

SPE/AAPG/SEG Unconventional Resources Technology Conference (URTeC 2018)

Houston, Texas, USA
23 - 25 July 2018

Volume 1 of 6

ISBN: 978-1-5108-6962-2

Printed from e-media with permission by:

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



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

Copyright© (2018) by Society of Petroleum Engineers
All rights reserved.

Printed by Curran Associates, Inc. (2018)

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

Society of Petroleum Engineers
P. O. Box 833836
Richardson, Texas 75083-3836

Phone: (800) 456-6863
Fax: (972) 952-9435

books@spe.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

VOLUME 1

SESSION 1: THEME 11: RESERVES, ECONOMICS, AND FIELD STUDIES II

Mapping the Barnett Shale Gas With Probabilistic Physics-Based Decline Curve Models and the Development of a Localized Prior Distribution	1
<i>Holanda, Rafael Wanderley de; Gildin, Eduardo; Valkó, Peter P.</i>	
The Use of the Bimodal Production Decline Curve for the Analysis of Hydraulically Fractured Shale/Tight Gas Reservoirs	17
<i>Doughty, Christine; Moridis, George J.</i>	
Hindcasting Production in Four Shale Gas Basins Using a Physics- Based Approach	37
<i>Male, Frank</i>	
Montney Versus North America Completions Comparison	49
<i>Ogilvy, Kaley; Papau, Brook; Kwan, Morgan; Maliki, Samir</i>	

SESSION 2: THEME 13: STAKEHOLDER MANAGEMENT AND SOCIAL PERFORMANCE (HSSE)

Using Drone Magnetic and LiDAR Surveys to Locate Unmarked, Abandoned Wells Prior to Unconventional Oil and Gas Development	54
<i>Hammack, Richard; Veloski, Garret; Sams, James</i>	
Advanced Characterization and Novel Waste Management for Drill Cuttings From Marcellus Shale Energy Development	63
<i>Stuckman, Mengling; Edenborn, Harry M.; Lopano, Christina; Hakala, J. Alexandra</i>	
Estimating Carbon Intensity of Unconventional Plays	73
<i>Meehan, D. Nathan</i>	

SESSION 3: UNIVERSITY LANDS SPECIAL SESSION I

Wolfcamp Geologic Reservoir Modeling Challenges	83
<i>Casey, Brian; Richards, Benjamin; Moore, Connor; Wehner, Matthew</i>	
Additional Applications of Optimal Artificial Lift Strategies in the Permian Basin	94
<i>Pradhan, Yogashri; Xiong, Hongjie; Forrest, James; Zhu, Jane</i>	
Additional Applications on Determining Optimal Lateral Lengths and Trajectories on University Lands' Delaware Basin	106
<i>Pradhan, Yogashri; Xiong, Hongjie</i>	

SESSION 4: THEME 03: FORMATION EVALUATION – INTEGRATED WORKFLOWS AND INTERPRETATION METHODS I

Montney Key Drivers: An Integration of Multidisciplinary Data Analytics in a Low-Permeability Reservoir	124
<i>Hermanson, Kay-Cee; Kwan, Morgan</i>	
Porosity and Organic Content Analysis, Bone Spring and Wolfcamp Formations	131
<i>Walls, Joel; Driskill, Brian; Durand, Melanie; Davalos, Gabriela; Rider, Tiffany</i>	
Water Saturation Interpretation Model for Organic-Rich Shale Reservoir: A Case Study of North Sumatra Basin	140
<i>Akbar, Muhammad Nur Ali; Musu, Junita Trivianti; Milad, Benmadi</i>	

SESSION 5: THEME 04: GEOMECHANICS AND PORE PRESSURE

Novel Pore Pressure Prediction Technique for Unconventional Reservoirs	153
<i>Yale, David P.; Perez, Adriana; Raney, Robert</i>	
Using Traditional Methods to Predict Pore Pressure in Devonian Black Shale Basins of North East British Columbia	172
<i>Green, Sam; Loeffler, Joel; Clarke, Shona; Thurston, David</i>	
Impact of Pore Pressure Depletion on Stress Reorientation and Its Implications on the Growth of Child Well Fractures	183
<i>Agrawal, Shivam; Sharma, Mukul M.</i>	

SESSION 6: THEME 07: AUGMENTED INTELLIGENCE FOR RESERVOIR CHARACTERIZATION AND PERFORMANCE PREDICTION

Spider Bots: Database Enhancing and Indexing Scripts to Efficiently Convert Raw Well Data Into Valuable Knowledge	195
<i>Saini, Gurtej; Chan, Hong-Chih; Ashok, Pradeepkumar; van Oort, Eric; Behounek, Michael; Theford, Taylor; Shahri, Mojtaba</i>	

Integrated Workflow for the Characterization of a Type Well Using Probabilistic Methods	203
<i>Jones, David S.</i>	
Toward a Management Science for Unconventional Wells: A Methodological Approach	219
<i>Batsell, Richard R.; Paranj, Sanjay; Mintz, Jason S.</i>	

SESSION 7: THEME 08: GEOCHEMISTRY – RESERVOIR CHARACTERIZATION

Reliable Solid Organic Matter Thermal Maturity Assessment Using Surface Enhanced Raman Spectroscopy and Case Studies	231
<i>Jiang, Raymond; Gao, Li; Bishop, Andrew; Tang, Yongchun</i>	
Integrated Inorganic and Organic Geochemistry Approach in the Petroleum Systems Analysis of Permian Shale Plays	235
<i>Gong, Changrui; Rodriguez, Lucia; Coffey, Brian; Donohue, Casey</i>	
Geochemical Characterization of the Eagle Ford Formation in Northeast Mexico	242
<i>Ortega-Lucach, Sandra; Gutierrez-Caminero, Leopoldo; Torres-Vargas, Ricardo; Murillo-Muñeton, Gustavo</i>	

SESSION 8: THEME 12: INTERNATIONAL EMERGING PLAYS

Emerging Shale Oil Plays in Hypersaline Lacustrine Qianjiang Formation, Jiangnan Basin, Central China	246
<i>Li, Maowen; Ma, Xiaoxiao; Li, Zhiming; Jiang, Qigui; Wu, Shiqiang</i>	
Unconventional Reservoir Development in Egypt's Western Desert: Lessons Learned From the First Appraisal Wells	264
<i>Salah, Mohamed; Ibrahim, Mazer</i>	

SESSION 9: THEME 14: DRILLING AND COMPLETIONS OPTIMIZATION I

Mechanism Study of Casing Deformation in Multistage Hydraulic Fracturing Shale Reservoir	282
<i>Xu, Ziyi; Yin, Fei; Han, Lihong; Yang, Shangyu; Wu, Xingru</i>	
Optimization and Drilling of Horizontal Wells Using a Bayesian Network	290
<i>Fierstien, John; Winkler, Hugh; Strauss, Phillip; Klovov, Alexander</i>	
TST3D: Automated Structural Interpretation in Horizontal Wellbores	296
<i>Zhang, Tuanfeng; McCormick, David; Nandlal, Allan; LeFranc, Marie</i>	

SESSION 10: OPERATORS' FORUM – COMPLETION OPTIMIZATION

New Mexico Delaware Basin Horizontal Well Heel Frac and Refrac Program and Hydraulic Fracture Diagnostics	311
<i>Han, Mei; Tanakov, Ivan; Bunker, Estevan; Vulgamore, Travis</i>	
Optimization of Completion and Well Spacing for Development of Multi-Stacked Reservoirs Using Integration of Data Analytics, Geomechanics and Reservoir Flow Modeling	332
<i>Min, Kyoung Suk; Sen, Vikram; Ji, Lujun; Sullivan, Richard B.</i>	
Accelerated Stimulation Optimization via Permanent and Continuous Production Monitoring Using Fiber Optics	343
<i>Ugueto, Gustavo A.; Wojtaszek, Magdalena; Huckabee, Paul T.; Reynolds, Alan; Brewer, Jim; Acosta, Luis</i>	
Multivariate Study of the Utica: Marrying the Rock to the Completion	355
<i>Trumbo, Amanda; Bowman, Jeff; Lasecki, Leo</i>	

SESSION 11: THEME 02: INTEGRATED CHARACTERIZATION OF UNCONVENTIONAL RESERVOIRS – FROM OUTCROPS TO GEOMODELS I

An Integrated View of the Petrology, Sedimentology, and Sequence Stratigraphy of the Wolfcamp Formation, Delaware Basin, Texas	363
<i>Thompson, Michelle; Desjardins, Patricio; Pickering, Jenn; Driskill, Brian</i>	
Outcrop and Subsurface Geology Applied to Drilling, Sweet Spot and Target Zone Detection of Resource Shales: The Woodford Example	371
<i>Slatt, Roger M.; Galvis-Portillo, Henry; Becerra-Rondon, Daniella; Ekwunife, Ifunanya C.; Brito, Richard; Zhang, Jing; Molinares, Carlos; Torres, Emilio; Duarte, David; Milad, Benmadi</i>	
Geological Facies Prediction Using Computed Tomography in a Machine Learning and Deep Learning Environment	388
<i>Odi, Uchenna; Nguyen, Thomas</i>	
Recent - Pleistocene Immature Mudrocks of Anoxic Basins of Venezuela and West Africa: Analogs for Unconventional Shale Oil/gas Reservoirs?	399
<i>Hammes, Ursula; Grammer, G. Michael; Gregg, Jay M.</i>	
Integration of Core Fracture and Lithofacies Descriptions in the Wolfcamp Shale: Implications for Mechanical Stratigraphy and Production	407
<i>Salem, Anthony; Solum, John; Naruk, Steve; Minisini, Daniel; Desjardins, Patricio; Hnat, James</i>	
Integrated Geocellular Static Model for Geomechanical and Dynamic Simulations in the Vaca Muerta Formation	418
<i>Lozano, Felipe A.; Palacio, Juan P.; Lazzari, Victoria; Bernhardt, Carolina; Hryb, Damian E.</i>	

