GLOBAL REFINING AND TERMINALLING
GENERAL MEETING P.21

BENEFITS OF MICROSEISMIC DEPLETION DELINEATION FOR IMPROVING COMPLETIONS AND FIELD DEVELOPMENT
COMPLETIONS & PRODUCTION P. 29

ETHICS AND MORAL REASONING
DRILLING P. 19

LESSONS LEARNED FROM DATA MINING IN UNCONVENTIONAL RESERVOIRS
WESTSIDE P. 28

SPORTING CLAYS TOURNAMENT
P. 37
When oil prices are low and you're worried about what the future will bring – or if your career even has a future – it's nice to get out and about and see the amazing potential today's young people have!

Take for instance, the winners of the SPE-GCS awards for the top three oil-related projects at the Science Engineering Fair of Houston. Karan Jerath, a senior at Friendswood High School, won first prize for his project titled “The Numerical Simulation of an In-Situ Subsea Separator, Part II.” This young man developed a three-phase separator, testing various designs in the simulation software until the oil, gas and water separations were optimized for the Macondo blowout flow rates – and then built a 3D model of it using a 3D printer! This project will go on to compete in the International Sustainable World Energy Engineering Olympiad (I-SWEEEP), which will bring innovative young people from the US, China, Russia, Germany and other countries to compete for international prizes. SPE-GCS plans to sponsor this event and provide judges. If you need a boost in your perspective about the future, you might want to volunteer to be a judge at this event, to be held May 7-11 in Houston.

The other two science fair winners were Michael Bohnet, who investigated the use of waste fly ash to make a greener, stronger cement for oil wells, and Kevin Westerfeld, who found the best plant species to soak up oil from frac ponds. All three winners will have their science fair projects on display at the SPE-GCS Annual Awards Banquet on May 21 at the Norris Center at City Centre. You will be pleased to know that Karan Jerath, the first prize winner, will also have a paid internship (compliments of SPE-GCS) at the Houston Museum of Natural Science this summer and will be going to University of Texas next fall majoring in petroleum engineering.

I also had the opportunity to judge the Science Writing contest that goes along with the Science Engineering Fair of Houston. Writing seems to be a lost art, IMHO, with pidgin texting lingo all the rage these days. Yet, excellence in writing can distinguish you as a consummate professional. According to Mignon Fogarty, also known as Grammar Girl, “Good grammar has become even more important today than it was ten or fifteen years ago. It's common to meet people online now, so the quality of your writing has a huge influence on the first impression you make on people. I like to say that instead of 'dressing for success,' you need to 'write for success.'”

Recently, I also got a chance to judge the SPE Student Paper Contest at the University of Houston, speak to about 70 high school students at the HSSE-SR Study Group's Student Invitational event, and work the SPE table at the HCC STEM Career Fair, which had lots of pre-engineering majors asking about our organization. At all of these events, I was so pleased to see so many bright, young people working hard to find out more about SPE, our industry, and how to be successful.

There's nothing like judging the papers and projects of smart students to give you faith in the future. If you need a boost in your outlook, here are some opportunities for you to inspire –
### STUDY GROUPS

<table>
<thead>
<tr>
<th>Group</th>
<th>Date</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>International</td>
<td>5.07.2015</td>
<td>Current Status of Unconventional Development and Policy</td>
</tr>
<tr>
<td>Research &amp;</td>
<td>5.07.2015</td>
<td>Active Flying Leads-Enabling Technology</td>
</tr>
<tr>
<td>Development</td>
<td>5.07.2015</td>
<td>Active Flying Leads-Enabling Technology</td>
</tr>
<tr>
<td>Petro-Tech</td>
<td>5.12.2015</td>
<td>Data Driven Approach to Wellbore Diagrams</td>
</tr>
<tr>
<td>Northside</td>
<td>5.12.2015</td>
<td>Sequenced Fracturing: The New Edge to Optimize Wellbore Coverage, Reservoir Contact and Completion Efficiency in Unconventional Reservoirs</td>
</tr>
<tr>
<td>Water &amp; Waste</td>
<td>5.12.2015</td>
<td>OCS Regulations - What’s on the Radar for 2015?</td>
</tr>
<tr>
<td>Management</td>
<td>5.12.2015</td>
<td>OCS Regulations - What’s on the Radar for 2015?</td>
</tr>
<tr>
<td>Drilling</td>
<td>5.13.2015</td>
<td>Ethics and Moral Reasoning</td>
</tr>
<tr>
<td>General Meeting</td>
<td>5.14.2015</td>
<td>Global Refining and Terminalling</td>
</tr>
<tr>
<td>Reservoir</td>
<td>5.14.2015</td>
<td>SPE GCS Reservoir Technology Forum</td>
</tr>
</tbody>
</table>

