Octavio Steffani</i>	
<b>Advanced Numerical Simulator To Predict Productivity for Conventional and Nonconventional Well Architecture</b> .....	872
<i>Eduardo Pacheco, Rene Castro, M.Y. Soliman</i>	
<b>A Performance Review of 14 Horizontal Wells in Baronia Field After 12 Years of Production</b> .....	879
<i>Maharon Jadid, Mohd Fahmi Mustapah</i>	
<b>Severe Downhole Frictional Heating Driving Increase in Drillstring Failures</b> .....	888
<i>Michael J. Jellison, Lucien Hehn, R. Brett Chandler, Grant Prideco, Jeff S. Shepard</i>	
<b>Optimum Horizontal Well Placement in Very Low Resistivity Reservoir With a Directional and Deep Logging-While-Drilling Technology</b> .....	900
<i>A. Silva, J. Caverro, W. Rodriguez, M. Augusto, J. Vargas, R. Chacon, A. Bardales</i>	
<b>Advances in Coiled Tubing Re-entry Access Bypassed Reserves on Alaska's North Slope</b> .....	906
<i>R. Madarapu, B. M. Lasley, C. S. Corson, I. Hinze, S. Carey</i>	
<b>Probabilistic Determination of Productivity Index for a Horizontal Well in a Heavy-Oil Reservoir</b> .....	911
<i>E.A. Lisboa, M.R. Castro</i>	
<b>Recycling and Final Disposal of Waste Generated While Mixing Drilling and Completion Fluids</b> .....	916
<i>Johanna Pedraza, Mario Serrano</i>	
<b>PIMS (SDIP)—Safe Driving Integrated Process: An Integral Vision To Solve an Old Problem</b> .....	920
<i>Carlos M. Martín</i>	
<b>Hydrocarbon Reserves and Production Increment in Laminated Sand/Shale Reservoir From 3D Resistivity Measurements, Image Logs, and Magnetic Resonance Technology</b> .....	924
<i>Miguel Vielma, Ricardo Vandini</i>	

<b>Physical Model Development To Study Sand Production .....</b>	<b>930</b>
<i>Jothsimar González, José Alvarellós, Hector González, Victor Lara</i>	
<b>Engineering Evolution for an Effective Zonal-Isolation Process in Production Casings for the Antonio J. Bermúdez Basin in South Mexico .....</b>	<b>936</b>
<i>Francisco Cázares Robles, Marco Antonio Corona Corbalá, Rafael Rodríguez Monroy, David Kulakofsky, Carlos Caballero, Jorge Rivera</i>	
<b>Cement Design to Optimize Production in a Highly Active Waterdrive Reservoir .....</b>	<b>948</b>
<i>Carlos Capacho, Felipe Baquero, Kris Ravi, Jose Vela</i>	
<b>The Frade Development Asset: How Robust Project Management Drove the Asset From Economically Marginal to One Company's Cornerstone Development Project in Brazil .....</b>	<b>962</b>
<i>J.M. Bergeron</i>	
<b>Neural Network and 3D Seismic Techniques Improve the Prediction of Facies Distribution Within a Submarine Channel Complex: Neuquen Basin, Argentina .....</b>	<b>971</b>
<i>F. Raggio, A. Ortin, C. Martinez, P. Uzzo</i>	
<b>Effect of the Elastic Constants on the Pressure Behavior of Vertical Wells .....</b>	<b>978</b>
<i>Freddy Humberto Escobar, Oscar Armando Munoz, Diego Fernando Brinez, Julio Cesar Guzman, Jose Humberto Cantillo</i>	
<b>Well Pressure Behavior for a Vertical Well in a Gas Condensate Naturally-Fractured Reservoir .....</b>	<b>989</b>
<i>Freddy Humberto Escobar, Humberto Garcia-Rocha, Ivan Mauricio Suaza, Jose Humberto Cantillo</i>	
<b>Polymer Flooding: A Sustainable Enhanced Oil Recovery in the Current Scenery .....</b>	<b>999</b>
<i>Ivonete P. Gonzalez da Silva, Maria Aparecida de Melo, Jose Marcelo Luvizotto, Elizabete F. Lucas</i>	