Advanced Downhole Measurements and 3D Model Based Geosteering Improves Wellbore Placement Accuracy	428
<i>Viens, Christopher; Tomlinson, Mark</i>	

SESSION 12: THEME 03: FORMATION EVALUATION – INTEGRATED WORKFLOWS AND INTERPRETATION METHODS II

Developing Predictive Power in the Permian: Leveraging Advanced Petrophysics to Deliver Cash to the Business.....	437
<i>Blount, Aidan; Craft, Tyler; Driskill, Brian; McMullen, Adam; Durand, Melanie</i>	
Integrated Reservoir Characterization Aids Target Selection, Production Fluid Prediction and Completions	
Optimization in the Southern Delaware Basin Resource Plays.....	447
<i>Tittlemier, Troy; Speight, John; Hager, Charles; Chiniwala, Barzin; Martocchia, Alberto; Easow, Isaac</i>	
Integrated Rock Characterization of a Shale Gas Field in the Horn River Basin, Canada.....	462
<i>Teklu, Tadesse W.; Park, Daejin; Jung, Hoiseok; Miskimins, Jennifer L.</i>	
Quantifying Nanoporosity: Insights Revealed by Parallel and Multiscale Analyses.....	493
<i>Reynolds, Amanda C.; Bonnie, Ron J. M.; Kelly, Shaina; Krumm, Robert; Howard, James</i>	
Quantifying the Mechanisms Contributing to Surface Relaxation of Protons in Kerogen Pores of Organic-Rich Mudrocks.....	505
<i>Tandon, Saurabh; Heidari, Zoya; Jagadisan, Archana</i>	
Development of Raman Spectroscopy as a Thermal Maturity Proxy in Unconventional Resource Assessment.....	523
<i>Myers, Grant A.; Kehoe, Kelsey; Hackley, Paul</i>	
Spatial Characterization of Organic Matter Maturity by Raman Microscope Mapping.....	535
<i>Krukowski, Elizabeth; Howard, James</i>	

SESSION 13: THEME 04: AAPG'S PETROLEUM STRUCTURE AND GEOMECHANICS DIVISION (PSGD)

3D Anisotropic Damage Mechanics for Modeling Interaction Between Hydraulic and Natural Fracture Planes in a Layered Rock- Application to Eagle Ford and Wolfcamp	544
<i>Aimene, Yamina; Hammerquist, Chad; Nairn, John A.; Ouenes, Ahmed</i>	
Origin, Detection, Involvement in Hydraulic Stimulation and Consequences for Field Development of Large-Scale Structural Lineaments in the Marcellus and Duvernay Plays	564
<i>Stephenson, Ben; Galan, Earl; Fay, Mathew; Savitski, Alexei; Bai, Taixu</i>	
A Method of Fracture Prediction Across Multiple Stratigraphic Horizons in the Midland Basin, Texas, USA.....	583
<i>Pollock, Caleb; Seiler, Christian; Valcárcel, Manoel; Macaulay, Euan</i>	
Can Seismic Inversion Be Used for Geomechanics? A Casing Deformation Example.....	597
<i>Meyer, Jeremy J.; Gallop, Jeremy; Chen, Alvin; Reynolds, Scott; Mildren, Scott</i>	
Elk Hills Monterey Formation - Challenge of Incorporating Complex Natural Fractures to Improve Production Understanding.....	604
<i>Gales, Robert; Sobczyk, Rad; Harvey, Nicholas</i>	
Reservoir Geomechanic Heterogeneity Index (RGHI): Concept, Methodology, and Application.....	621
<i>Zhou, Jie; Mandal, Subhadip; Chen, Feiyan; Quest, Martin; Hume, David</i>	
Polygonal Fault System in the Paleogene of the Magallanes Foreland Basin, Southern Chile.....	630
<i>Pinto, Jesús A.; González, Danilo L.; González, Ángel P.; Zapata, Ricardo A.; Mella, Pablo E.</i>	

SESSION 14: THEME 04: BEYOND BRITTLENESS: GEOMECHANICAL CHARACTERIZATION II

Identifying Volcanic Ash Beds and Lamina-Scale Stratigraphy Using Rock Mechanical Properties.....	646
<i>Hildick, Alice M.; Havens, Jesse</i>	
Compressibility, Porosity, and Permeability of Shales Involving Stress Shock and Loading/Unloading Hysteresis	652
<i>Civan, Faruk</i>	
Rigorous Estimation of the Initial Conditions of Flowback Using a Coupled Hydraulic Fracture/Dynamic Drainage Area Leakoff Model Constrained by Laboratory Geomechanical Data	672
<i>Zhang, Z.; Yuan, B.; Ghanizadeh, A.; Clarkson, C. R.; Williams-Kovacs, J. D.</i>	

VOLUME 2

SESSION 15: THEME 05: FRACTURING FLUID, FRACTURE, AND MATRIX INTERACTIONS

Modeling and Experimental Investigations of Fluid-Related Damage to Hydraulic Fractures.....	703
<i>Abivin, Patrice; Prabhu, Rasika; Khvostichenko, Daria; Hilliard, Casie; Nelson, Chris; Kuo, Tzu-Chi; Li, Yongfu; Shukla, Priyavrat; Makarychev-Mikhailov, Sergey</i>	
Impact of Natural Fractures Beyond the Hydraulic Fracture Complexity in Unconventional Reservoirs - A Permian Case Study	716
<i>Pankaj, Piyush; Li, James</i>	
Near Fracture Capillary End Effect on Shale Gas and Water Production	739
<i>Elputranto, Riza; Akkutlu, I. Yucel</i>	

Theoretical Investigation of Water Blocking in Unconventional Reservoirs Due to Spontaneous Imbibition and Water Adsorption	753
<i>Deng, Lichi; King, Michael J.</i>	
Diagnosing Fracture-Wellbore Connectivity Using Chemical Tracer Flowback Data	771
<i>Kumar, Ashish; Sharma, Mukul M.</i>	
Impact of Authigenic Surface Roughness on Water Invasion and Flowback in Fractured Media: A Micromodel Study	781
<i>Mehmani, Ayaz; Kelly, Shaina; Torres-Verdin, Carlos; Balhoff, Matthew</i>	
Effects of Hydraulic Fracturing Fluid Chemistry on Shale Matrix Permeability	791
<i>Alalli, Abdulgader; Li, Qingyun; Jew, Adam; Kohli, Arjun; Bargar, John; Zoback, Mark; Kovscek, Anthony</i>	

SESSION 16: THEME 08: INORGANIC GEOCHEMISTRY OF UNCONVENTIONAL PLAYS/FLUID ROCK INTERACTIONS

Bench-Top Experiments Evaluating Simulated Hydraulic Fracturing Fluid Interactions With Marcellus Shale Core	801
<i>Moore, Johnathan; Xiong, Wei; Lopano, Christina; Phan, Thai; Vankeuren, Amelia; Sharma, Shikha; Pilewski, John; Jarvis, Karl; Brown, Sarah; Crandall, Dustin; Hakala, Alexandra</i>	
Barium Sources in Hydraulic Fracturing Systems and Chemical Controls on Its Release Into Solution	812
<i>Jew, Adam D.; Li, Qingyun; Cercone, David; Maher, Kate; Brown, Gordon E. Jr.; Bargar, John R.</i>	
Imaging Pyrite Oxidation and Barite Precipitation in Gas and Oil Shales	824
<i>Li, Qingyun; Jew, Adam D.; Kiss, Andrew M.; Kohli, Arjun; Alalli, Abdulgader; Kovscek, Anthony R.; Zoback, Mark D.; Cercone, David; Maher, Katharine; Brown, Gordon E. Jr.; Bargar, John R.</i>	

SESSION 17: THEME 09: EOR APPLICATIONS FOR UNCONVENTIONAL RESERVOIRS

Chemical Stimulation With Driving Process to Extract Oil From Tight Formation	834
<i>Zhang, Jin; Wang, Dongmei</i>	
Lithologic and Geomechanical Control on CO₂ Huff-n-Puff Enhanced Oil Recovery Processes Using Integrated Modeling Framework in Wolfcamp	846
<i>Phan, Tien N.; Cronk, Bradley R.; Almasoodi, Mouin M.; Reza, Zulfiqar A.</i>	
Scaling for Wettability Alteration Induced by the Addition of Surfactants in Completion Fluids: Surfactant Selection for Optimum Performance	866
<i>Zhang, Fan; Saputra, I. W. R.; Adel, Imad A.; Schechter, David S.</i>	

SESSION 18: THEME 10: FLOWBACK AND ARTIFICIAL LIFT FOR UNCONVENTIONAL RESERVOIRS I

Flowback in Shale Wells: Proppant Transport and Distribution in the Wellbore	883
<i>Putri, Kamilia; Lu, Haidan; Kwok, Chun Ka; Moncada, Katharine</i>	
Evaluating Fracture Volume Loss During Flowback and Its Relationship to Choke Size: Fastback Versus Slowback	895
<i>Fu, Yingkun; Dehghanpour, Hassan; Motealleh, Styavash; Lopez, Carlos Manuel; Hawkes, Robert</i>	
Defining the Optimal Drawdown Strategy in the Vaca Muerta Formation	905
<i>Lerza, Alejandro; Rojas, Daniela; Liang, Baosheng</i>	