### Events

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permian Basin</td>
<td>5.19.2015</td>
<td>Successful Evaluation and Completion of Two Unconventional Wells in a La Pimienta Formation in Mexico</td>
</tr>
<tr>
<td>Projects Facilities &amp;</td>
<td>5.19.2015</td>
<td>Increase Efficiency and Reliability in Oil and Gas</td>
</tr>
<tr>
<td>Construction</td>
<td>5.19.2015</td>
<td>Increase Efficiency and Reliability in Oil and Gas</td>
</tr>
<tr>
<td>Westside</td>
<td>5.20.2015</td>
<td>Lessons Learned From Data Mining in Unconventional Reservoirs</td>
</tr>
<tr>
<td>Completions &amp; Production</td>
<td>5.20.2015</td>
<td>Benefits of Microseismic Depletion Delineation for Improving Completions and Field Development</td>
</tr>
<tr>
<td>International</td>
<td>5.26.2015</td>
<td>Argentina Outlook: The New Hydrocarbon Law and the Challenges Operators Will Face</td>
</tr>
<tr>
<td>Business Development</td>
<td>5.27.2015</td>
<td>Bulls and Bears - US M&amp;A&amp;D Activity, Capital Markets, Recent Trends, and Driving Themes in the E&amp;P</td>
</tr>
</tbody>
</table>

### COMMITTEES

<table>
<thead>
<tr>
<th>Committee</th>
<th>Date</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Young Professionals</td>
<td>5.04.2015</td>
<td>OTC Week Social</td>
</tr>
<tr>
<td>Auxiliary</td>
<td>5.08.2015</td>
<td>Oil Patch Orientation</td>
</tr>
<tr>
<td>Continuing Education</td>
<td>5.12.2015</td>
<td>Oil Patch Orientation</td>
</tr>
</tbody>
</table>

### IN EVERY ISSUE

<table>
<thead>
<tr>
<th>Section</th>
<th>Issue Date</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPE-GCS March Membership</td>
<td>5.04.2015</td>
<td>Membership Report</td>
</tr>
<tr>
<td>Volunteer Spotlight</td>
<td>5.04.2015</td>
<td>Mohammad Tabatabaei</td>
</tr>
<tr>
<td>Then &amp; Now</td>
<td>5.04.2015</td>
<td>Buddy Woodroof</td>
</tr>
<tr>
<td>Event Recap</td>
<td>5.04.2015</td>
<td>Buddy Woodroof</td>
</tr>
<tr>
<td>Student Chapter Section</td>
<td>5.04.2015</td>
<td>TAMU-SPE</td>
</tr>
</tbody>
</table>

### BOARD OF DIRECTORS MEETING

**Thursday May 21st / 7:30 AM to 10:30 AM**

**Location: SPE Houston Office**
10777 Westheimer Rd., Suite 1075, Houston, TX 77042

**Event Contact: Sharon Harris**
713-457-6821 / 713-779-4216 FAX / sharris@spe.org
Isn’t it time to stop manipulating data though the backend, creating SQL queries to report in Excel, questioning your application security, getting frustrated with poor scenario comparisons, or using 3rd party tools to enter and edit data?

Do your work faster, with less effort. Entero MOSAIC is one comprehensive solution that supports corporate, project, and well level processes for reserves, economics, and declines.

