

SPE Intelligent Energy International 2013

Realising the Full Asset Value

**Dubai, United Arab Emirates
28-30 October 2013**

ISBN: 978-1-62993-435-8

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© (2013) by the Society of Petroleum Engineers
All rights reserved.

Printed by Curran Associates, Inc. (2014)

For permission requests, please contact the 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: 845-758-2634
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

| | |
|--|-----|
| SPE 167381 Maturing Collaboration in Intelligent Energy: Challenging the Conventional Wisdom of Collaboration Environments | 1 |
| <i>Michael Khun</i> | |
| SPE 167382 Analyzing the Benefits of Utilizing 360° Panoramic Photo Survey Technology on a Shell Offshore Platform | 8 |
| <i>Per Erik Berger, Joao Paulo Matsuura, Andre Barrios, Peter Hopkins, Marc Thomas Wagner, Michael Weston</i> | |
| SPE 167383 Intelligent Integrated Management for New Ventures in High Risk Developing Countries | 14 |
| <i>Muhammad Ali Haider, Shaikh Muhammad Abdullah, Rameez Khalid, Meryam Mirajker, Batool Arhamna Haider</i> | |
| SPE 167384 “Delivering Operationally Efficient Platforms Using Inherently Safer Design” | 25 |
| <i>Brian J. Gordon, Robert K. Duncanson</i> | |
| SPE 167386 Complex Event Processing Implementation for Intelligent-Field | 37 |
| <i>Abdullah Al-Bar, Muhammad Gosayir, Waleed Awadh, Nasser Nasser, Hussain Towaileb</i> | |
| SPE 167387 A Management Framework for Deriving Organisational Cultural Advantage in the Upstream Oil & Gas Industry | 46 |
| <i>Glen Burrridge, Peter Franklin</i> | |
| SPE 167389 Development and Implementation of an Effective Operator Interface System in the UAE | 61 |
| <i>Corbett Legg, Matthew Kirkman, Saud Al Ghaith, Kamal Ali, Trond Tysseland, Naseem Dalloul</i> | |
| SPE 167390 Delivering Cost Effective Collaboration Technology Using Consumer Technology and Preparing for a BYOD Environment | 82 |
| <i>Matthew Kirkman, Hisham Hobaishi, David Cobb, Said Said, Corbett Legg</i> | |
| SPE 167391 Smart Collaboration for Decision Making in Drilling | 88 |
| <i>R. Fjellheim</i> | |
| SPE 167392 Application of Linear and Partial Correlation Techniques to Enhance the Waterflooding Surveillance Process | 93 |
| <i>M. Villamizar, F. Rivas, G. A. Carvajal, F. Md Adnan, A. Kheterpal, S. Knabe, J. A. Rodriguez, A. Al-Jasmi, B. Al-Saad, H. K. Goel</i> | |