SESSION 19: THEME 11: RESERVES, ECONOMICS, AND FIELD STUDIES I

Unconventional Field Development Optimization - Fit for Strategy Designs to Realize Your Corporate Goals	917
<i>Howrishi, R.; Anderson, D. M.; Thompson, J. M.; Loughheed, D.; Behmanesh, H.; Henke, J.; Pennell, S.; Szabo, A.</i>	
Is GOR Truly Affecting Recovery? A Multi-Variate Case Study in the Delaware Basin	932
<i>Dutta, Riteja; Dawson, Sam; Maler, Michael</i>	
A New Look at Reserves Estimation of Unconventional Gas Reservoirs	943
<i>Ibrahim, Mazher; Mahmoud, Omar; Pieprzica, Chester</i>	
Global Competitiveness of the US Tight Oil Cost Curve	957
<i>Clarke, Robert; Paton, Harry</i>	
Reserve Estimation With Unified Production Analysis	962
<i>Mehana, Mohamed; Callard, Jeff</i>	
New Analysis of EUR Probability Plots Yields Better Uncertainty Assessment and Better Type Wells	968
<i>Freeborn, Randy</i>	
The Value of Building a Multiscale, Regional Geomodel for Reserves Assessment of the Midland Basin	980
<i>Dommissse, Robin; Sivila, Livia; Male, Frank; Hamlin, H. Scott</i>	

SESSION 20: THEME 14: DRILLING AND COMPLETIONS OPTIMIZATION IV

A Unified Model to Predict Flowing Pressure and Temperature Distributions in Horizontal Wellbores for Different Energized Fracturing Fluids	991
<i>Xu, Zhengming; Wu, Kan; Song, Xianzhi; Li, Gensheng; Zhu, Zhaopeng; Pang, Zhaoyu</i>	

Development of a High-Performance Cement Slurry Antifoamer Through Lab Evaluation and Field Trials	1017
<i>Jiang, Li; Cabori, Logan; Abrams, Benjamin; Terracina, John</i>	
Fracture Initiation and Propagation Characteristics for Radial Drilling-Fracturing: An Experimental Study	1028
<i>Liu, Qingling; Tian, Shouceng; Li, Gensheng; Yu, Wei; Sheng, Mao; Fan, Xin; Zhang, Zhenxiang; Sepehrmoori, Kamy; Guo, Zhaoquan; Geng, Lidong</i>	
Rapid Evaluation of Diverter Effectiveness From Poroelastic Pressure Response in Offset Wells	1037
<i>Kahn, Charles; Cottingham, Byron; Kashikar, Sudhendu; Senften, Scott; Coenen, Erica</i>	
Geomechanical Modeling and Wellbore Stability Analysis Approach to Plan Deep Horizontal Wells Across Problematic Formations	1054
<i>Abbas, Ahmed K.; Flori, Ralph E.; Alsaba, Mortadha</i>	

SESSION 21: THEME 05: UNCONVENTIONAL WELL PRODUCTIVITY

Alternative Production Mechanisms in Unconventional Reservoirs	1064
<i>Acuña, Jorge A.; Wang, Shugang; Forand, David</i>	
Condensate Blocking and Mitigation in Liquid-Rich Shale Reservoirs: An Integrated PVT Modeling and Simulation Evaluation	1072
<i>Nagarajan, Narayana R.; Orangi, Abdollah</i>	

SESSION 22: UNIVERSITY LANDS SPECIAL SESSION II

Lessons Learned From Existing Horizontal Fractured Wells on University Lands in the Midland Basin: Rate Transient Analyses vs Completion and Field Development Optimization	1098
<i>Zhu, Jane; Forrest, James; Xiong, Hongjie; Pradhan, Yogashri</i>	
The Effect of Initial Conditions and Fluid PVT Properties on Unconventional Oil and Gas Recoveries in the Wolfcamp Formation in the Midland Basin	1108
<i>Forrest, James; Zhu, Tiejun; Xiong, Hongjie; Pradhan, Yogashri</i>	
A Practical Way to Prepare Physical-Based Type Well Performance Curves for Unconventional Reservoirs in the Permian Basin	1122
<i>Xiong, Hongjie; Zhu, Tiejun; Forest, James; Yang, Cao; Lee, Jae Wook; Kumar, Harish; Li, Chen</i>	
Evaluating Underperforming Wells on Permian Basin University Lands	1135
<i>Pradhan, Yogashri; Xiong, Hongjie; Forrest, James; Zhu, Jane; Spath, Jeff</i>	

SESSION 23: HYDRAULIC FRACTURE TEST SITE (HFTS) SPECIAL SESSION I

Hydraulic Fracturing Test Site (HFTS) - Project Overview and Summary of Results	1152
<i>Ciezobka, Jordan; Courtier, James; Wicker, Joe</i>	
Hydraulic Fractures in Core From Stimulated Reservoirs: Core Fracture Description of HFTS Slant Core, Midland Basin, West Texas	1161
<i>Gale, Julia F. W.; Elliott, Sara J.; Laubach, Stephen E.</i>	
Assessment of In-Situ Proppant Placement in SRV Using Through- Fracture Core Sampling at HFTS	1179
<i>Maity, Debotyam; Ciezobka, Jordan; Eisenlord, Sarah</i>	
Analysis and Distribution of Proppant Recovered From Fracture Faces in the HFTS Slant Core Drilled Through a Stimulated Reservoir	1195
<i>Elliott, Sara J.; Gale, Julia F. W.</i>	
Natural and Hydraulic Fracture Density Prediction and Identification of Controllers	1205
<i>Campbell, Whitney; Wicker, Joe; Courtier, James</i>	
Interwell Communication Study of UWC and MWC Wells in the HFTS	1215
<i>Wood, Tanner; Leonard, Richard; Senters, Chad; Squires, Chris; Perry, Matthew</i>	
Well Interference Diagnosis Through Integrated Analysis of Tracer and Pressure Interference Tests	1225
<i>Kumar, Ashish; Seth, Puneet; Shrivastava, Kaustubh; Manchanda, Ripudaman; Sharma, Mukul M.</i>	

SESSION 24: OPERATORS' FORUM – PERFORMANCE PREDICTION AND RESERVOIR CHARACTERIZATION

Integrated Stochastic Workflow for Optimum Well Spacing With Data Analytics, Pilots, Geomechanical-Reservoir Modeling, and Economic Analysis	1237
<i>Cao, Richard; Chen, Chaohui; Li, Ruijian; Firincioglu, Tuba; Ozgen, Chet; Croft, Tyler; Kathel, Prateek; Girardi, Alejandro; Chowdhury, Nitin</i>	
Myths and Facts of Forecasting Horizontal Well Production in Unconventional Reservoirs - Are We Complicating a Simple Analysis?	1253
<i>Muralidharan, Vivek; Joshi, Krupal</i>	
An Integrated Geomechanics-Reservoir Simulation Workflow for Completion Design Optimization	1272
<i>Yeh, Tzu-hao; Cakici, Deniz; Jennings, James; Will, Johannes; Guerra, Jose Chavarria; Durand, Melanie; Williams, Britt L.; Chen, Tianhong; Casillas, Rebecca; Jain, Vivek; Liu, Hope; Li, Ruijian; Bai, Taixu</i>	

SESSION 25: THEME 02: INTEGRATED CHARACTERIZATION OF UNCONVENTIONAL RESERVOIRS – FROM OUTCROPS TO GEOMODELS II

Seismic to Simulation: Woodford Shale Case Study in Oklahoma, USA..... 1285
Torres-Parada, Emilio J.; Sinha, Saurabh; Infante-Paez, Lennon E.; Slatt, Roger M.; Marfurt, Kurt J.

The Importance of Overburden and Pore Pressure on Horizontal Stress Magnitude Determination; an Example From the Delaware Basin 1302
Kozłowski, Kristen; Da Silva, Melia; Brown, David; Taylor, Jack; Willems, Heather; Watson, Tim; Burch, Don; Hutton, Trevor; Christensen, Chris; Manohar, Mohan

A Strategy for De-Risking the Upper Vaca Muerta as a Dual-Layer Development 1317
Boyd, Kristen; Notta, Raúl; Cakici, Deniz; Thomas, Mark A.

Geological Controls on Fluid Compositional Variations in Unconventional Hybrid Plays: Insight From Gas Geochemistry (Montney Play, Western Canada) 1323
Euzen, Tristan; Chatellier, Jean-Yves; Mort, Andy

Outlier Analysis: A Systematic Method for Distinguishing Between Sub-Surface and Engineering Influence on Well Performance in the Montney..... 1328
Todea, Felix; Stephenson, Ben; Tomlinson, Alexa; Pratt, Heidi; Williams, Will; Acosta, Luis; Eggenkamp, Irma; Speidel, Brad

Upscaled DFN Models to Understand the Effects of Natural Fracture Properties on Fluid Flow in the Hunton Group Tight Limestone 1343
Milad, Benmadi; Ghosh, Sayantan; Suliman, Mohamed; Slatt, Roger M.

