SPE/ICoTA Refracturing Through Optimized Interventions

Across all oil and gas plays, the rapid and evolving approaches to completion and stimulation design and deployment has created enormous opportunities to re-enter and re-stimulate wells that were treated early in play development. With the deep and sustained reduction in oil price, the refracturing of these wells is an obvious and highly attractive opportunity. Subject matter experts will present case study presentations on extensive field experiences and provide technical updates on refracturing. This workshop is an opportunity to network as well as to learn the newest developments.

COMMITTEE MEMBERS

Chairperson
Martin Rylance
BP Exploration

Dave Allison
Anadarko

Giuseppe Ambrosi
Halliburton

Steve Asbill
Silver Oak Energy

Steve Baumgartner
Marathon Oil Corporation

Robert Coon
Tartan Completions Systems

Juan Carlos Flores
Baker Hughes

Sam French
BP Exploration

Omkar Jaripatke
Pioneer Natural Resources

George King
Apache Corporation

Dick Leonard
ProTechnics

Bob Murphy
Weatherford

Oscar Rivas
Schlumberger

Ross Rucker
Aramco Services

Tom Walker
Noble Energy

Brian Ward
Hess Corporation
SPE/ICoTA Refracturing Through Optimized Interventions

THANK YOU TO OUR SPONSORS

HALLIBURTON
14-15 September Receptions

ENTVENTURE
EXPAND YOUR POSSIBILITIES

THRU TUBING SOLUTIONS

15–16 September Coffee Breaks
15 September Breakfast

Contributing Event

Contributing Event

CORPORATE

BAKER HUGHES

GENERAL INFORMATION

About Society of Petroleum Engineers
The Society of Petroleum Engineers (SPE) is a not-for-profit professional association for members engaging in oil and gas E&P, providing resources for technical knowledge. Income from this event will be invested back into SPE to support many other member programs. Scholarships, certification, the Distinguished Lecturer program, and SPE’s energy education program Energy4me are just a few examples.

Accessibility
Our events and functions are accessible to all attendees with wheelchairs. If you require special arrangements, please contact our staff at the registration desk.

Alcohol Policy
SPE recognizes the legitimate serving of alcoholic beverages in the process of conducting business and social activities. We also recognize that the use and consumption of alcohol carries with it the requirement for all attendees to consume those beverages responsibly.

Commercialism
In remaining consistent with workshop objectives and SPE guidelines, commercialism in presentations will not be permitted. Company logos should be used only to indicate the affiliation of the presenter(s).

Continuing Education Units
Attendees will receive 1.6 CEUs. One CEU equals 10 contact hours of participation. CEUs will be awarded through SPE Professional Development for participation and completion of SPE workshop. A permanent record of a participant’s involvement and awarding of CEUs will be maintained by SPE.

Documentation
Following the workshop a URL containing released copies of the workshop presentations will be available to all attendees.

Electronic Devices
As a courtesy to the speakers and your fellow registrants, please turn off all electronic devices during presentations.

Name Badges
Please wear your badge at all times. It is a courtesy to your fellow registrants, speakers and sponsors.

Photography and Recording Policy
SPE reserves the exclusive rights to all video/audio recording or reproductions of the workshop.

Unauthorized video/audio recording is expressly prohibited in the session room(s) or poster area, whether by video, still or digital camera, mobile phone, or any other means or form of reproduction.

Any person attending may be photographed or videotaped, and by your attendance, you give permission to use your image in possible future marketing publications including print, online, and video.

Workshop Format
Workshops maximize the exchange of ideas among attendees and presenters through brief technical presentations followed by extended Q&A periods. Focused topics attract an informed audience eager to discuss issues critical to advancing both technology and best practices.

