PROCEEDINGS

1999 SPE Annual Technical Conference and Exhibition

Drilling and Completion

3–6 October 1999
Houston, Texas, U.S.A.
## CONTENTS

<table>
<thead>
<tr>
<th>Paper Number</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPE 56439</td>
<td>Field Investigation of the Effects of Stick-Slip, Lateral, and Whirl Vibrations on Roller Cone Bit Performance</td>
<td>S.L. Chen and K. Blackwood, Security DBS, and E. Lamine, Consultant</td>
</tr>
<tr>
<td>SPE 56441</td>
<td>Rock Strength Measurements on Cuttings as Input Data for Optimizing Drill Bit Selection</td>
<td>V. Uboldi, ENI SpA; L. Civolani, Smith Intl.; and F. Zausa, ENI SpA</td>
</tr>
<tr>
<td>SPE 56442</td>
<td>Application of Neural Networks for Predictive Control in Drilling Dynamics</td>
<td>D. Dashevskiy, U. of Houston, and V. Dubinsky and J.D. MacPherson, Baker Hughes INTEQ</td>
</tr>
<tr>
<td>SPE 56444</td>
<td>Outstanding Economic Advantages Based on New Straight-Hole Drilling Device Proven in Various Oilfield Locations</td>
<td>A. Calderoni, Eni-AGIP, and A. Savini, J. Treviranus, and J. Oppelt, Baker Hughes INTEQ</td>
</tr>
<tr>
<td>SPE 56467</td>
<td>Fracturing Bypassed Pay in Tubingless Completions</td>
<td>S.J. Olejniczak, Schlumberger Oilfield Services; J.A. Swaren, S.N. Gulrajani, and C.C. Olmstead, Schlumberger Oilfield Services</td>
</tr>
<tr>
<td>SPE 56468</td>
<td>Case History of Complex Fracture Behavior in the Hanoi Trough, Vietnam</td>
<td>C.L. Cipolla and M.J. Mayerhofer, Pinnacle Technologies Inc., and B.L. Wilson, Anzoil NL</td>
</tr>
<tr>
<td>SPE 56471</td>
<td>Perforating for Stimulation: An Engineered Solution</td>
<td>R.S. Lestz and J.N. Clarke, Chevron USA Production Co., and D. Plattner and A.C. Byrd, Halliburton Energy Services</td>
</tr>
<tr>
<td>SPE 56473</td>
<td>Skin Bypass Fracs: Proof That Size is Not Important</td>
<td>Phil Rae, A.N. Martin, and B. Sinanan, BJ Services Co.</td>
</tr>
<tr>
<td>SPE 56500</td>
<td>Expandable Tubular Solutions</td>
<td>Andrei Filippov and Robert Mack, Shell; Lance Cook, Patrick York, and Lev Ring, Enventure Global Technology; and Terry McCoy, Halliburton Energy Services</td>
</tr>
<tr>
<td>SPE 56527</td>
<td>New HF Acid System Improves Sandstone Matrix Acidizing Success Ratio By 400% Over Conventional Mud Acid System in Niger Delta Basin</td>
<td>Nicholas Kume, BJ Services Co. Nigeria; Robert Van Melsen and Luckie Erhahon, SPDC Nigeria; and A.F. Abiodun, BJ Services Co. Nigeria</td>
</tr>
</tbody>
</table>
E.R. Upchurch, Thums Long Beach Co.

SPE 56591 The Nominal Sand Control Screen: A Critical Evaluation of Screen Performance ........................................ 399
D.R. Underdown and R.C. Dickerson, Chevron Petroleum Technology; and William Vaughan, Chevron Corp.

SPE 56592 Openhole Stability and Sanding Predictions by 3D Extrapolation from Hole Collapse Tests ........................................ 415

SPE 56593 Increased Resistance to Proppant Flowback by Adding Deformable Particles to Proppant Packs Tested in the Laboratory ........................................ 427

SPE 56596 Roughness of Hydraulic Fractures: The Importance of In-Situ Stress and Tip Processes ........................................ 439
D.B. van Dam and C.J. de Pater, Delft U. of Technology

SPE 56597 Incorporating Crossflow and Spurt-Loss Effects in Filtration Modeling Within a Fully 3D Fracture-Growth Simulator ........................................ 453

SPE 56598 High Propagation Pressures in Transverse Hydraulic Fractures: Cause, Effect, and Remediation ........................................ 467
W.F.J. Deeg, Halliburton Energy Services Inc.

SPE 56600 Estimating Pore Pressure and Permeability in Massively Stacked Lenticular Reservoirs Using Diagnostic Fracture-Injection Tests ........................................ 475
D.P. Craig, Halliburton Energy Services Inc., and T.D. Brown, Barrett Resources Corp.