- **SPEED**: Go from weeks to hours in entry, editing, evaluating, reconciling, and reporting
- **EFFICIENCY**: Experience up to 50% in productivity gains
- **INTEGRITY**: Have confidence in your data with better visibility
- **TRUST**: Improve security through role based user/data management
- **INSIGHT**: Built-in stored results with scenario comparisons at the portfolio level

Learn more at www.entero.com/mosaic, or call 713.446.4633.
SP-E-GCS
MEMBERSHIP REPORT
March 2015

3.2015 | 2.2015
TOTAL: 13,599 | TOTAL: 13,078
YP: 2,845 | YP: 2,680

<table>
<thead>
<tr>
<th>SPE-GCS MEMBERS</th>
<th>TOTAL</th>
<th>YP</th>
<th>TOTAL</th>
<th>YP</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Members</td>
<td>181</td>
<td>84</td>
<td>277</td>
<td>134</td>
</tr>
<tr>
<td>Transferred to Section</td>
<td>7</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Unpaid</td>
<td>4,818</td>
<td>1,605</td>
<td>4,818</td>
<td>1,605</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STUDENT MEMBERS</th>
<th>PAID</th>
<th>UNPAID</th>
<th>PAID</th>
<th>UNPAID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Texas A&amp;M</td>
<td>1,102</td>
<td>253</td>
<td>1,063</td>
<td>275</td>
</tr>
<tr>
<td>Rice</td>
<td>64</td>
<td>19</td>
<td>62</td>
<td>19</td>
</tr>
<tr>
<td>HCC</td>
<td>37</td>
<td>19</td>
<td>32</td>
<td>20</td>
</tr>
<tr>
<td>UH</td>
<td>400</td>
<td>134</td>
<td>371</td>
<td>145</td>
</tr>
<tr>
<td>Total</td>
<td>24</td>
<td>7</td>
<td>19</td>
<td>7</td>
</tr>
</tbody>
</table>

| Total Paid/Unpaid | 15,226 | 5,250 | 14,625 | 5,284 |
| % Paid            | 74.4%  | 73.5% |

<table>
<thead>
<tr>
<th>YEAR</th>
<th>TOTAL</th>
<th>YP</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014-2015</td>
<td>13,599</td>
<td>2,845</td>
</tr>
<tr>
<td>2013-2014</td>
<td>13,078</td>
<td>2,680</td>
</tr>
<tr>
<td>2012-2013</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

VOLUNTEER SPOTLIGHT
MARISSA DAVIS

Marissa Davis is a Product Line Coordinator and Product Champion in Lower Completions for Baker Hughes, a global oilfield service company. Prior to becoming a Product Line Coordinator in November 2014, Ms. Davis worked as a Design Engineer for Baker Hughes from October 2012 to November 2014, gaining valuable technical knowledge of completions. From August 2010 to August 2012, Ms. Davis worked as a graduate assistant at Texas A&M University in Mechanical Engineering. During that time, she worked for seven months as an intern at Alstom in Baden, Switzerland, furthering her understanding of combustion engineering. Ms. Davis has volunteered with the Community Services Committee since 2013 and served as the Energy4me contact. She currently holds the SPE Community Services Chair on the Board of Directors. Ms. Davis holds a Master’s Degree from Texas A&M University in Mechanical Engineering and a Bachelor’s Degree from Rice University in Bioengineering.

Amy Timmons, the current chair of the Permian Basin Study group, highlighted Marissa’s outstanding dedication and commitment to SPE Community Services, as she has participated in many community events that SPE has sponsored, as well as presented to several Houston area schools of all levels. She has gone above and beyond as a volunteer for SPE. Thank you Marissa!
**THEN & NOW**