Many of the presentations are in the form of case studies, highlighting engineering achievements and lessons learned. In order to stimulate frank discussion, no proceedings are published and members of the press are not invited to attend.
TECHNICAL AGENDA
MONDAY, 14 SEPTEMBER
1730-1900 | Welcome Reception
La Sierra Room

TUESDAY, 15 SEPTEMBER
All technical sessions are located in the San Antonio Ballroom AB.
0700-0800 | Registration and Continental Breakfast
San Antonio Ballroom Foyer

0800-0805 | Chairperson’s Opening Remarks

0805-0840 | Keynote Address: Engineering Malpractice – How NOT to Pump a Refrac
Mike Vincent, FracWell

0840-1010 | Session 1: Selection Process for Re-Fracturing Candidates
Session Chairs: Juan Carlos Flores, Baker Hughes
Sam French, BP Exploration
Dave Allison, Anadarko

- Presentation 1: Considerations and a Statistical Methodology for Refracturing Candidate Selection in Horizontal Wells
  Randy LaFollette, Baker Hughes

- Presentation 2: Multidisciplinary Teams Key to Optimizing Refrac Candidate Selection Criteria for the Barnett Shale Play
  Dario Stemberger, Devon Energy

- Presentation 3: Workflow for Refracturing Horizontal Wells – Analyzing Refracturing Potential in Eagle Ford and the Associated Challenges
  Mehdi Rafiee, Statoil

1010-1030 | Coffee Break
San Antonio Ballroom Foyer

1030-1200 | Session 2: Well Integrity and Regulatory
Session Chairs: George King, Apache Corporation
Steve Baumgartner, Marathon Oil Corporation
Tom Walker, Noble Energy

- Presentation 1: Horizontal Multi-Frac Failure Investigations
  Bob Moe, Viking Engineering

1200-1330 | Lunch
Palo Duro Pavilion

1330-1500 | Session 3: Completions and Coiled Tubing Intervention
Session Chairs: Robert Coon, Tartan Completions
Bob Murphy, Weatherford
Sam French, BP Exploration

- Presentation 1: Selected Case Histories of DJ Basin Horizontal Refracs
  Jim Rouse, Noble

- Presentation 2: Refracturing Case Studies - Applications and Recent Results
  Rob Oberhofer, Packers Plus Energy Services

- Presentation 3: Refracs – Revival or Remorse
  Eric Schmeizl, NCS Multistage

1500-1530 | Coffee Break
San Antonio Ballroom Foyer

1530-1730 | Session 4: Diversion and Zonal Isolation
Session Chairs: Robert Coon, Tartan Completions
Bob Murphy, Weatherford
Sam French, BP Exploration

- Presentation 1: Application and Optimization of Particulate Diversion Material in Horizontal Wells in the Eagle Ford
  Andrew Acock, Schlumberger

- Presentation 2: Case Histories of Diversion Refracs
  Stephan Cadwallader, BP Exploration
Presentation 3: Advancements in Particulate Diverting Technology, Designs, and Processes  
Matthew Lahman, Halliburton

Presentation 4: Refracturing Case Studies of Horizontal and Vertical Wells Using Advanced Degradable Mechanical Diverters  
David Arnold and Francisco Fragachan, Weatherford

1730-1900 | Networking Reception and Poster Presentations  
Palo Duro Pavilion

WEDNESDAY, 16 SEPTEMBER

0700-0800 | Continental Breakfast  
San Antonio Ballroom Foyer

0800-0930 | Session 5: Fracture Stimulation Design In a Fractured Well  
Session Chairs: Omkar Rivas, Schlumberger  
Ross Rucker, Aramco Services  
Brian Ward, Hess Corporation

Presentation 1: Performance Considerations of Fluid and Proppants in Refracturing  
Curtis Boney, BHP Billiton

Presentation 2: Considerations for Economic Refracturing Success in Horizontal Wells  
Brian Sinosic, Schlumberger

Presentation 3: Using MDD Technology to Define and Select Bakken Refracturing Candidates  
Ted Dohmen, Hess Corporation

0930-1000 | Coffee Break  
San Antonio Ballroom Foyer

1000-1130 | Session 6: Diagnostics and Surveillance  
Session Chairs: Dick Leonard, ProTechnics  
Steve Asbill, Silver Oak Energy  
Giuseppe Ambrosi, Haliburton