Sedimentological Characterization of the Pimienta Formation in the Central Part of the Tampico-Misantla Basin, Veracruz, Mexico..... 1359
Abascal-Hernández, Griselda; León-Francisco, Juan; Torres-Vargas, Ricardo; Garduño-Martínez, Diana; Franco-Navarrete, Sonia; Méndez-Vázquez, Josefina; Ortega-Lucach, Sandra; Gutiérrez-Camino, Leopoldo; Murillo-Muñetón, Gustavo

SESSION 26: THEME 04: GEOMECHANICS – HYDRAULIC FRACTURE SIMULATION I

Increase Net Present Value and Reduce Completion Cost by Using an In-House Automated Fracture Design, Reservoir Simulator and Optimization Workflow for Well Spacing and Completions Design 1365
Bhattacharya, Srimoyee; Lake, Ed; Liu, Xin; Dombrowski, Robert; Cao, Richard; Girardi, Alejandro

Numerical Study of Stress Shadowing Effect on Fracture Initiation and Interaction Between Perforation Clusters 1382
Damjanac, Branko; Maxwell, Shawn; Pirayehgar, Atena; Torres, Maurilio

An Integrated Field and Numerical Study of the Impact of Formation Anisotropy on Stage Spacing in Horizontal Wells..... 1388
Sesetty, Varahanaresh; Ghassemi, Ahmad; Gil, Ivan

VOLUME 3

Effect of Interbeds on Hydraulic Fracture Characteristics and Formation Pressure Response..... 1408
Profit, Matthew; Dutko, Martin; Bere, Adam; Mutlu, Uno

A Coupled Three-Dimensional Hydraulic Fracture Propagation Model Considering Multiple Bedding Layers 1428
Tang, Jizhou; Wu, Kan; Zuo, Lihua; Ehlig-Economides, Christine

The Impact of Natural Fracture Thickness on Hydraulic Fracture Interaction Mechanics 1449
Wang, Weiwei; Olson, Jon E.; Prodanovic, Masa; Schultz, Richard A.

Field Scale Proppant Transport Simulation and Its Application to Optimize Stimulation Strategy 1467
Kou, R.; Moridis, G. J.; Blasingame, T. A.

SESSION 27: THEME 05: TRANSIENT ANALYSIS, HISTORY MATCHING, AND RESERVOIR MODELING

A Methodology to Characterize Well Performance in the Delaware Basin: A Wolfcamp Case Study 1481
Mohan, Kshitij; Macalello, Steve; Lascaud, Benjamin

Pressure and Rate-Transient Behavior of a Horizontal Well Intercepting Multiple Vertical Fractures Within a Fractal Reservoir 1492
Valdes-Perez, Alex R.; Larsen, Leif; Blasingame, Thomas A.

Improved Rate-Transient Analysis for Heterogeneous Fractured Liquid-Rich Tight Reservoirs With Non-Static Properties 1516
Yuan, B.; Zhang, Z.; Hamdi, H.; Clarkson, C. R.

Transient Linear Flow Analysis of Multi-Fractured Horizontal Wells Considering Three-Phase Flow and Pressure-Dependent Rock Properties 1540
Behmanesh, H.; Hamdi, H.; Clarkson, C. R.; Thompson, J. M.; Anderson, D. M.; Chin, A.

Understanding Production Drivers in the Vaca Muerta Shale Using an Integrated Reservoir Simulation Approach 1560
Altman, Raphael; Pederiva, Dario; Mehranfar, Reza; Frydman, Marcelo

Reservoir Characterization to Understand Optimal Well Spacing – A Wolfcamp Case Study..... 1579
Bansal, Neha; Han, Jichao; Shin, Yongduk; Blasingame, Tom

Modeling Well Performance in Piceance Basin Niobrara Formation Using Embedded Discrete Fracture Model 1596
Xu, Yifei; Yu, Wei; Li, Ningning; Lolon, Ely; Sepehrnoori, Kamy

SESSION 28: THEME 06: GEOPHYSICS IN THE PERMIAN BASIN

Predicting Pore-Pressure From On-Shore Seismic Data in the Delaware Basin	1618
<i>Rauch-Davies, Marianne; Schmicker, Bob; Smith, Steven W.; Green, Sam; Meyer, Jeremy</i>	
Production Metric Analytics in the Wolfcamp Formation	1624
<i>Ross, Christopher P.</i>	
Integration of Geophysics and Engineering for Geomechanical Earth Modeling in a Midland Basin Development Project, Midland/Ector Counties, Texas	1629
<i>Singleton, Scott</i>	
Revealing Geologic Features in the Midland Basin Through Frequency Decomposition	1635
<i>Moore, Rachael</i>	
Strategies for Improving the Performance of Child Wells in the Permian Basin	1639
<i>Manchanda, Ripudaman; Hwang, Jongsoo; Bhardwaj, Prateek; Sharma, Mukul M.; Maguire, Matt; Greenwald, Jason</i>	
Estimation of Seismic Attenuation in the Delaware Basin Using Peak Frequencies	1651
<i>Drwila, Malgorzata; Eisner, Leo; Jechumtalová, Zuzana; Anikiev, Denis; Keller, Randy</i>	

SESSION 29: THEME 07: NANOPARTICLES, CHEMISTRY, AND MACHINE LEARNING: TOOLS FOR ENHANCING OIL RECOVERY

Nanoparticle-Encapsulated Acids for Stimulation of Calcite-Rich Shales	1661
<i>Singh, Robin; Tong, Songyang; Panthi, Krishna; Mohanty, Kishore K.</i>	
Post-Frac-Hit Mitigation and Well Remediation of Woodford Horizontal Wells With Solvent/Surfactant Chemistry Blend	1676
<i>Swanson, Cory; Hill, W. A.; Nilson, Gary; Grimman, Christian; Hill, Randal; Sullivan, Phil; Aftien, Carl; Jimenez, Jose C.; Pietrangeli, Gianna; Shedd, Daniel C.; Pursley, John</i>	
Ion Tuned Water Can Greatly Enhance Alteration of Carbonate Surface to Water-Wet	1692
<i>Ding, Hongna; Mettu, Srinivas; Dagastine, Raymond R.; Rahman, Sheik H.</i>	
Synthetic Well Log Generation Using Machine Learning Techniques	1704
<i>Akinnikawe, Oyewande; Lyne, Stacey; Roberts, Jon</i>	

SESSION 30: THEME 11: WELL SPACING OPTIMIZATION

Development of the Stacked Pay in the Delaware Basin, Permian Basin	1720
<i>Alimahomed, Farhan; Malpani, Raj; Jose, Rohann; Defeu, Cyrille; Arteaga, Edgar Ignacio Velez; Haddad, Elia</i>	
Material-Balance Approach for Determining Drainage Volume of Multifracture Unconventional Oil Wells	1749
<i>Gherabati, S. Amin</i>	
Characterizing Well Spacing, Well Stacking, and Well Completion Optimization in the Permian Basin: An Improved and Efficient Workflow Using Cloud-Based Computing	1764
<i>Pankaj, Piyush</i>	
Advanced Modeling of Production Induced Stress Change Impact on Wellbore Stability of Infill Well Drilling in Unconventional Reservoirs	1793
<i>Zheng, Wei; Xu, Lili; Pankaj, Piyush; Ajisafe, Foluke; Li, James</i>	
Understand the Early Indicators for Long-Term Performance of Unconventional Wells	1806
<i>Cao, Richard; Liu, Chunlei; Brennan, Coleman</i>	
Depth of Investigation for Linear Flow: Theory and Practice	1815
<i>Ravikumar, Arjun; Lee, John</i>	
Rapid Field-Scale Well Spacing Optimization in Tight and Shale Oil Reservoirs Using Fast Marching Method	1829
<i>Iino, Atsushi; Onishi, Tsubasa; Olalotiti-Lawal, Feyi; Datta-Gupta, Akhil</i>	

SESSION 31: THEME 04: GEOMECHANICS: FROM LAB TO FIELD

Physics-Driven Optimization of Drained Rock Volume for Multistage Fracturing: Field Example From the Wolfcamp Formation, Midland Basin	1846
<i>Parsegov, Sergei G.; Nandlal, Kiran; Schechter, David S.; Weijermars, Ruud</i>	
Experimental and Numerical Investigation of Fracture Toughness of Anisotropic Shale Rocks	1877
<i>Suo, Yu; Chen, Zhixi; Rahman, Sheik</i>	
The Elastic Moduli Change After Carbon Dioxide Flooding Into Limestone: An Experimental Study	1887
<i>Zhang, Yihuai; Lebedev, Maxim; Sarmadivaleh, Mohammad; Yu, Hongyan; Iglauer, Stefan</i>	
Pulsed Power Plasma Stimulation Technique - Experimental Study on Single Pulse Test for Fractures Initiation	1894
<i>Xiao, Yue; House, Waylon; Unal, Ebru; Soliman, M. Y.</i>	

SESSION 32: THEME 05: NANOSCALE PVT AND IOR

An Integrated Geological Modeling Approach to Assess Potential of Field Wells for Application of a Surfactant Imbibition Process in an Ultra-Tight Rock Formation	1912
<i>Detwiler, Stephen L.; Wang, Dongmei</i>	

Characterization of Thermal Evolution of Pores and Fluids in Shales Using NMR 2D Measurement	1926
<i>Jiang, Han; Daigle, Hugh; Zhang, Boyang; Tian, Xiao</i>	
Determination of Confined Fluid Phase Behavior Using Modified Peng- Robinson Equation of State	1936
<i>Yang, Gang; Fan, Zhaoqi; Li, Xiaoli</i>	
Simulation of Gas Adsorption and Capillary Condensation in Shale Nanopores Using Lattice Boltzmann Modeling	1951
<i>Xu, Rui; Prodanovic, Masa; Landry, Christopher J.</i>	