<b>Improving Reserves and Production Using a CO2 Fluid Model in El Trapial Field, Argentina .....</b>	<b>1008</b>
<i>M.A. Crotti, Gustavo Fernandez, Martin Terrado</i>	
<b>Comparison of Methodologies to Evaluate the Risk of Petroleum Fields .....</b>	<b>1016</b>
<i>Eliana L. Ligeró, Fernanda V. Alves Risso, Denis J. Schiozer</i>	
<b>Decision-Making Process in Development of Offshore Petroleum Fields .....</b>	<b>1024</b>
<i>Suzana H. Deguchi Hayashi, Eliana L. Ligeró, Denis J. Schiozer</i>	
<b>Surface Facilities Development for Mature Fields .....</b>	<b>1032</b>
<i>Rafael Morales, Jorge Navarro</i>	
<b>A Numerical Model for Multiphase Flow on Oil Production Wells .....</b>	<b>1037</b>
<i>S.P. Ferro, M.B. Goldschmit</i>	
<b>Wireline Logs and Core Data Integration in Los Molles Formation, Neuquen Basin, Argentina .....</b>	<b>1043</b>
<i>L. P. Stinco</i>	
<b>Improved ASP Design Using Organic Compound-Surfactant-Polymer (OCSP) for La Salina Field, Maracaibo Lake .....</b>	<b>1050</b>
<i>E. Guerra, E. Valero, D. Rodríguez, L. Gutierrez, M. Castillo, J. Espinoza, G. Granja</i>	
<b>The Centrifuge as a Tool To Determine the Pore-Throat Size Distribution in Plugs .....</b>	<b>1059</b>
<i>Carlos A. Martin, Maximo E. Ramia, Lucas Barberis</i>	

<b>Correction of Bound and Free Fluid Volumes in the Timur-Coates Permeability Equation for the Presence of Heavy Oil—A Case Study From the Golfo San Jorge Basin, Argentina</b> .....	1066
<i>Hugo Gómez, Luis Sinco, Alejandro Nawratil, Javier Lopetrone, Pedro Romero, Benito Saavedra</i>	
<b>Management of Steam Flooding in Nine Spot with Fiber Optic in Observation Wells</b> .....	1078
<i>M F Silva, R G Izetti</i>	
<b>Generation of a Compositional Model to Simulate EOR Processes for the Complex Fluids System of the Carito-Mulata Field, Venezuela</b> .....	1084
<i>F. Rodríguez, L. López G., J. Bello</i>	
<b>Visualization of New Production Opportunities From Reservoir Characterization of Muri Field, Venezuela</b> .....	1098
<i>A. Malavé, G. Carpio, M. Bolívar, K. Khan, J. Bello</i>	
<b>Optimal Process for Design of Fracturing Treatments in a Naturally-Fractured Volcaniclastic Reservoir: A Case History in the Cupén Mahuida Field, Neuquén, Argentina</b> .....	1106
<i>E. d'Huteau, R. Ceccarelli, M. Pereira</i>	
<b>Defining and Implementing Functional Requirements of an Intelligent-Well Completion System</b> .....	1112
<i>Arashi Ajayi, Michael Konopczynski, Victoria Jackson Nielsen, Corrado Giuliani</i>	
<b>Streamline-Based Integral Modeling for Waterflooding Design Optimization, Surveillance, and Monitoring</b> .....	1119
<i>Mirta Galacho, Pablo Vázquez, Gerardo Laiz, Andrés Krittian, Fabián Gutiérrez, Victor Pací</i>	
<b>Heavy-Crude-Oil Upgrading With Transition Metals</b> .....	1133
<i>H.R. Nares, P. Schacht-Hernández, M.A. Ramírez-Garnica, M.C. Cabrera-Reyes</i>	
<b>Filtration Effect on Water in Oil Emulsions Stabilization in Slop Crude Treatment</b> .....	1143
<i>M. Ricaurte, H. Perozo</i>	
<b>Assessment of CO<sub>2</sub> Corrosion Damage: Likelihood of Failure in Deviated Wells by Deterministic and Stochastic Modelling</b> .....	1149
<i>R. Case, M. Carpio</i>	
<b>Volume 3</b>	
<b>Study of Sweep Efficiency of Water Injection Under Fracturing-Conditions Process</b> .....	1167