SPE 56632 Rheology of Various Drilling Fluid Systems Under Deepwater Drilling Conditions and the Importance of Accurate Predictions of Downhole Fluid Hydraulics ........................................ 489
J.M. Davison and S. Clary, Schlumberger Dowell; A. Saasen, Statoil; and M. Allouche, D. Bodin, and V.A. Nguyen, Dowell Schlumberger Dowell

SPE 56633 Rheological Properties of Aqueous Foams for Underbalanced Drilling ........................................ 503
Stéphane Saintpere, Total; Benjamin Herzhaft, IFP; Abdoulaye Toure, Cenergys; and Stéphane Jollet, IFP

SPE 56634 A Probabilistic Reasoning Tool for Circulation Monitoring Based on Flow Measurements ........................................ 515

SPE 56635 Cleanup of Wall-Building Filter Cakes ........................................ 529
Z.M. Zain, PETRONAS Research, and M.M. Sharma, U. of Texas at Austin

SPE 56636 Correlation of Ultra-Low Shear Rate Viscosity and Dynamic Barite Sag in Invert-Emulsion Drilling Fluids ........................................ 543
William Dye, Terry Hemphill, William Gusler, and Gregory Mullen, Baker Hughes INTEQ

SPE 56638 Influence of Drillpipe Rotation and Eccentricity on Pressure Drop Over Borehole During Drilling ........................................ 555
G. Ooms, TU-Delft, and B.E. Kampman-Reinhartz, Shell Intl, E&P

SPE 56669 Use of Formed Metal Technology to Provide Low-Risk Solutions to High-End Multilateral Completion Challenges ........................................ 561

SPE 56685 Correlation of Fluid Properties and Fluid Loss Mechanisms in Deepwater Caspian Sea Wells: Implications for the Selection of the Optimal Drilling Fluid ........................................ 571
C.J. Bovenkerk, J. Moore, R. Leary, and T. Dugan, Shell E&P International

SPE 56686 Rheology of Various Drilling Fluid Systems Under Deepwater Drilling Conditions and the Importance of Accurate Predictions of Downhole Fluid Hydraulics ........................................ 575
J.M. Davison and S. Clary, Schlumberger Dowell; A. Saasen, Statoil; and M. Allouche, D. Bodin, and V.A. Nguyen, Dowell Schlumberger Dowell

SPE 56687 Rheological Properties of Aqueous Foams for Underbalanced Drilling ........................................ 581
Stéphane Saintpere, Total; Benjamin Herzhaft, IFP; Abdoulaye Toure, Cenergys; and Stéphane Jollet, IFP

SPE 56688 A Probabilistic Reasoning Tool for Circulation Monitoring Based on Flow Measurements ........................................ 591

SPE 56689 Cleanup of Wall-Building Filter Cakes ........................................ 601
Z.M. Zain, PETRONAS Research, and M.M. Sharma, U. of Texas at Austin

SPE 56690 Correlation of Ultra-Low Shear Rate Viscosity and Dynamic Barite Sag in Invert-Emulsion Drilling Fluids ........................................ 611
William Dye, Terry Hemphill, William Gusler, and Gregory Mullen, Baker Hughes INTEQ

SPE 56691 Influence of Drillpipe Rotation and Eccentricity on Pressure Drop Over Borehole During Drilling ........................................ 621
G. Ooms, TU-Delft, and B.E. Kampman-Reinhartz, Shell Intl, E&P

SPE 56692 Use of Formed Metal Technology to Provide Low-Risk Solutions to High-End Multilateral Completion Challenges ........................................ 631
SPE 56670  Application of Intelligent Completion Technology to Optimize the Reservoir Management of a Deepwater Gulf of Mexico Field—A Reservoir Simulation Case Study .......................................................... 573
Stephen Rester, Jacob Thomas, Madeleine Peijs-van Hilten, and W.L. Vidrine, Halliburton Energy Services Inc.