COLUMN BY BUDDY WOODROOF

<table>
<thead>
<tr>
<th>MAY</th>
<th>1955</th>
<th>MAY</th>
<th>1980</th>
<th>MAY</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>One of the hottest areas for drilling in California just so happens to be the present day site of our favorite surf shop (“Toes on the Nose”), namely Huntington Beach with 35 rigs running and more slant hole drilling out under the Pacific Ocean planned.</strong> (You Hollister shoppers might recognize Huntington Beach as the live beach scene shown on monitors in those stores.) Eva’s husband (pardon me…Argentina’s President Peron) gives his blessing to contested Argentine oil concessions for drilling, production, and refining to Standard Oil of California.</td>
<td><strong>On the heels of President Carter’s failed hostage rescue mission in Iran, American foreign policy on the Middle East is shaken and the status of vital crude supplies to the U.S., Western Europe, and Japan are as shaky as ever. Former Secretary of State Henry Kissinger is overheard to say: “The trouble with Carter is that he doesn’t understand foreign policy, but that he doesn’t understand that he doesn’t understand it.” The Alaska gas line inches ahead, as the FERC approves in principle the Northern Border’s plan for the 800-mile eastern leg between Saskatchewan and Ventura, Iowa. (A recurring theme!)</strong> Despite a budget pinch, Congress continues to pursue exotic energy sources, with grants for wood energy, manure, seaweed, and other vegetable matter candidates. (With all the manure in the area, that just might be the ticket for powering Washington D.C. someday.) Nelson Bunker Hunt is given the OK by the Canadian Northwest Territories Supreme Court to transfer $300 million of his Beaufort Sea holdings to Englehard Minerals to cover his debts incurred in the silver market.</td>
<td><strong>ChevronTexaco’s plans to acquire Unocal are temporarily slowed by a challenge from a group of Senators that are asking the U.S. Federal Trade Commission to examine the impact that this acquisition would have on gasoline prices. Anadarko makes a deepwater discovery with its Genghis Khan well in Green Canyon in the Gulf of Mexico. The well will be a subsea tieback to the Marco Polo platform. (With at least three more exploration wells planned this year, maybe they can name them the “Alexander the Great,” the “Napoleon Bonaparte,” and the “Attila the Hun” wells.) The East Texas Bossier gas play is extended to the southwest into Robertson County just north of that SEC school.</strong> (With all of the Bossier horizontal wells that were drilled under I-45 back in the late ’90’s, is it possible that one day some poor soul driving down I-45 could….) <strong>Light sweet crude oil - $50.47/bbl; Natural gas - $6.63/MMbtu; U.S. active rig count – 1,324</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| **U.S. active rig count – 2,697** | **U.S. active rig count – 2,748** | **U.S. active rig count – 1,324** |

---

**THE REST OF THE YARN**

This month we conclude our look back at the life and times of industrialist and philanthropist Andrew Carnegie.

In his last years Carnegie pursued his grand passion for world peace. He was convinced, as were many people in the first decade of the 20th century, that a new age of world concord was soon to arrive, perhaps via a “league of nations.” He seems to have believed that his money could make peace happen. In this we can see his wonderful optimism, and also his ability to shut his mind to things he didn’t want to know about, such as Europe’s massive buildup of arms.

The guns of August 1914 destroyed his dream. At first he refused to believe that the cataclysm in Europe was a major tragedy, but soon he knew the truth, and for the first time in his life his spirits were laid low. He contracted pneumonia and recovered sluggishly. For hours on end he would sit in his garden in New York City, covered with blankets, staring into space.

He eventually snapped out of it, finding hope in the peace ideas of President Woodrow Wilson, but his core optimism was damaged. Soon he would pass from the scene, spared the knowledge of America’s refusal to join the League of Nations.
Andrew Carnegie died on August 11, 1919, at age 83, at his home in Lenox, Massachusetts, and was buried in North Tarrytown, New York. In the end, he had in fact given away more than 90% of his money.

Next month, Andrew’s passion for peace follows him to his grave.

**M A Y**

**QUIZ**

Maverick County in South Texas is currently a prime target for oil prospectors. The first reported oil production in Maverick County was in 1955. What formation was the source of that first reported oil?

**ANSWER TO APRIL’S QUIZ**

It took 41 years for the U.S. to produce its first billion barrels of oil (1859–1900). It took 9 years for the U.S. to produce its second billion barrels (1900–1909).