<i>Eduin O. Muñoz Mazo, Juan M. Montoya Moreno, Denis J. Schiozer</i>	
<b>An Efficient Response Surface Approach for the Optimization of ASP Flooding Processes: ASP Pilot Project LL-03 Reservoir</b> .....	1176
<i>Luis E. Zerpa, Nestor V. Queipo, Salvador Pintos</i>	
<b>Applications of Organic Geochemistry in Rayoso Formation Characterization: Chihuido De La Sierra Negra, Lomita Field, Neuquina Basin, Argentina</b> .....	1185
<i>E. Lovrincevich, M. Fasola, I. Labayen</i>	
<b>Analysis of Condensate Buildup and Flow Impairment of Retrograde Gases in Fissured Reservoirs</b> .....	1192
<i>H. Ayala, F. Luis, Eduardo Radespiel</i>	
<b>Evolutionary Optimization of Smart-Wells Control Under Technical Uncertainties</b> .....	1199
<i>Luciana Faletti Almeida, Yvan J. Túpac, Juan G. Lazo-Lazo, Marco Aurélio Pacheco</i>	
<b>New Method To Squeeze Perforations and Reduce Sand Production</b> .....	1206
<i>F. Ramón, N. Galacho, M.A. Crotti</i>	

<b>Characterisation of Sulphate Scale Damage System From Pressure Measurements .....</b>	<b>1209</b>
<i>P. Bedrikovetsky, M. Marotti, I.A. Lima Neto, T. Carageorgos</i>	
<b>Integrated Reservoir Management Enhances the Recovery in a Mature Field .....</b>	<b>1221</b>
<i>L. E. Pérez, J. G. Gonzalez, V. Gómez, M. E. Lozano, J. A. Vargas</i>	
<b>Miscible EOR Processes: Existence of Elliptic Regions in Gasflood Modeling .....</b>	<b>1226</b>
<i>T. A. Dutra, A. P. Pires, P. G. Bedrikovetsky</i>	
<b>Integrated Analysis for PCP Systems .....</b>	<b>1234</b>
<i>Oscar Becerra Moreno, Maria Eugenia Mena Romero</i>	
<b>Pressure and PVT Uncertainty in Material Balance Calculations .....</b>	<b>N/A</b>
<i>Carlos A. Garcia, Jose R. Villa</i>	
<b>Estimation of Permeability From Porosity, Specific Surface Area, and Irreducible Water Saturation Using an Artificial Neural Network .....</b>	<b>1244</b>
<i>B. Basbug, Z. Karpyn</i>	
<b>Design and Surveillance of Development Projects Through Specific Software Tools: Importance of Data Management in Mature and Complex Fields in the Golfo San Jorge Basin, Argentina .....</b>	<b>1254</b>
<i>Ricardo Mazzola, Isabel Cano Frers, Dario R. Baldassa, Jorge ValleAlejandro Lacivita, Carlos A. Ponce, Alfredo F. Viola, Miguel A. Laffitte</i>	
<b>Modeling of Facies and Net-to-Gross Ratio Conditioned by Seismic Attribute Maps .....</b>	<b>1261</b>
<i>Carlos Conforti Ferreira Guedes, Darci Jose Sarzenski, Renato Luiz Almeida dos-Santos, Flaviana de Almeida Costa</i>	
<b>Pressure Evidence of Communication Through a Canyon: Sedimentary, Structural, and Reservoir Management Aspects, Campos Basin, Brazil .....</b>	<b>1265</b>
<i>Adriana O. Gangá, Mário Sérgio S. Braga, Edilon R. Silva, Glaucia H. Bragança, Walter B. Maciel</i>	
<b>New Attempt in Improving Sweep Efficiency at the Mature Koluel Kaike and Piedra Clavada Waterflooding Projects of the S. Jorge Basin in Argentina .....</b>	<b>1273</b>
<i>Pablo Adrian Paez Yañez, Jorge Luis Mustoni, Maximo F. Relling, Kin-Tai Chang, Paul Hopkinson, Harry Frampton</i>	
<b>Offshore Exploration in the Golfo San Jorge Basin: A Technological Challenge 100 Years After the Discovery of Oil in Well 2 .....</b>	<b>1283</b>
<i>Ricardo Clavijo, Yudistira Effendi, Anna Ortin</i>	