| SPE 167393 Building Neural-Network-Based Models Using Nodal and Time-Series Analysis for Short-Term Production Forecasting | 102 |
| <i>J. Rebeschini, M. Querales, G. A. Carvajal, M. Villamizar, F. Md Adnan, J. Rodriguez, S. Knabe, F. Rivas, L. Saputelli, A. Al-Jasmi, H. Nasr, H. K. Goel</i> | |
| SPE 167394 ESP “Smart Flow” Integrates Quality and Control Data for Diagnostics and Optimization in Real Time (Part of KwIDF Project) | 115 |
| <i>A. Al-Jasmi, H. Nasr, H. K. Goel, G. Moricca, G. A. Carvajal, J. Dhar, M. Querales, M. A. Villamizar, A. S. Cullick, J. A. Rodriguez, G. Velasquez, Z. Yong, F. Bermudez, J. Kain</i> | |
| SPE 167395 Intelligent Digital Oilfield Implementation: A Case Study of Change Management Strategies to Ensure Success | 125 |
| <i>Ahmad Al-Jasmi, Harish K. Goel, Soraya Sirikit Cerda, Kevin Barry, Guillermo Velasquez</i> | |
| SPE 167396 An Intelligent Operation Solution for Oil & Gas Production Process | 136 |
| <i>Santai Hwang, Jose Rodriguez, Justin Healy, Cesar Enrique Bravo</i> | |
| SPE 167397 Maximizing the Value of Real-Time Operations for Diagnostic and Optimization at the Right Time (KwIDF Project) | 149 |
| <i>A. Al-Jasmi, H. K. Goel, A. Al-Abbasi, H. Nasr, G. Velasquez, G. A. Carvajal, A. S. Cullick, J. A. Rodriguez, M. Scott</i> | |
| SPE 167398 Automated Workflows to Monitor, Diagnose, Optimize, and Perform Multi-Scenario Forecasts of Waterflooding in Low-Permeability Carbonate Reservoirs (a KwIDF Project) | 159 |
| <i>P. Ranjan, G. A. Carvajal, H. Khan, R. Vellanki, L. Saputelli, F. Md Adan, M. Villamizar, S. Knabe, J. Rodriguez, A. Al-Jasmi, H. Nasr, B. Al-Saad, A. Pattak</i> | |
| SPE 167399 Multivariate Analysis of Job Pause Time Data Using Classification and Regression Tree and Kernel Clustering | 174 |
| <i>Marko Maucec, Ajay Singh, Srimoyee Bhattacharya, Jeffrey Yarus, Dwight Fulton, Jon Orth</i> | |
| SPE 167402 Impact of WITSMML Data Surveillance on Shallow Casing Points | 192 |
| <i>Musab M Khudiri, John A James, Waleed I Gadri, Ali H Bu Khamsin, Faisal S Samie, Ramzi A Miyajan, Mazin Y Abbas, Muhammad Kashif, Tony Jovin</i> | |
| SPE 167403 Using Predictive Analytics for Asset Management: A Case Study of Early Warning Prediction Application | 199 |
| <i>A. Ajayi, O. Akinyemi, M. Kurdi</i> | |