SESSION 33: THEME 10: COMPLETION TO RESERVOIR OPTIMIZATION AND DIAGNOSTICS

Fracture Closure Determination From Two Successive DFITs (Diagnostic Fracture Injection Test) in One Formation	1966
<i>Rizwan, Yawar; Liu, Guoqing</i>	
Well Testing Model of Fractured Horizontal Wells in Shale Reservoirs with Continuum and Discrete Fracture Networks	1974
<i>Chen, Z. M.; Liao, X. W.; Zhang, H.; Yu, W.; Shen, X. D.; Shang, X. T.; Zhang, J. L.; Chu, H. Y.; Liu, Q. L.</i>	

SESSION 34: THEME 07: FROM MACHINE LEARNING TO CT SCANNING – NOVEL APPROACHES TO OLD PROBLEMS

Novel Monitoring Technology Helps to Make Informed Decisions and Maximize the Efficiency of Completion Strategy	1990
<i>Parkhonyuk, Sergey; Korkin, Roman; Kabannik, Artem; Fedorov, Andrey; Nikolaev, Max; Litvinets, Fedor</i>	
High-Quality 3-D MicroCT Imaging of Source Rocks - Novel Methodology to Measure and Correct for X-Ray Scatter	2009
<i>Katsevich, Alexander; Frenkel, Michael; Sun, Qiusi; Eichmann, Shannon L.; Prieto, Victor</i>	
Feature Detection for Digital Images Using Machine Learning Algorithms and Image Processing	2029
<i>Tian, Xiao; Daigle, Hugh; Jiang, Han</i>	

SESSION 35: OPERATORS' FORUM – WELL SPACING AND FIELD DEVELOPMENT

Integrating Microseismic, Geomechanics, Hydraulic Fracture Modeling, and Reservoir Simulation to Characterize Parent Well Depletion and Infill Well Performance in the Bakken	2043
<i>Cipolla, Craig; Motiee, Monet; Kechemir, Aicha</i>	
An Integrated Approach to Optimizing Completions and Protecting Parent Wells in the Montney Formation, N.E.B.C.	2055
<i>Nieto, John; Janega, Graham; Batlai, Bogdan; Martinez, Hugo</i>	
Tank Development in the Midland Basin, Texas: A Case Study of Super-Charging a Reservoir to Optimize Production and Increase Horizontal Well Densities	2070
<i>Thompson, Jill; Franciose, Nick; Schutt, Marc; Hartig, Kate; McKenna, Jon</i>	

SESSION 36: THEME 03: NMR AND ELECTRICAL MEASUREMENTS

Investigation of the Shale Electrical Resistivity Reversal Commonly Observed at the Wet- to Dry-Gas Transition	2086
<i>Cumella, Stephen; Byrnes, Alan; Sonnenfeld, Mark</i>	

VOLUME 4

Observations of Induction Dielectric Measurements and Their Role in Determining Thermal Maturity of Organic Mudrocks	2105
<i>Rasmus, John C.; Homan, Dean; Wang, Gong Li; Uschner, Natalie</i>	
Quantifying the Influence of Rock Fabric, Composition, and Electrical Double Layer on the Broadband Dielectric Dispersion of Organic-Rich Mudrocks	2127
<i>Garcia, Artur Posenato; Heidari, Zoya</i>	
Multiscale Pore Systems in Shales and Their Effect on Laboratory Measurements and Transport Properties	2146
<i>Daigle, Hugh; Jiang, Chunbi; Tian, Xiao; Jiang, Han</i>	
NMR Considerations in Shales at Elevated Temperature	2160
<i>Chakravarty, Aditya; Tinni, Ali; Rai, Chandra S.; Sondergeld, Carl H.</i>	
Measurement of Natural Gas Isotherms and Imaging Gas in Shale Using NMR	2171
<i>Veselinovic, Dragan; Dick, Michael; Muir, Colleen; Green, Derrick</i>	
High-Frequency (400 MHz) T₂ Measurements Using a Custom-Built NMR Probe, Eagle Ford Shale, Gonzales and La Salle Counties, Texas	2179
<i>McDowell, Bryan; Tutuncu, Azra; Yang, Yuan</i>	

SESSION 37: THEME 04: FRACTURE MONITORING AND DIAGNOSTICS

Geomechanical Simulation of Different Conceptual Models for Microseismic Interpretation	2198
<i>Maxwell, Shawn C.; Pirayehgar, Atena</i>	
Modeling Distributed Fiber Optic Sensor Signals Using Computational Rock Mechanics	2207
<i>Sherman, Christopher S.; Mellors, Robert J.; Morris, Joseph P.; Ryerson, Frederick J.</i>	
Estimation of Fracture Geometries From Poroelastic Pressure Responses in Offset Wells	2213
<i>Spicer, Sean; Coenen, Erica</i>	

SESSION 38: THEME 05: FLUID FLOW – NANOSCALE COMPOSITIONAL AND DIFFUSION PROCESSES

In-Situ Fractionation in Liquids-Rich Shales and Its Implications for EOR: Experimental Verification and Modeling Study	2233
<i>Timmi, Ali; Perez, Felipe; Devegowda, Deepak; Truong, Tu; Dang, Son; Sondergeld, Carl; Rai, Chandra</i>	
Minimum Miscibility Pressure Calculation for Oil Shale and Tight Reservoirs With Large Gas-Oil Capillary Pressure	2244
<i>Zhang, Kaiyi; Nojabaei, Bahareh; Ahmadi, Kaveh; Johns, Russell T.</i>	
Solution Gas Drive in Tight Oil Reservoirs: New Insights From Capillary Condensation and Evaporation Experiments	2259
<i>Barsotti, Elizabeth; Piri, Mohammad; Althaus, Stacey; Chen, Jin-Hong</i>	
Flow Behavior From Organic and Mineral-Hosted Porosity Systems — From Pores to Production	2268
<i>MacDonald, Richard M; Geetan, Steve Isaac; Klemm, Denis; Hill, Barbara</i>	
Experimental and Theoretical Investigation of the Confinement Effect on Gas Properties in Nano-Scale Porous Media	2285
<i>Salahshoor, Shadi; Fahs, Mashhad</i>	
The Effect of Mineral Composition on Shale Oil Recovery	2304
<i>Fakhry, Andrew; Hoffman, Todd</i>	
Determining the Impact of Mineralogy Composition for Multiphase Flow Through Hydraulically Induced Fractures	2324
<i>Santos, Javier E.; Prodanovic, Masa; Landry, Christopher J.; Jo, Honggeun</i>	

SESSION 39: THEME 05: WELL-SCALE MODELING AND SIMULATION

Applications of a Novel Hybrid Model for Unconventional Reservoirs	2339
<i>Ayoub, J. A.; Blakey, B.; Krishnamurthy, S.; Thambynayagam, R. K. M.</i>	
Multiscale Modeling to Evaluate the Mechanisms Controlling CO₂- Based Enhanced Oil Recovery and CO₂ Storage in the Bakken Formation	2355
<i>Torres, Jose A.; Jin, Lu; Bosshart, Nicholas W.; Pekot, Lawrence J.; Sorensen, James A.; Peterson, Kyle; Anderson, Parker W.; Hawthorne, Steven B.</i>	
Impact of Cluster Spacing on Infill Completions in the Eagle Ford	2375
<i>Evans, Shea; Siddiqui, Shameem; Magness, Jeremy</i>	
Numerical Modeling and Optimization of Condensate Banking Treatment in the Hydraulic-Fractured Shale Gas Condensate Reservoir	2388
<i>Liu, Wendi; Ganjandesh, Reza; Varavei, Abdoljalil; Yu, Wei; Sepehrnoori, Kamy</i>	

SESSION 40: THEME 06: THE USE OF GEOPHYSICAL TECHNOLOGIES IN UNCONVENTIONAL PLAYS

Novel 3D Field-Scale Characterization of Reservoir Fractures Using Surface Seismic Data by the Double-Beam Method and Field Applications	2406
<i>Zheng, Yingcai; Hu, Hao; Fang, Xinding; Stewart, Robert</i>	
Improving Marcellus Imaging Through the Use of FWI and Joint Tomographic Inversion for Velocity and Epsilon	2417
<i>McCann, Dave</i>	
Quantitative Interpretation Efforts in Seismic Reservoir Characterization of Utica-Point Pleasant Shale - A Case Study	2429
<i>Chopra, Satinder; Sharma, Ritesh; Nemati, Hossein; Keay, James</i>	

SESSION 41: THEME 09: CHEMICAL EOR AND NOVEL TECHNIQUES

A Chemical Blend for Stimulating Production in Oil-Shale Formations	2440
<i>Miller, Chammi; Tong, Songyang; Mohanty, Kishore K.</i>	
Comprehensive Workflow for Laboratory to Field-Scale Numerical Simulation to Improve Oil Recovery in the Eagle Ford Shale by Selective Testing and Modelling of Surfactants for Wettability Alteration	2449
<i>Saputra, I. W. R.; Schechter, D. S.</i>	
Comprehensive Study of Gas Cycling in the Bakken Shale	2471
<i>Sanaei, Alireza; Abouie, Ali; Tagavifar, Mohsen; Sepehrnoori, Kamy</i>	