<b>Hydrocarbon Generation, Migration, and Accumulation Related to Igneous Intrusions: An Atypical Petroleum System From the Neuquen Basin of Argentina .....</b>	<b>1288</b>
<i>Felipe Rodríguez, Héctor J. Villar, Roger Baudino</i>	
<b>Experimental and Numerical Investigation of Proppant Placement in Hydraulic Fractures .....</b>	<b>1293</b>
<i>Eissa M. El-M. Shokir, Abdulrahman A. Al-Quraishi</i>	
<b>Optimizing Producing Wells With Solid Expandable Tubular Technology .....</b>	<b>1304</b>
<i>Eduardo Perez-Roca</i>	
<b>Using Seismic Attributes in Petrophysical Reservoir Characterization .....</b>	<b>1311</b>
<i>Flaviana Costa</i>	
<b>Hybridizing Genetic Algorithms and Real Options to Approach of the Optimal Decision Rule for Oilfield Development Under Uncertainties .....</b>	<b>1316</b>
<i>Juan G. Lazo-Lazo, Marco Aurélio C. Pacheco</i>	

<b>Look Ahead VSP, Inversion, and Imaging From ZVSP and OVSP in a Surface Basalt Environment: Neuquen Basin, Argentina</b> .....	1321
<i>Leonardo Rodríguez Arias, Mario Galaguza, Adrian Sanchez</i>	
<b>Increase Heavy-Oil Production in Combustion Tube Experiments Through the Use of Catalyst</b> .....	1325
<i>M.A. Ramírez-Garnica, D.D. Mamora, H.R. NaresP. Schacht-Hernández, A.A. Mohammad, M.C. Cabrera-Reyes</i>	
<b>Fluid Distribution Model for Structurally Complex Reservoirs in El Carito-Mulata and Santa Bárbara Fields, Venezuela</b> .....	1335
<i>G. Carpio, F. Rodríguez, K. Khan, A. Contreras, L. Campos, C. Idrogo, E. Labastida</i>	
<b>Rubiales Oil Field: A Heavy-Oil Colombian Example of Excellent Operative PCP Systems Development</b> .....	1345
<i>C.A. Rubio, J.M. Doval</i>	
<b>Forecasting Oil Production in Waterflooded Reservoirs</b> .....	1358
<i>Antonio Cláudio de França Corrêa</i>	
<b>Evaluating Reservoir Production Strategies in Miscible and Immiscible Gas-Injection Projects</b> .....	1365
<i>Iman Farzad, Mahmood Amani</i>	
<b>Analytical Evaluation of Gas/Condensate Skin in Hydraulically Fractured Wells</b> .....	1381
<i>Reza Rostami Ravari, Robert A. Wattenbarger, Alireza Rezaei Doust, Mahmood Amani</i>	
<b>Bayesian Characterization of Subsurface Lithofacies and Saturation Fluid</b> .....	1393
<i>Raquel Teixeira, Igor Braga, Luiz Loures</i>	
<b>Material Balance of Fractured Fields—Double Reservoir Method</b> .....	1405
<i>José Renato da Costa Peron</i>	
<b>Water-Alternating-Gas Pilot in the Largest Oil Field in Argentina: Chihuido de la Sierra Negra, Neuquen Basin</b> .....	1411
<i>Esteban Fernandez Righi, Mario Pascual</i>	
<b>Structural Styles and Tectonic Framework of the Fold and Thrust Belt in Tierra del Fuego and Offshore Austral-Malvinas Basins, Argentina</b> .....	1420
<i>P. Bonillo Martínez, D. Figueroa, M.C. Ghiglione</i>	
<b>Water Control in Heavy-Oil Mature Field, Block 1AB</b> .....	1425
<i>Pedro Zegarra Sánchez, Marco Augusto Delgado, Victor Huerta Quiñones</i>	
<b>Challenges and Solutions in Hydraulic Fracture Jobs in Land Fields in Alagoas, Brazil</b> .....	1437
<i>Edson Payão, Luiz Gomes</i>	
<b>Produced Water Reinjection in Mature Field With High Water Cut</b> .....	1443
<i>William NavarroLeytzhher Muro</i>	
<b>Use of Discrete Fracture Network “DFN” to Characterise and Model a Naturally Fractured Sandstone Reservoir: A Case Study of Orocuál Field, San Juan Formation, Venezuela</b> .....	1450