| | |
|---|-----|
| SPE 167404 Data Driven Analytics Method for Real Time Analysis of Distributed Temperature Sensing Measurements for Reservoir and Well Management | 208 |
| <i>A. A. Ajayi, O. Fasasi</i> | |
| SPE 167406 Transforming Performance, Safety and Security Assurance | 219 |
| <i>G. Arango, P. Flichy, S. J. Jose</i> | |
| SPE 167409 A Decade Long Journey into Intelligent Field: A Story to be Shared | 225 |
| <i>A. A. Dhubaiki, M. A. Khalifah, A. A. Kaba</i> | |
| SPE 167410 A Unified Framework for Implementing Business Intelligence, Real-time Operational Intelligence and Big Data Analytics for Upstream Oil Industry Operators | 230 |
| <i>Mohamed Akoum, Alaa Mahjoub</i> | |
| SPE 167413 Knowledge Intelligence (Ki) | 245 |
| <i>D. Saxby, G. Burridge</i> | |
| SPE 167414 Inflow Control Devices Improve Production in Heavy Oil Wells | 251 |
| <i>Brandon Least, Stephen Greci, Mike Konopczynski, Kim Thornton</i> | |
| SPE 167415 The Theory of a Fluidic Diode Autonomous Inflow Control Device | 262 |
| <i>Michael Fripp, Liang Zhao, Brandon Least</i> | |
| SPE 167416 South Oman Progressing Cavity Pumps Continuous Control Pressure Setup | 271 |
| <i>Salim Al Mahrooqi, Conny Velazco, Luis Vargas, Carlos Sanchez</i> | |
| SPE 167417 Robotics for the Petroleum Industry – Challenges and Opportunities | 282 |
| <i>Aksel A. Transeth, Henrik Schumann-Olsen, Anders Røyrvåg, Mauricio Galassi</i> | |
| SPE 167418 Real Time Data: Interactive Monitoring of Data Flow for Continuous and Reliable Data Transmission | 290 |
| <i>Abdulrahman A. Al-Amer, Muhammad Al-Gosayir, Naser Al-Naser, Hussain Al-Towaileb</i> | |
| SPE 167419 Profit and Loss at the Wellhead; Producing from the Wells that are Profitable and Shutting-in the Loss-makers | 297 |
| <i>Dean Forrester, Jenna M. Trescott, Johan Nell, Ken Landgren</i> | |
| SPE 167420 Novel Technology for Downhole Reality Check and Realization - A Case Study of Real-time Monitoring of High-Rate Matrix Acid Stimulation Treatments in a Tight Chalk Reservoir using Distributed Temperature Sensing | 306 |
| <i>A. Mohamed Hashim, D. J. Stemberger, M. Mulrooney</i> | |
| SPE 167421 Innovative Solution to Produce Intelligently From a Multi-zone Gravel-packed Completion With a Multi Drop Hydraulic Module First in Offshore Malaysia | 325 |
| <i>M. E. Mohammed Tawfik, S. Mohd, C. Ogbonna, A. Ahmad, Ian Raw, Gordon Goh, P. K. Kaka Singh</i> | |
| SPE 167422 Areal Field Surveillance – Applying the Right Solutions for Each Asset | 340 |
| <i>Peter Engbers, Marcel Zwaan, Samantha Grandi</i> | |
| SPE 167424 Real-Time Optimization of a Maturing North Sea Gas Asset with Production Constraints | 348 |
| <i>Ruud Van Der Linden, Tom Busking</i> | |
| SPE 167425 Remote Communication, Collaboration and Cognition | 357 |
| <i>Jocelyn Lomer</i> | |
| SPE 167426 Smart Mobile Worker - Bringing Our Facilities Closer! | 366 |
| <i>Jaap E. Van Dijk</i> | |
| SPE 167428 Data Mining Methodologies Enhance Probabilistic Well Forecasting | 376 |
| <i>Keith R. Holdaway</i> | |
| SPE 167429 Transforming Health, Safety and Environment Strategy and Culture Using Social Business | 392 |
| <i>M. Weitner, D. Hatler</i> | |
| SPE 167431 A Case Study: Producer to Injector - Flow Measurement Experiences in Buzzard Field | 401 |
| <i>Martin White, Marcos Monteferrante, Ö. Haldun Ünalms</i> | |
| SPE 167432 Achieving Digital Oilfield Competency | 416 |
| <i>J. G. Pickering, S. Sengupta</i> | |
| SPE 167433 A Decision Analytic Approach to Geosteering Operations | 424 |
| <i>K. Kullawan, R. Bratvold, J. E. Bickel</i> | |
| SPE 167434 Monitoring Well Performance and Rate Compliance in Real Time: A Case Study | 437 |
| <i>A. K. Al-Dulajjan, J. S. Al-Thuwaini, A. M. Alali, H. A. Towaileb, H. Y. Al-Daif</i> | |
| SPE 167435 Integrated Operations Implementation in Samarang Field | 443 |
| <i>Chik Adnan Abdul Razak, Colinus Lajim Sayung, M Zul Izz Ahmad, Lee Hin Wong, Muzahidin Muhamed Salim, Mohamad Kasim Mohd Som</i> | |
| SPE 167436 Samarang Integrated Operations (IO) - Enabling Real Time Monitoring and Operation of Remote and Mature Asset | 453 |
| <i>K. Murugesan, Munira Nur Farizan Ishak, Nurul Izzwani C Mohamood, Muzahidin Muhamed Salim, Mohamad Kasim Mohd Som, Lee Hin Wong</i> | |