Presentation 1: An Engineering Approach to Optimize Refracture Treatment Using Real-Time Microseismic Data  
Sudhendu Kashikar, MicroSeismic

Presentation 2: Fiber-Optic Revelations from a Multistage Openhole Lateral Fracturing Treatment and Its Application to Refracs  
Jason Baihly, Schlumberger

1130-1300 | Lunch  
Palo Duro Pavilion

1300-1430 | Session 7: Flowback, Productivity, and Economics  
Session Chairs: Juan Carlos Flores, Baker Hughes  
Steve Asbill, Silver Oak Energy  
Dave Allison, Anadarko

Presentation 1: Shale Reservoirs Production Management – Do It Now or Refracture Early  
Ibrahim Abou-Sayed, i-Stimulation Solutions, Inc.

Presentation 2: Refraconomics – Shale Revolution 2.0?  
Jonathan Colaco, Apache Corporation

Presentation 3: Haynesville Shale Refrac Case Study  
Bryan Surles, Comstock Resources

1430-1500 | Coffee Break  
San Antonio Ballroom Foyer

1500-1630 | Session 8: Best Practices  
Session Chair: Martin Rylance, BP Exploration

Presentation 1: Candidate Selection Best Practices – Where Do We Start?  
George King, Apache Corporation

Presentation 2: More Than Just a Diversion?  
Bruce Robertson, Weatherford

Presentation 3: Mechanics of Refracture Extension and Possible Problems to Watch For  
Ali Daneshy, Daneshy Consultants, Intl.

Presentation 4: Productivity and Economics – Is It All Worthwhile?  
Mike Vincent, FracWell

1630-1645 | Closing Remarks
The Ultimate Diverter

Enventure’s ESeal RF Liner delivers the industry’s most precise and reliable refrac solution

Stop guessing. Start expanding! Contact your expandable experts at Enventure to maximize the efficiency and value of your unconventional refrac program.

<table>
<thead>
<tr>
<th>Successful Refrac Requirements:</th>
<th>Chemical Diversion</th>
<th>ESeal RF Liner</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precision Isolation</td>
<td>Low to ???</td>
<td>High</td>
</tr>
<tr>
<td>Pressure Integrity</td>
<td>Low to ???</td>
<td>High</td>
</tr>
</tbody>
</table>

NOTES:
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
POSTER PRESENTATIONS:

Posters will be displayed in the Palo Duro Pavilion during Tuesday’s networking reception.

- Zonal Isolation System for Stimulation in Extended Horizontal Completions  
  Brett Fears, Thru Tubing Solutions

- AccessFrac ReFrac Pilot Program Recovers Bypassed Reserves from Modern Completions in the Eagle Ford  
  Matthew Lahman, Halliburton

- Fiber-Optic Monitoring: Stimulation Results From Unconventional Reservoirs  
  Ali Elasfori, Halliburton, Pinnacle

- Refracturing Compels New Demand on Coiled Tubing  
  Bruce Reichart, Tenaris

- Say YES to Refracturing! YES - With Solid Expandable Diversion - The Ultimate Diverter!  
  Jerry Fritsch, Enventure Global Technology

- Re-Stimulation and Refracturing of Mature Assets: Interra Energy Completion Tools Provides Technical Means to Target and Produce More Reserves in Existing Completions  
  Will Gardner, Interra Energy Services

- NextWave Production Rejuvenation Solution – Well Candidate Screening Selection  
  Ronald Pinto, Baker Hughes

- REAL Connect Service  
  Elizabeth McCartney, Baker Hughes

- EasyReach Metal-to-Metal Lubricant for Coiled Tubing Extended-Reach Applications  
  Rodrigo Micheli, Baker Hughes

- Single-Entry In-Situ Fracturing with Coiled Tubing  
  Robert Mckitrick, Baker Hughes