No winner in April

If you would like to participate in this month’s quiz, e-mail your answer to contest@spe.org by noon, May 15. The winner, who will be chosen randomly from all correct answers, will receive a $50 gift card to a nice restaurant.

**Marathon Oil**

increases productivity in Eagle Ford Shale well by 21%.

The BroadBand Sequence* fracturing technique effectively stimulated perforation clusters that would not have produced by conventional techniques. Enabled by a proprietary engineered composite fluid of degradable particles and fibers, the BroadBand Sequence technique increased production by 21% over 115 days.

Read the case study at slb.com/BroadBand
You want to optimize your completion and production (C&P) processes and increase the value of your reservoir. We get that. We can help you do that too.

Our decades of field-proven experience push traditional boundaries. This experience reproduces success and helps avoid costly mistakes. Our Total Systems Approach to your C&P challenges also includes meticulous planning and the efficient implementation of the world’s most reliable technologies—specifically designed to improve access to reserves, maximize production, and increase your ultimate recovery.

Call us or visit BakerHughes.com/GoM-pushtheboundaries and learn how our Total Systems Approach pushes the boundaries of what was previously thought possible.
The International Study Group is excited to host the President and Founder of Energy China Forum, Zhou Xiaolai. Ms. Zhou will discuss three main topics: 1) new directions or movements of the energy industry in China, focusing on shale policy and strategy, the new bidding process for new shale players, and potential risks. 2) Shale infrastructure, developments, and major processes and technologies used in China. 3) The recent change in China gas prices, its energy supply chain impact, and a 2015 outlook.

We hope that you will join us at this exciting presentation.

Zhou Xiaolai is the President and Founder of Energy China Forum (ECF) and also of SZ Energy Intelligence Co. Ms. Zhou is also the General Director of the Shanghai United Institute for Unconventional Resources. She established ECF to be a leading China Energy think tank and research and consulting institution with strong support from both China national energy companies and China Government energy regulatory agencies. ECF has close to 700 members across Asia, Europe, and the United States. It organized and hosted 4 Asia Energy Summits and the Unconventional Resources Technology and Equipment Exhibition with over 500 attendees from 15 different countries. Ms. Zhou is from a scholastic family rooted in Southern China and has a bachelor’s degree of Computer Science from Northwestern Polytechnic University in Xi’an Shaanxi, China.

Presenting in English on behalf of Ms. Zhou will be Joan Lu, the Vice President of ECF. Ms. Lu has 19 years of global energy finance experience, working with international energy players across four continents. She has supported U.S.-based energy companies with multi-billion dollar yearly global sales and has worked to create partnerships for U.S. companies through ECF. Ms. Lu is a native of China and has a BA in Accountancy and Information Systems from the University of Texas, and she is a U.S. CPA.
Active Flying Leads-Enabling Technology

Mr. Greene will introduce the concept of Active Flying Leads, how one simple concept turned into a family of products, and share why it is vital to the future of subsea oil production. Michael will also describe how this new class of products can be used for both green fields and brown fields and the challenges that will be faced. His talk will be followed by a question and answer session.

Michael C Greene

Michael C Greene is the Ethernet Technology Manager at Teledyne Oil & Gas. He has been instrumental in key developments in subsea processing for Shell, and others. Prior to Teledyne, he worked for Norsk Hydro. Michael has a Bachelor’s of Science (BS) degree in Mechanical Engineering and a Master’s of Science (MS) in Engineering Management.

Dr. Weinschenk will describe the Penn State Applied Research Lab's nationally unique infrastructure for deep ocean testing and associated core competencies in Autonomous Underwater Vehicles (AUVs), high energy density air-independent propulsion, synthetic aperture sonar, and autonomous control systems.