| | |
|--|-----|
| SPE 167437 Intelligent Data Quality Control of Real-time Rig Data | 461 |
| <i>A. Arnaout, P. Zoellner, N. Johnstone, G. Thonhauser</i> | |
| SPE 167438 Gas Lift optimization by Real Time Monitoring using SCADA system | 470 |
| <i>Mohammed Ezzine</i> | |
| SPE 167439 Quantifying the Intelligent Field Added Values | 495 |
| <i>Z. B. Husain, M. A. Al-Hajri</i> | |
| SPE 167440 Remote Field Management of Greenfield Assets in Australia and East Timor: Delivering Value by Automated Production Surveillance and Optimization Platform | 504 |
| <i>Shripad Biniwale, Rajesh Trivedi, Andrew Tran, Joseph Derrij, Ryosuke Yokote</i> | |
| SPE 167443 Selection and Optimization Study on Passive Inflow Control Devices by Numerical Simulation | 515 |
| <i>Quanshu Zeng, Zhiming Wang, Gang Yang, Jianguang Wei</i> | |
| SPE 167445 Strategies Accelerating Progress of Digital Oil Fields (DOF) | 525 |
| <i>Saeed M. Mubarak, Winford E. Holland</i> | |
| SPE 167446 On The Stochastic Response Surface Methodology For The Determination Of The Development Plan Of An Oil & Gas Field | 534 |
| <i>Davi M. Valladao, Ruben R. Torrado, Bruno Flach, Sonia Embid</i> | |
| SPE 167447 Inflow Monitoring in Intelligent Wells using Distributed Acoustic Sensor | 546 |
| <i>J. Xiao, M. Farhadiroushan, A. Clarke, Q. Khalifa, A. Mulhem, H. Forero Reyes, T. R. Parker, J. Shawash, H. C. Milne</i> | |
| SPE 167448 Production Optimisation of a Long Horizontal Well Using Permanent Downhole Distributed Temperature and Pressure Monitoring and Surface Controlled Zones | 553 |
| <i>Magnus Carlsen, Sara Sparre Kofoed, Lex Rijkels, Franz Marketz</i> | |
| SPE 167449 Advanced Optimization Techniques Applied to a Petrobras FPSO | 563 |
| <i>Vidar Gunnerud, Stine Ursin-Holm, Alex Furtado Teixeira</i> | |
| SPE 167451 Implementing Intelligent Energy - Change Management Experiences and Recommendations | 574 |
| <i>Thomas Halland, Leif Kristian Jensen, Martin Eike, Dag Solnørdal</i> | |
| SPE 167452 Optimization Drilling with Real-Time Surveillance System of Mechanical Specific Energy in Deep Wells | 583 |
| <i>Meng Cui, Haige Wang, Guodong Ji</i> | |
| SPE 167453 Field Management by Proactive Optimisation of Intelligent Wells - A Practical Approach | 592 |
| <i>Morteza Haghghat Sefat, Khafiz Muradov, David Davies</i> | |
| SPE 167454 Smart Water Management as part of Supply Chain Logistic for Source Rock Development | 607 |
| <i>D. K. Olsen, M. Weitner, D. C. Olsen, J. O. Perino, D. M. Womack</i> | |
| SPE 167455 Collaborative Work Environments in Shell - Global Scale, Learning and Evolution | 618 |
| <i>Frans G. Van Den Berg, Giles A. R. McCallum, Matt Graves, Elizabeth Heath, Allen Evans</i> | |
| SPE 167457 Real-time Evaluation of Acid Stimulation Performance in Extended-Reach Carbonate Wells with DTS-enabled Intelligent Completions | 627 |
| <i>Xiaowei Wang, Terry R. Bussear</i> | |
| SPE 167460 Second Generation CWE's can Enable Enhanced Oil Recovery How to Add Value by Deploying CWE's Country Wide | 639 |
| <i>Brian Crockett</i> | |
| SPE 167462 Development and Utilization of Integrated Artificial Expert Systems for Designing Multi-Lateral Well Configurations, Estimating Reservoir Properties and Forecasting Reservoir Performance | 648 |
| <i>Talal S. Almousa, Turgay Ertekin</i> | |
| SPE 167463 Application of Inflow Well Tracers for Permanent Reservoir Monitoring in North Amethyst Subsea Tieback ICD Wells in Canada | 673 |
| <i>Andrew Montes, Fridtjof Nyhavn, Gaute Oftedal, Erlend Faevelen, Christian Andresen, Edmund Leung, Vidar Wikmark</i> | |
| SPE 167464 Bringing ESP Optimization to the Digital Oil Field: Rockies Field (USA) Case Studies | 688 |
| <i>Dustin Ratcliff, Ivan Cetkovic, Cesar Gomez</i> | |
| SPE 167465 Spectroscopic Sensing for In-Situ Monitoring of Water Fraction in Natural Gas Flow | 702 |
| <i>Hesham Enshasy, Amjad Omar, Mosong Cheng, Hussein Alnuweiri</i> | |
| SPE 167466 Drilling Assembly Vibration Model Validated with Frequency Domain Examination of Distributed Downhole Measurements | 710 |
| <i>B. L. Feauto, C. Jeffery, C. Hanley, R. G. Duff</i> | |
| SPE 167467 Creating a Wireless Digital Platform to Accelerate and Improve Upstream and Downstream Operations | 728 |
| <i>René Plus</i> | |