- ControlView Control Line Detection Service  
  Sandeep Gade, Baker Hughes

- Insignia Well Integrity Evaluation Service  
  Sandeep Gade, Baker Hughes

- RockView Thru Service  
  Sandeep Gade, Baker Hughes

- The Saltel Industries Casing Patch: A Reliable Way to Isolate Perforation Clusters With a Small ID Loss  
  Nick Saltel, Saltel Industries

- The Saltel Industries Slim-Line Packer: The Isolation Packer With the Smallest ID Loss  
  Nick Saltel, Saltel Industries

- Insight Into Geomechanics of Refracking – A Geomechanically Optimized Refrac Design  
  Alireza Agharazi, MicroSeismic

- Eco-Friendly Degradable Materials for Diversion and Zonal Isolation of Multiple Stage Horizontal Well Completions: Case Histories From US Shale Plays  
  David Arnold, Weatherford

- Development Process and Application of Degradable Diverting Agents  
  Jose Garza, Trican Well Service

- Addressing FAQs Regarding Diverters  
  Brad Todd, Completion Science

- REFRACS: A Deeper Dive Into Regional Market Share, Operator Activity, and Proppant Usage  
  Matt Johnson, Primary Vision

- Stimulating the Refrac World  
  Scott Benzie, Mohawk

- Recompletion for Refrac  
  Scott Benzie, Mohawk

- Diverters Enable Refracturing  
  David Kulakofsky, Impact Fluid Solutions

- Extended-Reach Well Re-Entry with Water Hammer Tools: Case Histories and Best Practices  
  Jack Kolle, Oil States

- Cost-Effective Isolation for Old Perforations While Maintaining Maximum ID  
  Tom Rogers, Meta Downhole

- Microseismic Geomechanics for Refracturing  
  Mark Mack, ITASCA
SPE WORKSHOPS AND FORUMS

27–29 October  SPE Environmental Stewardship in Oil and Gas Development Workshop
Galveston, Texas, USA

28–30 October  SPE Flow Assurance Challenges in Shale and Tight Developments Workshop
Galveston, Texas, USA

9–11 November  SPE Performance and Design of Water Injectors Requiring Sand Control Workshop
Austin, Texas, USA

9–11 November  SPE Well Placement Best Practices for Increasing Value and Reducing Consequences Workshop
Galveston, Texas, USA

12 November  SPE Surface and Wellbore Positioning Errors Impact Subsurface Models and Reserves Estimates Workshop – How Much and How Serious
Galveston, Texas, USA

17–18 November  SPE Learning from Reservoir Response – History Matching and Production Data Analysis Workshop
Galveston, Texas, USA

2016
March  Bakken Petroleum System Stimulation and Enhanced Development Workshop
Williston, North Dakota, USA

28–30 March  SPE/SEG Workshop: Injection-Induced Seismicity – Engineering Integration, Evaluation, and Mitigation
Fort Worth, Texas, USA

12–17 June  Key Factors for Success in Unconventional Reservoirs and Development Strategies Forum
San Antonio, Texas, USA

REVITALIZE YOUR FIELD WITH CONFIDENCE...

AND LOWER YOUR COST PER BOE.

ACTIVATE™ Refracturing Service is a collaborative workflow that leverages subsurface insight expertise and breakthrough diversion technology to recover bypassed reserves from unconventional wells predictively and repeatedly at one-third the cost of a new drill.

In basins where we’ve delivered the ACTIVATE service, operators have seen up to:
- 80% EUR increase per well
- 25% increase in oil recovery factor
- 66% reduced cost per BOE compared to new drills

ACTIVATE service allows operators to build a balanced field development portfolio of new wells, infills, and refracs, thus increasing bookable reserves and reducing the cost per BOE break-even point of their unconventional assets.

Learn more at halliburton.com/ACTIVATE
It’s possible. And without drilling more wells.

The NextWave™ production rejuvenation solution can unlock the full potential of your older unconventional wells—restoring recovery to levels that can even exceed initial production.

Find out how our NextWave solution can maximize your recovery and cash flow. Call us or visit us at BakerHughes.com/NextWave.

+1 713-268-6218