<i>L. Guaquirian, P. Gonzalez, A. Gonzalez, M. Manuela Hernandez, T. Le Maux, L. Mattioni, P. Rouvroy</i>	
<b>Artificial-Lift Systems Overview and Evolution in a Mature Basin: Case Study of Golfo San Jorge</b> .....	1458
<i>Marcelo Hirschfeldt, Paulino Martinez, Fernando Distel</i>	
<b>Evaluation of Different Models for Injectivity Decline Prediction</b> .....	1471
<i>C.J.A. Furtado, A.L.S. Souza, C.H.V. Araujo</i>	

<b>Contrastive Analysis of the Conventional and Unidimensional Dynamic Modeling Applied in an Oil Field of Eastern Venezuela Basin .....</b>	<b>1477</b>
<i>Sonia Lopez, Renato Peron, Carlos Selva, Gustavo Becerra</i>	
<b>Speeding Up Oil Recovery by Infill Drilling Prior to Considering Implementation of a Full-Field WAG Process—El Furrial Field, Venezuela .....</b>	<b>1483</b>
<i>Leonardo Lopez G., Analiesse Rivas, Joaquin Bello</i>	
<b>A Field Development Strategy: When a Simple Stochastic Model Surpasses Numerical Simulation.....</b>	<b>1490</b>
<i>V. Sancho, V. Berrios, F. Gulino</i>	
<b>Marlim Field: Incorporating 4D Seismic in the Geological Model and Application in Reservoir Management Decisions .....</b>	<b>1497</b>
<i>Rildo M. Oliveira, Dirceu Bampi, Rui C. Sansonowski, Nier M.S. Ribeiro Júnior, Paulo R. Schroeder Johann, Marcos S. dos-Santos, Deise M. Ferreira</i>	
<b>Porosity Variations by Diagenesis in Reservoirs of the Bajo Barreal Formation, San Jorge Basin: Methodology of Evaluation With Logs .....</b>	<b>1504</b>
<i>Néstor Acosta Enrique Estrada</i>	
<b>Pore-scale Characterization and Productivity Analysis by Integration of NMR and Openhole Logs—A Verification Study .....</b>	<b>1511</b>
<i>Tania Galarza, Sergio Giordano, Michael Fontanarosa</i>	
<b>Horizontal Well Completion and Stimulation Techniques—A Review With Emphasis on Low-Permeability Carbonates .....</b>	<b>1519</b>
<i>Valdo Ferreira Rodrigues, Luis Fernando Neumann, Daniel Torres, Cesar Guimarães, Ricardo Sadowski Torres</i>	
<b>Permeability Model Calibration and Pore Throat Radius Determination Using Core Analysis and Nuclear Magnetic Resonance Data in Mixed-Lithology Reservoirs, South Western Venezuela .....</b>	<b>1534</b>
<i>F. Ferrer, M. Vielma</i>	
<b>Saving Energy in Heavy-Oil Fields in Colombia With Progressive Cavity Pumps.....</b>	<b>1541</b>
<i>J. Ramírez, W. Abril, Leonel Vargas, C. Trivino</i>	
<b>Communication Between Perforations: Solution Based on Good Practices and Numerical Simulations.....</b>	<b>1547</b>
<i>W. Morris, J. Robles, M. Zappacosta, P. Bajuk, J. Moreyra, E. Lorenzo</i>	
<b>Propellant-Assisted Solution to Perforation Penetration and Breakdown—San Jorge Field, Argentina: Case Histories .....</b>	<b>1557</b>
<i>Ashraf Aly Abou Elnaga, Edgar Almanza, Marcelo Batocchio, Kent Folse, Martin Schoener-Scott</i>	
<b>R Sand Production in an Oil Field of Eastern Venezuela Basin: Example of Change in the Operation Strategy in a Mature Field Reactivation .....</b>	<b>1565</b>
<i>William Bellorin, José Castillo, Sonia Lopez, Ladimir Riera</i>	
<b>New Downhole Fluid Analysis (DFA) Technologies Supporting Improved Reservoir Management.....</b>	<b>1571</b>
<i>Jesús A. Cañas, Evie Freitas, A. Ballard Andrews, Oliver C. Mullins, Santiago E. Colacelli</i>	
<b>Geomechanical Application for Drilling Optimization in Marginal Fields, East Venezuela.....</b>	<b>1580</b>