| | |
|---|-----|
| SPE 167468 Delivering Access to Expertise in Upstream Oil and Gas Operations | 733 |
| <i>Eyad Alqadi</i> | |
| SPE 167469 Live Well Models a Tool for Production Optimization | 737 |
| <i>R. V. Rachapudi, B. Y. Haider, T. Al-Mutairi, K. W. Al Deyain, M. Al-Yahya, A. Shakeel, K. R. Qureshy, Mikhail Harith</i> | |
| SPE 167470 Predictive Maintenance and Deterministic Maintenance Scheduling for Continuous Process Industry Rotary Equipments | 747 |
| <i>Tapan Dey, Sarika Chandramohan, Shefali Bansal</i> | |
| SPE 167472 Petroleum Development Oman Approach to Intelligent Production Measurement | 753 |
| <i>K. K. Al Hanashi, Z. Syed Mohammad, A. N. Al-Obaidani, S. H. Al-Hinai</i> | |
| SPE 167473 PDO's Journey Of Process Control Optimisation - A Look Back To The 15 Years Of Existence Of The PCO Team - Challenges, Achievements, Training, Future | 763 |
| <i>Hilal Al-Harthy</i> | |
| SPE 167474 The Process Control Aspects for Well Head Control | 768 |
| <i>Salim Al-Mawali</i> | |
| SPE 167475 The Use of KPIs to Measure Performance Improvement in a Collaborative Work Environment | 775 |
| <i>Jasim Ajmi, Keith Simmonds</i> | |
| SPE 167476 Bridging Operational Information with Real-Time Data: Enhancing Real-Time Monitoring Engineer's Situational Awareness | 780 |
| <i>Ricardo Borjas, Mohammad Khairi Hamzah</i> | |
| SPE 167477 Innovative Applications of Downhole Temperature Data | 787 |
| <i>Xingru Wu, Weibo Sui, Yuanlin Jiang</i> | |
| SPE 167478 Delivering Real-Time 220,000-Channel 3D Seismic Experience for the First Time in Kuwait | 798 |
| <i>Binu Thomas Joseph</i> | |
| SPE 167479 Model-Driven Development for Safety-Critical Projects in Intelligent Energy | 804 |
| <i>Paul Fechtelkotter, Graham Bleakley, Bruce Powel Douglass, Ben Amaba</i> | |
| SPE 167480 A New Intervention-less Completion System Using Radio Frequency Identification (RFID) Techniques | 818 |
| <i>Feng Yuan, Eric Blanton, Jane Mason, Euan Murdoch</i> | |
| SPE 167481 WellPlanET - Smart & Efficient Drilling Well Program by Saudi Aramco | 827 |
| <i>A. O. Radhwi, M. M. Amer, H. Idrees, A. Fakhruddin, M. A. Hazzazi</i> | |
| SPE 167482 Improving Reservoir Management through Big Data Technologies | 837 |
| <i>D. Seemann, M. Williamson, S. Hasan</i> | |
| SPE 167484 Upstream Workflow Transformation in a Mature Joint Venture Asset:-Design, Implementation and Adoption for Value Creation | 848 |
| <i>O. S. Adeyemi</i> | |
| SPE 167486 Energy Harvesting Powered Wireless Monitoring and Control in Oil and Gas | 857 |
| <i>Talha J. Ahmad, Mohamed N. Noui Mehidi</i> | |
| SPE 167488 IOR / EOR Operations: Can the Recent Developments in Intelligent Wells Technology Advance the Concept? | 869 |
| <i>Usman Ahmed</i> | |
| SPE 167490 Tangible Values for Running Distributed Temperature Survey (DTS) as Part of Stimulating Multi-Lateral Injection Wells | 880 |
| <i>S. D. Al-Gamber, Sajid Mehmood, Danish Ahmed, Anton Burov, George Brown, Souhaibe Barkat, Robert Gwynne Shrake</i> | |
| SPE 167492 Real-Time Automatic Operation and Optimization of Produced-Water Treatment | 890 |
| <i>S. Asdahl, K. Rabe</i> | |
| SPE 167493 A Real Case Study: "Efficient Monitoring and Evaluation the Superficial Production Network" - Litoral de Tabasco Asset | 900 |
| <i>F. Mijares, E. Molina, C. Escalona, L. A. Montes De Oca, W. Jageregger</i> | |
| SPE 167494 A Real Case Study: "Well Monitoring System and Integration Data for Loss Production Management" Consorcio Shushufindi | 911 |
| <i>J. Goyes, D. Biedma, A. Suter, P. Navarre, M. Tortolero, M. Ostos, J. Vargas, P. Vivas, J. Sena, C. Escalona</i> | |
| SPE 167495 The Art of Intelligent Energy (iE) Part 2 - Insights and Lessons Learned from the Application of iE between 2009 and 2012 | 919 |
| <i>A. R. Edwards, P. Helm, T. Dhubaib</i> | |
| SPE 167497 Intelligent Energy - Changing How Work Gets Done | 932 |
| <i>A. Quaadgras, A. R. Edwards</i> | |

| | |
|--|------------|
| SPE 167500 Certification for Interoperability: A Behavior-Driven, Automated Testing Program for WITSML Version 1.4.1 Servers | 939 |
| <i>Nigel Deeks, Craig Bye, Yashodhan Gidh, Jose Guterman, Denys Metelskyy, Bill Riegel, S. Steinsbø Lie, Joey Magsipok, Donna Marcotte</i> | |
| SPE 167501 Distributed Acoustic Sensing For ESP Understanding and Surveillance | 953 |
| <i>C. Allanic, J. Frangeul, M. Liebeck, B. Carbonnier, G. J. Naldrett, M. Farhadiroushan, A. Clarke</i> | |
| Author Index | |