Analyzing the Impact of Fracture Complexity on Well Performance and Wettability Alteration in Eagle Ford Shale	2486
<i>Li, Jiawei; Yu, Wei; Wu, Kan</i>	
An Efficient Method to Determine Wormhole Propagation During Matrix Acidizing	2501
<i>Fan, Zhaoqi; Li, Xiaoli; Ostermann, Russell D.; Jiang, Jie</i>	
The Impact of the Fracturing Additives on the Near Fracture Face Matrix Permeability for Shale and Low Permeability Sand Formations	2513
<i>Al-Ameri, Aymen; Gamadi, Talal; Heinze, Lloyd; Ispas, Ion; Gorell, Sheldon</i>	
Surfactant Based EOR for Tight Oil Unconventional Reservoirs Through Wettability Alteration: Novel Surfactant Formulations and Their Efficacy to Induce Spontaneous Imbibition	2530
<i>Patil, Pramod D.; Rohilla, Neeraj; Katiyar, Amit; Yu, Wanglin; Nelson, Christopher; Falcone, Susan; Rozowski, Peter</i>	

SESSION 42: THEME 13: WATER MANAGEMENT

Systematic Approach for Developing a “Fit-for-Purpose” Treatment for Produced Water Reuse in Hydraulic Fracturing	2540
<i>Sharma, Ramesh R.; Bjornen, Kevin</i>	
Produced Water Treatment R&D: Developing Advanced, Cost-Effective Treatment Technologies	2553
<i>Folio, Erica; Ogunsola, Olayinka; Melchert, Elena; Frye, Evan</i>	
Tailoring Treated Brines for Reuse Scenarios	2561
<i>Wenzlick, Madison; Siefert, Nicholas; Hakala, Alexandra</i>	
The Water Challenge Program - Permian Basin Pilot Results	2581
<i>Wilcox, Andra</i>	
Optimal Planning for Wastewater Disposal Facilities: Application of Geographic Information System and Data Analytics	2587
<i>Jamali, Ali; Etehadtavakkol, Amin; Ramirez, Katie; Jamal, Shawn</i>	
Replacing the Use of Freshwater With Seawater: Problems, Solutions, and Applications	2596
<i>Ng, Jun Hong; Almubarak, Tariq; Nasr-El-Din, Hisham A.</i>	

SESSION 43: THEME 14: DRILLING AND COMPLETIONS OPTIMIZATION II

Modeling of Azimuthal Gamma Ray Tools for Use in Geosteering Unconventional Reservoirs	2614
<i>Wang, Haijing; Stockhausen, Ed; Wyatt, Dennis; Gulick, Dean</i>	
Monitoring Wellbore Quality in Real-Time Using a Geometrically Derived Tortuosity Metric	2634
<i>D'Angelo, John; Ashok, Pradeepkumar; van Oort, Eric; Shahri, Mojtaba; Nelson, Brian; Thetford, Taylor; Behounek, Michael</i>	
Cement Placement in Severe Doglegs and Its Impact on Well Integrity: A Numerical Assessment	2649
<i>Yu, Hao; Taleghani, Arash Dahi; Lian, Zhanghua</i>	

SESSION 44: INDUCED SEISMICITY SPECIAL SESSION

Integrating Poroelastic Effects of Wastewater Injection and Rupture Dynamics to Understand Induced Seismicity	2659
<i>Szafrański, Dawid; Duan, Benchun</i>	
Induced Seismicity Near Fox Creek, Alberta: Interpretation of Source Mechanisms	2679
<i>Zhang, Hongliang; Eaton, David W.</i>	
Case Study: Casing Deformation Caused by Hydraulic Fracturing-Induced Fault Slip in the Sichuan Basin	2687
<i>Chen, Zhaowei; Zhou, Lang; Walsh, Rall; Zoback, Mark</i>	
Statistical Controls on Induced Seismicity	2696
<i>Sinha, Saurabh; Wen, Yunjie; De Lima, Rafael Pires; Marfurt, Kurt</i>	

SESSION 45: THEME 02: INTEGRATED CHARACTERIZATION OF UNCONVENTIONAL RESERVOIRS – FROM OUTCROPS TO GEOMODELS III

SCOOP/STACK Periphery Plays: A Multidisciplinary Approach	2709
<i>Yee, Denise; Johnston, Gillian; Levesque, Jason; Ahmed, Shak; Walker, Justin</i>	
Using Data Analytics to Maximize Value in the Denver-Julesburg Basin	2713
<i>Repchuk, Kristina; Reimchen, Aaron; Gregoris, Dane</i>	

SESSION 46: THEME 04: FROM PERFORATION TO PERFORMANCE: GEOMECHANICAL APPLICATIONS

Paradigm Shift in Wolfcamp Shale Improves Well Performance by 70%	2719
<i>Ejofodomi, Efejera; Sethi, Richa; Aktas, Elcin; Padgett, Julie; Mackay, Bruce; Mirakyan, Andrey; McCrackin, Ben; Douglas, Chris</i>	
Production Optimization Using Machine Learning in Bakken Shale	2732
<i>Luo, Guofan; Tian, Yao; Bychina, Mariia; Ehlig-Economides</i>	
An Industrialized Approach to Stage-by-Stage Completion Designs	2756
<i>Logan, William D.; Dalamarinis, Panagiotis; Williams, Brandon; Urbis, Kate; Lipari, Stephen</i>	

A Simple and Cost-Effective Workflow for Engineered Perforations	2766
<i>Cottingham, Byron; Truax, Jerome; Roark, Sam; Padgham, Matt; Denney, Steve; An, Xiaoxuan</i>	

SESSION 47: THEME 08: GEOCHEMISTRY – APPLICATIONS TO UNCONVENTIONALS

Are Redox-Sensitive Geochemical Proxies Valid in Mature Shales?	2780
<i>Lindsey, Dakota R.; Rimmer, Susan M.; Anderson, Ken B.</i>	
Interpretation of High Resolution XRF Data From the Bone Spring and Upper Wolfcamp, Delaware Basin, USA	2787
<i>Driskill, Brian; Pickering, Jenn; Rowe, Harry</i>	

VOLUME 5

SESSION 48: THEME 11: DECLINE CURVE ANALYSIS AND RESERVOIR MODELS II

RTA Assisted Production Forecasting in Shale Reservoir Development	2815
<i>Aniemena, Chigozie; Vera, Fabian</i>	
Integrating Model Uncertainty in Probabilistic Decline Curve Analysis for Unconventional Oil Production Forecasting	2830
<i>Hong, Aojie; Bratvold, Reidar B.; Lake, Larry W.; Ruiz Maraggi, Leopoldo M.</i>	

SESSION 49: THEME 14: DRILLING AND COMPLETIONS OPTIMIZATION III

Impact of Cyclic Pressure Loading on Well Integrity in Multi-Stage Hydraulic Fracturing	2851
<i>Barreda, Diego; Shahri, Mojtaba P.; Wagner, Randy; King, George</i>	
Diagnostic Applications of Borehole Hydraulic Signal Processing	2867
<i>Clark, Connor J.; Miskimins, Jennifer L.; Gallegos, Dana L.</i>	
Enhancing Placement of Microsized Proppant in Microfractures for Increasing Stimulated Reservoir Volume in Shale Reservoirs	2885
<i>Xu, Liang; He, Kai; Nguyen, Philip; Lord, Paul</i>	
Is Conductivity Still Important in Unconventional Reservoirs? A Field Data Review	2894
<i>Shelley, Robert; Shah, Koras; Sheludko, Stan; Davidson, Brian; Palisch, Terry</i>	

SESSION 50: OPERATORS' FORUM – OPERATING IN THE PERMIAN

Life Isn't Perfect: The Petrophysical Difficulties of Modeling the Permian	2906
<i>Croft, Tyler; Blount, Aidan; McMullen, Adam; Warneke, Sarah; Durand, Melanie; Driskill, Brian</i>	

SESSION 51: THEME 03: PHYSICAL PROPERTIES OF LOW-PERMEABILITY ROCKS

A Novel Methodology for Mercury Intrusion Porosimetry Analysis, Data Reduction, Blank Correction and Interpretation for Shales	2917
<i>Gorynski, Kyle; Dewane, Terrence; Smagala, Tom; Tobey, Mark; Mansoori, John</i>	
Application of Integrated Core and Multiscale 3-D Image Rock Physics to Characterize Porosity, Permeability, Capillary Pressure, and Two- and Three-Phase Relative Permeability in the Codell Sandstone, Denver Basin, Colorado	2937
<i>Byrnes, Alan P.; Zhang, Shawn; Canter, Lyn; Sonnenfeld, Mark D.</i>	
A New Method for Quantifying Cation Exchange Capacity: Application to Organic-Rich Mudrock Formations	2957
<i>Cheng, Kai; Heidari, Zoya</i>	
Impacts of Geochemical Properties on Wettability of Kerogen and Organic-Rich Mudrocks	2975
<i>Jagadisan, Archana; Heidari, Zoya</i>	
Pore-Scale Characterization of Shales Using Dendroidal Theoretical Pore-Network Model	2993
<i>Zheng, Da; Zapata, Yuliana; Reza, Zulfiqar</i>	
Probing the Wettability of Mudrocks at the Pore-Scale Using Nanoparticle Tracers	3008
<i>Landry, Christopher J.; Prodanovic, Masa; Mohanty, Kishore</i>	
Measurement and Analysis of Wellbore Micro Losses and Rock Properties While Drilling: A Novel Approach to Identification of Fractures in the Osage and Meramec Formations of Anadarko Basin	3025
<i>Chiniwala, Barzin; Palakurthi, Aruna Kumar; Easow, Isaac; Russo, Eliana R.</i>	