Dr. Weinschenk

Dr. Weinschenk graduated from the University of Dayton with a BS & MS in Electrical Engineering. He also holds a Ph.D. in Electrical Engineering from the University of Washington. Dr. Weinschenk joined the Penn State Applied Research Laboratory (PSU-ARL) in 2004, where he served as a research engineer and principal investigator in the Autonomous Control and Intelligent Systems division and then a deputy department head for Intelligent Control Systems. In 2009, Jeff founded and led the Operations Research department, a new competency for PSU-ARL emphasizing the development of novel methodologies for concept development and characterization of the technological “art of the possible.” The Operations Research department has influenced Navy documents (such as the Fleet Unmanned Undersea Systems CONOPs), provided a foundational reference for technology trades in acquisition (e.g. Large Displacement Unmanned Underwater Vehicle Analysis of Alternatives), and worked to develop rigorous, game-theoretic tools for unmanned systems tactics development. Dr. Weinschenk oversees the laboratory’s competency in Unmanned Underwater Vehicles and application of associated enabling technologies.
CoolSet™
Curable Resin-Coated Proppant

Prevent proppant flowback without activator

CoolSet proppant – frac fluid and breaker friendly – is your no-activator, low-temperature solution to enhance conductivity and increase hydrocarbon production.

Get more from your wells at FairmountSantrol.com/CoolSet

For direct technical data
CoolSet Product Director
Taso Melisaris
713.234.5450 x 42271
Technology@FairmountSantrol.com

Still GROWING...
and revolutionizing Downhole Video Diagnostic services

See what others can only imagine! Experience reality with our patented LiteSabre® diffused lighting and up to 1000 lumens in an OptiGe™ clear window strategically displaced to the problem area downhole.

• E-Line Down and Side View Video Surveillance
• 16 Hours of Stickline or CT-Deployed Memory Video
• 30 frames PS, High-Definition Color Video Recording
• Shallow Work Video

Bringing new technology to the challenges of downhole image capture.

Abrado® Wellbore Services

www.abrado-intl.com
Email us at: info@abrado-intl.com

Pegasus Vertex, Inc. | Drilling Software
(713) 981-5558 | info@pvisoftware.com | www.pvisoftware.com

CEMPRO® - Mud Displacement Software

Global Hydraulic Fracturing Expertise

281-380-4646
www.elyfrac.com
Data Driven Approach to Wellbore Diagrams

Wellbore diagrams provide an organization with a powerful tool to visualize the downhole status of a well. They are often described as the most important single reporting document produced during Drilling, Completions, and Production operations. Unfortunately, they are generally incredibly time consuming to produce or update, and once created some are either unavailable or unreadable.

JAMES MORLEY

James manages the ongoing operations of WellEz and works closely with the 120+ oil and gas operators who utilize their daily services to capture and report well site operations. WellEz focuses on providing exceptional support to the field users and engineers who rely on the Drilling, Completions, Workover, and other data sets captured in the application to control costs and identify opportunities for increased efficiency.

Prior to assuming the role of Director of Operations in late 2009, James managed WellEz’s 24/7 support service. Before joining the company, he worked at Dell in Round Rock, Texas developing IT infrastructure for both new and established clients. James holds a B.A. from the University of Texas at Austin and is a graduate of the Project Management Institute.
THE MISSING PIECE
TO MAXIMIZE YOUR PRODUCTION

You can’t put together the puzzle without all the pieces. MicroSeismic’s completions evaluation services and real-time microseismic monitoring help you fill in the blanks with recommendations on improved well spacing and stage length, frac coverage area, and analysis on how each well is completed. Our goal is to provide transparent results that you can rely on to maximize your production.
Sequenced Fracturing: The New Edge to Optimize Wellbore Coverage, Reservoir Contact and Completion Efficiency in Unconventional Reservoirs

Hydraulic fracturing is a key enabling technology for the recovery of vast oil and gas reserves stored in low-permeability reservoirs such as shales and tight sandstones and carbonates worldwide. Multi-stage fracturing treatments comprising large volumes of fluids and proppants into horizontal wells is increasingly becoming the preferred stimulation strategy to achieve economic production from such reservoirs. Despite a sustained increase in drilling and fracturing intensity over the last decade (longer lateral lengths and higher number of fracturing stages per well), the average production rate in major basins has plateaued. The need exists for innovative fracturing technologies able to enhance well productivity, improve completion efficiency and optimize completion costs with a more rational use of resources.