SPE 56671  Coiled Tubing Used as a Continuous Sucker-Rod System in Slim Holes: Successful Field Experience ............................................. 583
Fernando Solanet and Luis Paz, YPF S.A.; and Humberto Leniek, Coiled Tubing Americas

SPE 56697  Optimizing Horizontal Laterals in a Heavy Oil Reservoir Using LWD Azimuthal Measurements .............................................. 597
J. Rasmus, Ted Bornemann, G. Farruggio, and S. Low, Schlumberger

SPE 56699  Local Geomagnetic Field Modelling Closes the Gap Between MWD and Gyro Directional Surveying ........................................ 609
T.I. Waag, SINTEF Petroleum Research AS; Torger Torkildsen, Statoil; O.H. Inderhaug, Norsk Hydro; and I.M. Carlsen, Saga Petroleum (now at SINTEF Petroleum Research)

SPE 56700  Development for Acoustic Sensing System Ahead of the Bit for Detection of Abnormally High-Pressured Formation ...................... 617
Yuzo Sugimura, Toru Masukawa, and Tetsuo Yonezawa, Japan Natl. Oil Corp., and Shinichi Hattori, Ryosuke Taniguchi, and Takashi Shimada, Mitsubishi Electric Corp.

SPE 56701  New Platform for Attitude Determination and Declination Correction .......................................................... 627
Hatem Morsy and Robert Estes, Baker Hughes INTEQ

SPE 56702  Accuracy Prediction for Directional MWD .................................................. 637
H.S. Williamson, BP Amoco

SPE 56723  Determining Fracture Closure Pressure in Soft Formations Using Postclosure Pulse Testing .................................................. 653
E.R. Upchurch, ARCO Alaska Inc.

SPE 56724  Understanding Hydraulic Fracture Growth: Tricky But Not Hopeless .......... 661
C.A. Wright, L. Weijers, E.J. Davis, and M. Mayerhöfer, Pinnacle Technologies Inc.

SPE 56725  Lateral Proppant Distribution: The Good, the Bad and the Ugly of Putting Frac Jobs Away .................................................. 671

SPE 56726  Understanding Proppant Flowback .................................................. 681
Mark Parker, Jim Weaver, and Diederik Van Batenburg, Halliburton Energy Services Inc.

SPE 56727  Time-Lapse Ultrasonic Measurements of Laboratory Hydraulic Fracture Growth: Width Profile and Tip Behavior ..................... 695
J. Groenenboom, D.B. van Dam, and C.J. de Pater, Delft U. of Technology

SPE 56728  Deliverability Enhancement via Advanced Fracturing Technology in Gas Storage Wells .................................................. 711

SPE 56757  Borehole Stability of Multilateral Junctions .................................................. 727
B.S. Aadnøy, Stavanger U., and Cecilie Edland, BP Amoco

SPE 56759  Time-Dependent Coupled Processes in Wellbore Design and Stability: PBORE-3D .................................................. 737
Y. Abousleiman, S. Ekkbote, and L. Cui, U. of Oklahoma; F. Mody, Halliburton/Baroid Inc.; and J-C. Roegiers and M. Zaman, U. of Oklahoma

SPE 56760  Estimation of Leakoff Pressure Gradient from Cementing and Casing Data .................................................. 747
D. Zhou and A.K. Wojtanowicz, Louisiana State U.

SPE 56761  Application of a New Model to Analyze Leakoff Tests .................................................. 759
G. Altun, J. Langlinais, and A.T. Bourgoyne Jr., Louisiana State U.
SPE 56762  Optimization of Multistring Casing Design with Wellhead Growth  771
G.R. Samuel and Adolfo Gonzales, Landmark Drilling & Well Services

SPE 56777  Screen Performance and Cleanup Characterization in Horizontal Well
Drill-In-Fluids Using a Large-Scale Radial Flow-Cell  777
Mahmoud Asadi and G.S. Penny, Stim-Lab Inc.

SPE 56779  Case History of the World’s First Level 5 Multilateral Completed from a
Semisubmersible Rig  791
A.M. Pasiczny, W.C. Hogg, D.L. Williams, and C.M.P. Cordeiro, Baker Oil Tools, and
G.P.G. Sotomayor, I. Alves, R.L.L. De Oliveira, and M. Blauth, Petrobrás

SPE 56780  Limited-Entry Frac Applications on Long Intervals of Highly Deviated
or Horizontal Wells  805

SPE 56782  Evaluation of Acid Treatments in Horizontal Wells  817
D. Zhu and A.D. Hill, U. of Texas at Austin, and M.D. Looney, Texaco Inc.

SPE 56783  Horizontal Gravel Packing Successfully Moved to Deepwater Floating
Rig Environment  823
S.P. Mathis, Baker Oil Tools; L.A.G. Costa, A.N. de Sa, Heitor Tsuha, and
Agostinho Calderon, Petrobrás; J.C. Arango, Ken MacDonald, and S.A. Hebert,
Baker Oil Tools

SPE 56833  New Insights into Proppant-Pack Damage Due to Infiltration
of Formation Fines  837
Matt Blauch, Jim Weaver, Mark Parker, and Brad Todd, Halliburton Energy Services Inc.,
and Mark Glover, BP Amoco