<i>Franklin Romero, Kenny Yu Woo, William Meaño Wilmer López, Jorge Romero, José Castillo, Luz Mery Rodríguez</i>	
<b>Plunger-Lift Advancements, Including Velocity and Pressure Analysis.....</b>	<b>1592</b>
<i>Stanley J Morrow, William Hearn</i>	

<b>The Real-Options Approach to Analyze Sequential Investments in Oil and Gas Projects: An Application to Heavy-Oil Production Projects</b> .....	1599
<i>Gabriel A. Costa Lima, Saul B. Suslick, Rafael F. Schiozer</i>	
<b>Impact of Pressure Depletion on Oil Recovery in Naturally Fractured Reservoirs</b> .....	1608
<i>Abel Chacon, Djebbar Tiab</i>	
<b>Drilling Fluids Rheological and Volumetric Characterization Under Downhole Conditions</b> .....	1616
<i>B. Demirdal, S. Miska, N. Takach, J.C. Cunha</i>	
<b>Beam Pumping System Optimization Through Automation</b> .....	1624
<i>Juan Pablo Sanchez, Diego Festini, Oscar Bel</i>	
<b>A Parametric Study of Reservoir Parameter for Micellar Solution Injection Process in Oil Reservoirs of Northeast Brazil</b> .....	1632
<i>H.O. Medeiros, J.L.M. Barillas, T.V. Dutra Jr., W. Mata</i>	
<b>Recoverable Reserve Estimation in a Tight Gas Reservoir During the Exploration Stage, Neuquen, Argentina</b> .....	1640
<i>Sezai Ucan, Sebastian Olmos, Daniel Valencio, Alfonso Mosquera, Jorge Alonso, Horacio Marin</i>	
<b>Insertable PC Pumps Reduce Operation Costs</b> .....	1648
<i>Miguel Angel Martinez, Jorge Mario Lopez K.</i>	
<b>Long Stroke Pumping System Improves the Energy Efficiency of the Production</b> .....	1655
<i>Mauricio Antonioli, Antonio Stocco</i>	
<b>Oil Invasion in Gas Zone and Sweep Efficiency Due to Stratigraphic Barrier in an Active Waterdrive System, Hollin Formation, Ecuador</b> .....	1666
<i>Sezai Ucan, Sebastian Olmos, Sergio Rios, Horacio Marin</i>	
<b>History-Matched Reservoir Model Validation Based on Wavelets Methods</b> .....	1679
<i>Martín V. Kind, Javier Quinteros</i>	
<b>Novel Frac-and-Pack Technique for Selective Fracture Propagation</b> .....	1690
<i>O. Hidalgo, O. González V. González, A. Sánchez, A. Peña</i>	
<b>Look at the Behavior of the Reservoir, Well and Facilities as an Integrated System</b> .....	1697
<i>Ivan Cetkovic</i>	
<b>Multiple-Zone Completion in Marginal Production Wells</b> .....	1704
<i>Guillermo Pitrelli, Maximiliano Giraldo</i>	
<b>Reducing Drilling Risks in Highly Overpressurized Formation: A Case History in Nororient Basin, Argentina</b> .....	1709
<i>M. Frydman, J.D. Restrepo, J. Palacio, C. Airolti, H. Eguia</i>	
<b>Transient Analysis of Flowlines and Slug Catcher Level Control</b> .....	1721
<i>R. Rezzónico, A. Carp</i>	
<b>Evolution of Stimulation Jobs, Block X, Talara Basin, Perú</b> .....	1732
<i>Luis Sánchez, Daniel Palomino, José Mercado, Tomás Díaz</i>	
<b>Stochastic Modeling and Uncertainty Analysis of Mature Fields</b> .....	1740
<i>F.P. Camposana, Y. Backheuser, R.F. Antunes, Z. Camoleze</i>	
<b>Tracing Groundwater Pollution in the Oil Industry: Myths and Reality</b> .....	1747
<i>H A. Osters, C. Torres, M. Fasola</i>	

**Composting: Bioremediation of Soil Contaminated With Weathered Hydrocarbons**..... 1752  
*M. Cecilia Medaura, M. Paula Balla, Pablo A. Gutierrez, Inés E. García de Salamote, Tristán  
P. García Torres, Azucena Monzón*

**Author Index**