The Sequenced Fracturing methodology resorts to degradable materials supported with engineering workflows to enhance wellbore coverage and reservoir contact in horizontal wells. For wellbore coverage, the technique relies on composite pills comprising degradable fibers and particles to promote near-wellbore diversion of proppant and fluids to clusters that otherwise would remain untreated. For reservoir contact, the methodology builds on the channel fracturing technique (SPE 135034) with use of fibers and special pumping protocols to enhance proppant transport and placement and increase the volume of reservoir effectively stimulated. Since its inception in February 2014, more than 4000 sequenced fracturing operations have been performed in over 400 wells for 35 operators in seven countries. Case studies from the Eagle Ford, Bakken, Haynesville and Anadarko basins are presented to highlight the impact of this technology, which has led to increases in production up to 70% in new wells, over 30-fold increases in production in re-fractured wells and reductions in completion time in new wells in excess of 60% with respect to conventional methods.

DR. ALEJANDRO PEÑA

Dr. Alejandro Peña serves as Integrated Completion Services manager for Schlumberger. Dr. Peña oversees the development, integration and implementation of chemistry-based well stimulation technologies, including breakthrough hydraulic fracturing technologies for highly efficient and responsible recovery of hydrocarbons from unconventional reservoirs. He previously held several operational, engineering and technology management positions with Schlumberger in South and North America.

Dr. Peña is an inventor with nine granted patents, an author with 28 publications on interfacial phenomena and reservoir stimulation technologies, and a former tenured faculty in chemical engineering at Universidad de Los Andes in Mérida, Venezuela, where he taught physical chemistry and thermodynamics among other subjects. Dr. Peña received a Bachelor of Science degree in chemical engineering, Summa Cum Laude, from Universidad de Los Andes. He earned his Ph.D. degree in chemical engineering from Rice University, where he attended as a J. W. Fulbright scholar.
Take the Shock Out of Your Drilling Operations

Keep your drill bits running longer and deeper with the APS Active Vibration Damper™ system

• Adapt to a continuously changing environment
• Suppress undesired drilling dysfunctions
• Extend bit & drilling tool life
• Improve overall rate of penetration
• Significant cost/foot savings

For more information, visit www.aps-tech.com or call us at 281.847.3700

Delivering Award-Winning, Technology-Driven Engineered Solutions to the Oil & Gas Industry

World-Class Completions & Production Solutions
- Completion Fluids Products/Services
- Well Testing Equipment/Services
- Fluids Management

tetratec.com

VIBRATION TECHNOLOGY
LEADING THE INDUSTRY IN STUCK PIPE RECOVERY
INNOVATIVE TECHNOLOGY FOR REMOVING STUCK TUBULARS

+ WORKOVER
+ COMPLETIONS
+ DRILLING

www.layne.com

NOW IN THE WOODLANDS, TX
Providing routine and special core analysis on whole core, plugs, and cuttings.

www.trican.us | 832-943-5103

TRICAN GEOLOGICAL SOLUTIONS

© 2014 TETRA and the TETRA logo are registered trademarks of TETRA Technologies, Inc. All rights reserved.

© 2014 TETRA and the TETRA logo are registered trademarks of TETRA Technologies, Inc. All rights reserved.
WATER & WASTE MANAGEMENT

OCS Regulations - What’s on the Radar for 2015?

Successful unconventional shale exploration and production is dependent on hydraulic fracturing. However, concerns over environmental issues related to exploitation in densely populated areas are increasing. Having a strategy in place to document baseline environmental, particularly groundwater conditions, prior to exploration can help manage risk for stakeholders. This presentation will present experience gained in the United States shale exploration regions related to baseline groundwater sampling.