SESSION 52: THEME 04: BEYOND BRITTLENESS: GEOMECHANICAL CHARACTERIZATION I

Full-Field Strain Measurement on Rocks With Horizontal Natural Fractures	3035
<i>Mokhtari, Mehdi; Nath, Fatick; Jiang, Shuxian</i>	
Rock Dilatation and Its Effect on Fracture Transmissivity	3047
<i>Zhou, Hongyuan; Abdelaziz, Aly; Grasselli, Giovanni</i>	
Effects of Porous Properties of Rock on Near-Wellbore Hydraulic Fracture Complexity	3053
<i>Feng, Yongcun; Gray, K. E.</i>	

A Novel Method for Experimental Characterization of the Poroelastic Constants in Unconventional Formations	3066
<i>Gokaraju, Deepak; Aldin, Munir; Thombare, Akshay; Mitra, Abhijit; Govindarajan, Sudarshan; Patterson, Robert</i>	
Layered Modulus Effect on Fracture Modeling and Height Containment	3080
<i>Yue, Kaimin; Olson, Jon E; Schultz, Richard A.</i>	
Stimulation Mechanisms in Unconventional Reservoirs	3100
<i>Ye, Zhi; Ghassemi, Ahmad; Riley, Spencer</i>	
Hydraulic Fracture Propagation in a Vertically and Laterally Heterogeneous Stress Media in the Permian Basin	3109
<i>Cruz, Leonardo; Elliott, Brendan; Izadi, Ghazal; Barton, Colleen; Hoeink, Tobias</i>	

SESSION 53: THEME 05: PERMEABILITY MEASUREMENT AND MODELING

Controls on Liquid Hydrocarbon Permeability of Tight Oil and Liquid-Rich Gas Reservoirs: Examples From Bakken and Montney Formations (Canada)	3119
<i>Ghanizadeh, A.; Clarkson, C. R.; Song, C.; Vahedian, A.; DeBuhr, C.; Deglint, H. J.; Wood, J. M.</i>	
Impacts of Kerogen and Clay on Stress-Dependent Permeability Measurements of Shale Reservoirs	3145
<i>An, Cheng; Guo, Xuyang; Killough, John</i>	
A Finite-Difference Based Multi-Scale Approach for Electromagnetic Digital Rock Modeling	3165
<i>Yu, Mengping; Wang, Yibo; Chen, Jin-Hong; Chen, Ji</i>	
Determination of Shale Matrix Permeability Through Dynamic Methane Production Experiments Using Variable Pressure Gradients	3171
<i>Fan, Kunkun; Li, Yajun; Elsworth, Derek; Dong, Mingzhe; Yu, Hao; Yin, Congbin; Li, Yanchao</i>	
Use of Rate-Transient Analysis Techniques for Evaluating Experimental Core Permeability Tests for Unconventional Reservoirs	3182
<i>Vahedian, A.; Clarkson, C. R.; Ghanizadeh, A.; Zanganeh, B.; Song, C.; Hamdi, H.</i>	
Integrated Effects of Pore Volume Compaction and Connectivity Loss on Intrinsic Permeability of Shale Samples	3198
<i>Davudov, Davud; Moghanloo, Rouzbeh Ghanbarnezhad</i>	
A Validated Digital Rock Workflow to Accurately Predict Apparent Permeability in Tight Rocks	3213
<i>Bautista, Juan; Fidler, Luke; Freed, David; Crouse, Bernd; Balasubramanian, Gana; Chen, Hudong; Zhang, Raoyang; Ghodke, Chaitrali</i>	

SESSION 54: THEME 06: GEOPHYSICAL RESERVOIR CHARACTERIZATION IN UNCONVENTIONAL PLAYS

Considerations in Azimuthal Processing and Velocity Inversion for Unconventional Plays	3221
<i>Perz, Mike; Keller, William; Kriechbaum, Victor</i>	
Unconventional Play Fracture Characterization Through Orthorhombic Depth Model Building	3231
<i>Hilburn, Guy; Pendharkar, Amit; Keller, William; Mott, René; Peinado, Jorge; Jumper, Austin; Kriechbaum, Victor</i>	
Steps for Improving the Utility of Land Seismic Data for Unconventional Reservoirs	3238
<i>Stork, Christof</i>	
Coherence Attribute Applications on Seismic Data in Various Guises	3252
<i>Chopra, Satinder; Marfurt, Kurt J.</i>	
Fracture Productivity Prediction Considering Natural Fracture Formation Proximal to Fault Damage Zone	3261
<i>Ramsay, Travis; Hernandez, Luisalic; Li, Jennifer; Erdogan, Meftun</i>	
Time-Lapse Petro-Elastic and Seismic Modeling to Evaluate Fracturing Efficiency in Low-Permeability Reservoirs	3273
<i>Alfi, Masoud; Chai, Zhi; Pradhan, Anshuman; Ramsay, Travis; Barrufet, Maria; Killough, John</i>	
First Unconventional Play From Peruvian Northwest: Muerto Formation	3287
<i>Morales, Walter; Porlles, Jerjes; Rodriguez, Jose; Taipe, Heraud; Arguedas, Americo</i>	

SESSION 55: THEME 07: BIG DATA AND ARTIFICIAL INTELLIGENCE ARE RAPIDLY CHANGING THE OILFIELD – DON'T BE LEFT BEHIND

Rate of Penetration (ROP) Modeling Using Hybrid Models: Deterministic and Machine Learning	3301
<i>Hegde, Chiranth; Soares, Cesar; Gray, Ken</i>	
Identification and Evaluation of Viscoelastic Surfactants Including Smart Viscoelastic Systems for Generation and Stabilization of Ultra-Dry N₂ and CO₂ Foam for Fracturing Fluids...	3320
<i>Alzobaïdi, Shehab; Lotfollahi, Mohammad; Lu, Congwen; Bloom, Michael; Zhang, Xuan; Prodanovic, Masa; Johnston, Keith; DiCarlo, David</i>	
Degradation Study on Materials for Dissolvable Frac Plugs	3336
<i>Takahashi, Shinya; Shitsukawa, Aki; Okura, Masayuki</i>	
Accelerating Well Construction Using a Digital Twin Demonstrated on Unconventional Well Data in North America	3345
<i>Saini, Gurtej; Ashok, Pradeepkumar; van Oort, Eric; Isbell, Matthew R.</i>	
Oilfield Data Analytics: Linking Fracturing Chemistry and Well Productivity	3358
<i>Khvostichenko, Daria; Makarychev-Mikhailov, Sergey</i>	
A Fiber-Optic Assisted Multilayer Perceptron Reservoir Production Modeling: A Machine Learning Approach in Prediction of Gas Production From the Marcellus Shale	3372
<i>Ghahfarokhi, Payam Kavousi; Carr, Timothy; Bhattacharya, Shuvajit; Elliott, Justin; Shahkarami, Alireza; Martin, Keithan</i>	

Extracted Pore-Network Model for Shales Characterizing Geometry of Void Space	3382
<i>Zheng, Da; Reza, Zulfiquar A.</i>	

SESSION 56: THEME 09: GAS INJECTION PROJECTS

Field Test of CO₂ Injection in a Vertical Middle Bakken Well to Evaluate the Potential for Enhanced Oil Recovery and CO₂ Storage	3397
<i>Sorensen, James A.; Pekot, Lawrence J.; Torres, José A.; Jin, Lu; Hawthorne, Steven B.; Smith, Steven A.; Jacobson, Lonny L.; Doll, Thomas E.</i>	
Miscible EOR Process Assessment for Unconventional Reservoirs: Understanding Key Mechanisms for Optimal Field Test Design	3415
<i>Sahni, Vinay; Liu, Shunhua</i>	
Huff-N-Puff Gas Injection Performance in Shale Reservoirs: A Case Study From Duvernay Shale in Alberta, Canada	3427
<i>Hamdi, H.; Clarkson, C. R.; Ghanizadeh, A.; Ghaderi, S. M.; Vahedian, A.; Riazi, N.; Esmail, A.</i>	
Laboratory Investigation of EOR Techniques for Organic Rich Shales in the Permian Basin	3452
<i>Liu, Shunhua; Sahni, Vinay; Tan, Jiasen; Beckett, Derek; Vo, Tuan</i>	
Gas Injection for EOR in Organic Rich Shales. Part II: Mechanisms of Recovery	3461
<i>Tovar, Francisco D.; Barrufet, Maria A.; Schechter, David S.</i>	
The Influence of Organics on Supercritical CO₂ Migration in Organic- Rich Shales	3482
<i>Kurz, Bethany A.; Sorensen, James A.; Hawthorne, Steven B.; Smith, Steven A.; Sanei, Hamed; Ardakani, Omid; Walls, Joel; Jin, Lu; Butler, Shane K.; Beddoe, Christopher J.; Mibeck, Blaise A. F.</i>	
Ethane Flooding as an Alternative to CO₂ Injection in Tight Formations: A Bakken Case Study	3498
<i>Yolo, Barco N.; Agbor, Yannick; Pu, Hui</i>	

VOLUME 6

SESSION 57: THEME 11: DECLINE CURVE ANALYSIS AND RESERVOIR MODELS I

A Physical Decline Curve for Fractured Horizontal Wells	3515
<i>Artus, Vincent; Houzé, Olivier</i>	
Variation of Hyperbolic-B-Parameter for Unconventional Reservoirs, and 3-Segment Hyperbolic Decline	3534
<i>Varma, Saroj; Tabatabaie, S. Hamed; Ewert, James; Mattar, Louis</i>	
Criteria for Proper Production Decline Models and Algorithm for Decline Curve Parameter Inference	3552
<i>Zhou, Peng; Pan, Yuewei; Sang, Huiyan; Lee, W. John</i>	
Variable Exponential Decline - Modified Arps to Characterize Unconventional Shale Production Performance	3569
<i>Gupta, Ishank; Rai, Chandra; Sondergeld, Carl; Devegowda, Deepak</i>	
A Model-Based Diagnostic Workflow for Time-Rate Performance of Unconventional Wells	3586
<i>Fulford, David S.</i>	
Straightforward Representative Fluid Flow Models for Complex Fracture Networks in Unconventional Reservoirs	3638
<i>Acuña, Jorge A.</i>	
A Production Decline Model Based on Anomalous Diffusion Stemming From Complex Fracture Network	3651
<i>Liu, Shuai; Li, Han; Valkó, Peter</i>	

SESSION 58: HYDRAULIC FRACTURE TEST SITE (HFTS) SPECIAL SESSION II

Downhole Microseismic Mapping of More Than 400 Fracturing Stages on a Multiwell Pad at the Hydraulic Fracturing Test Site (HFTS): Discussion of Operational Challenges and Analytic Results	3671
<i>Stegent, Neil; Candler, Cody</i>	
Using Stage Level Microseismic Analysis to Gain Insight Into Fracture Efficiency and Completion Effectiveness	3699
<i>Wang, Iris Haihong; Fairfield, Ryan; Courtier, James; Gray, Danny; Lee, Shawn</i>	
Using Stage Level Microseismic Analysis to Correlate and Ground Truth Cored Hydraulic Fractures	3709
<i>Wicker, Joe; Courtier, James; Campbell, Tammy; Lee, Shawn; Fairfield, Ryan; Trowbridge, Stacy</i>	
Surface Seismic Monitoring of Hydraulic Fracturing Test Site (HFTS) in the Midland Basin, Texas	3716
<i>Kumar, Abhash; Chao, Kevin; Hammack, Richard; Harbert, William</i>	
Microseismicity Analysis for HFTS Pad and Correlation With Completion Parameters	3727
<i>Maity, Debotyam</i>	
Environmental Impact Analysis on the Hydraulic Fracture Test Site (HFTS)	3739
<i>Eisenlord, Sarah; Hayes, Thomas; Perry, Kent</i>	

SESSION 59: THEME 03: QUANTIFICATION AND EVALUATION OF RESERVOIR QUALITY IN UNCONVENTIONAL RESERVOIRS

Advances in Borehole Imaging in Unconventional Reservoirs	3759
<i>Morys, Marian; Knizhnik, Sergei; Duncan, Andrew R.; Tingey, Brady E.</i>	
Laboratory Evaluation of Apparent Conductivity of Ultra-Fine Particulates	3769
<i>Cortez-Montalvo, Janette; Inyang, Ubong; Dusterhoft, Ron; Hu, DanDan; Apostolopoulou, Maria</i>	

Causes of Resistivity Reversal in the Vaca Muerta Formation, Argentina	3784
<i>Ortiz, Alberto César; Bernhardt, Carolina; Tomassini, Federico González; Cumella, Stephen; Saldungaray, Pablo; Mosse, Laurent</i>	

SESSION 60: THEME 04: GEOMECHANICS – HYDRAULIC FRACTURE SIMULATION II

Microscale Laboratory Studies for Determining Fracture Directionality in Tight Sandstone and Shale During Hydraulic Fracturing	3804
<i>Ante, M. A.; Manjunath, G. L.; Aminzadeh, F.; Jha, B.</i>	
Decoding Positives or Negatives of Fracture-Hits: A Geomechanical Investigation of Fracture-Hits and Its Implications for Well Productivity and Integrity	3822
<i>Pankaj, Piyush</i>	
Micromechanical Modeling of Multi-Cluster Hydraulic Fracturing in Horizontal Well	3848
<i>Fang, Yi; Han, Yanhui</i>	

SESSION 61: THEME 05: FLUID FLOW – FRACTURE SIMULATION AND GEOMECHANICS

Simulation of Proppant Transport in Foam Fracturing Fluid Based on Experimental Results	3859
<i>Tong, Songyang; Gu, Ming; Singh, Robin; Mohanty, Kishore</i>	
Multi-Physics Pore-Scale Modeling of Particle Plugging Due to Fluid Invasion During Hydraulic Fracturing	3876
<i>Zapata, Yuliana; Phan, Tien N.; Reza, Zulfiqar A.</i>	
Understanding the Mechanism of Interwell Fracturing Interference Based on Reservoir-Geomechanics-Fracturing Modeling in Eagle Ford Shale	3892
<i>Guo, Xuyang; Wu, Kan; Killough, John; Tang, Jizhou</i>	
Modeling of Fluid Injection in Depleted Parent Wells to Minimize Damage Due to Frac-Hits	3913
<i>Gala, Deepen P.; Manchanda, Ripudaman; Sharma, Mukul M.</i>	

SESSION 62: THEME 07: ADVANCED MATERIALS AND CHEMISTRY

Quantitative Mineralogy of Vaca Muerta and Alum Shales From Core Chips and Drill Cuttings by Calibrated SEM-EDS Mineralogical Mapping	3927
<i>Fialips, Claire I.; Labeyrie, Bernard; Burg, Valérie; Mazière, Valérie; Munerel, Yann; Haurie, Hélène; Jolivet, Isabelle; Lasnel, Régis; Laurent, Jean-Paul; Lambert, Laurent; Jacquelin-Vallée, Laurence</i>	
Development of a Mixed Polymer Hydraulic Fracturing Fluid for High Temperature Applications	3940
<i>Almubarak, Tariq; Ng, Jun Hong; Sokhanvarian, Khatere; Khaldi, Mohammed; Nasr-El-Din, Hisham A.</i>	
Enhancing Friction Reducer Performance in High Salt Conditions	3958
<i>Seymour, Brian; Friesen, Dawn; Sanders, Aaron</i>	
Can Friction Reducers Transport Sand During Fracturing Treatment?	3967
<i>Shen, Lingjuan; Vigderman, Leonid; Heller, David; Fu, Diankui</i>	

SESSION 63: THEME 07: SURVEILLANCE OF UNCONVENTIONAL PRODUCTION AND ROCK PHYSICS

Rapid Reservoir Modeling With Automated Tops Correlation	3978
<i>Grant, Christian W.; Bashore, William M.</i>	
Machine-Learning Based Analytics Applied to Stimulation Performance in the Utica Shale: Case Study and Lessons Learned	3994
<i>Perrier, Sebastien; Delpeint, Arnaud; Shawuti, Zulibukaer; Shrestha, Ashis</i>	
Unlocking Reservoir Potential With a Multilayer Inversion Technique From a Directional Resistivity Tool	4015
<i>Rathmann, Tim; Gremillion, Joe; Lemay, Philip; Flowers, Mike; Nandlal, Allan</i>	
Novel Diversion Case Studies for Improved Near-Wellbore Connection Between Wellbore and Hydraulic Fracture	4024
<i>Scanlan, William P.; Pierskalla, Kyle J.; Sobernheim, David W.; Boehringer, Roberto</i>	

SESSION 64: THEME 08: PRODUCED FLUID GEOCHEMICAL SURVEILLANCE – DRAINED ROCK VOLUME

Fluid Heterogeneity on a Well-Box Scale in Tight Unconventional Reservoirs	4038
<i>Whitson, Curtis H.; Alqahtani, Fahd M.; Chuparova, Ellie</i>	
Production of Migrated Oil From Horizontal Wells Landed in the Eagle Ford Formation on the San Marcos Arch	4054
<i>Kornacki, Alan S.</i>	
Permian Basin Petroleum Systems - Geochemical Insight Into Hydrocarbon Generation, Migration and Well Performance	4071
<i>Curtis, John B.; Zumberge, John E.</i>	
Insights From Stable Isotope Geochemistry Surveillance in the Unconventional Horn River Basin Play	4077
<i>Norville, Giselle; Muehlenbachs, Karlis</i>	

SESSION 65: THEME 10: FLOWBACK AND ARTIFICIAL LIFT FOR UNCONVENTIONAL RESERVOIRS II

Diagnosing the Health of Your Well With Rate Transient Analysis 4095
Anderson, D. M.; Thompson, J. M.; Behmanesh, H.

Artificial Lift Selection and Its Applications for Deep Horizontal Wells in Unconventional Reservoirs 4106
Pankaj, Piyush; Patron, Katherine Escobar; Lu, Haidan

Use of Chemical Gas Tracers Reveals Details of the Cleanup of an Unconventional Gas Well in the Vaca Muerta Formation 4127
Ramirez, Joaquín; Garcia, Daniel; Ceccon, Daniela; Ferlaza, Carlos

Multifunctional Surfactant Provides Superior Post Frac Production by Enhancing Polymer and Load Fluid Recovery 4148
Plasier, Ronald; Delorey, John; Cooney, Kevin; Leguizamon, Javier; Thomson, Corey

SESSION 66: THEME 12: EMERGING PLAYS IN NORTH AMERICA

Review of the First Bone Spring Hybrid Play in the Delaware Basin, West Texas and Southeast New Mexico 4163
Schwartz, Kenneth M.; Meier, Holly; Star, Allison; Stolte, Natasha

Predicting Success in the Haynesville Shale: A Geologic, Completion, and Production Analysis 4168
Johnston, Brad; Volkner, Nick

The Niobrara Formation in the Southern Powder River Basin, Wyoming: An Emerging Giant Continuous Petroleum Accumulation 4175
Sonnenberg, Stephen A.

Regional Appraisal of Shale Resource Potential Within the Permian, Anadarko, and Arkoma Basins: How Does the Alpine High Stack Up? 4190
Bromhead, Alex; Butt, Thomas

Author Index