Jodie is the President of J. Connor Consulting, Inc. (JCC), a consulting firm specializing in the OCS regulatory process. JCC was formed in 1981 and assists operators with permitting and compliance. Approximately 80 employees assist over 100 operators with oil spill response planning, training and exercises.
Ethics and Moral Reasoning

Ethics and Moral Reasoning is the one-hour first part of a three-part Business Ethics series provided by the author. It deals with a description of ethics, misconceptions about ethics, moral dilemmas, teaching ethics, importance of ethics in business as an extension of personal life, and moral reasoning. This presentation will provide examples for the participants to ponder and interactively provide feedback, personal experiences, and their beliefs. One PDH credit is available for those requiring ethics for their professional license.

JAMES PAPPAS

James Pappas has been Global Technology Coordinator, Facilities Engineer in the DW/International Well Engineering & Facilities Division, DW Project Coordinator for Devon Energy in the past, and Production Engineer in the GOM Division for Devon, and Santa Fe Snyder. He has also held drilling, completions, production, operations, reservoir, and A&D positions with Fina, UPRC, and Amoco.

He’s been active in SPE for 34 years. He is a past SPE International Production & Operations Technical Director and SPE Technical Programs/Meetings Committee Chair, and a former chair of the SPE-GCS Scholarship Committee, General Meeting, Drilling SG, and SPE-CGS Board of Directors. He is a member of the Awards/Nominating Committee, and past chair of the SPEI Production & Operations Award Committee. He has served on several technical program committees for the OTC, ATCE, LACPEC, SPE R&D Conference, and P&O Conference.

He is co-chair of the Marine Technical Society (MTS) OTC Program Subcommittee and is a past Private Industry Practice Chair and Executive Committee member of the Texas Society of Professional Engineers. James has authored over 60 technical papers and spoken at conferences on various technical and professional topics. He is an advisor to the US Department of Energy’s Office of Fossil Energy.

James earned a BS in Chemical Engineering and BA in Chemistry from the University of Texas at Austin in 1979, and an MBA with highest honors from the University of Texas at Tyler in 1993.

He’s earned the SPE-GCS and SPE Gulf Coast Region Service Awards, the SPE Distinguished Service Award, as well as both the Houston Area Engineer of the Year in 2007 and Texas Engineer of the Year by the Texas Society of Professional Engineers in 2008. He was selected as a Distinguished Engineer in Texas by the Texas Engineering Foundation in 2008 and an SPE Distinguished Member in 2012. He’s been a Registered Professional Engineer (Texas) since 1985.
The most efficient field frac network starts with predictable frac spacing and predictable frac volume.

Unpredictable

Predictable

Plug-and-perf cannot deliver predictable, consistent frac results, and neither can open-hole completions. With Multistage Unlimited single-point injection, fracs initiate right where you plan them and proppant volume in every frac is exactly what you want. The result: an efficient field frac network for maximum reservoir connectivity.
Global Refining and Terminalling

This presentation will cover 1) refining market dynamics, 2) the US refining market, 3) refining operations, 4) crude by rail, and 5) refinery to terminal conversion case studies. Information on refining capacities and margins, crude prices, domestic crude production (including the impact of shale oil production), impact on gasoline prices, imports, terminals, and the location of refineries relative to crude production will be presented to help us understand the relationships of the oil production, transportation, and refining portions of our industry, their effects on pricing of oil and gasoline, and the long-term view of crude oil as a transportation fuel.

STEVE CROWER

Mr. Steve Crower has over 20 years of operational and financial experience focused on the energy industry. His work experience includes operations and financial roles at FMC Technologies and Network International (acquired by Liquidity Services), an online auction site for oilfield equipment in Houston.

He has worked as an Energy Investment Banker for Capital One Securities, Inc. in New Orleans and Dahlman Rose & Company in New York, NY (acquired by Cowen & Company) and is currently performing M&A advisory services to all sectors of the energy industry. He is presently Managing Partner of Energy Investment Banking for Crower and Associates, LLC in Denver.

Mr. Crower also serves as an adjunct professor at the University of Colorado at Denver teaching “Global Refining and Terminalling”. Mr. Crower graduated with a BS in Civil Engineering from the University of Michigan and an MBA concentrating in Finance from Rice University. He resides in Denver, Colorado.
Now may be a good time to look at some innovative alternatives...

With oil prices down cost saving products will improve your bottom line. Binder has some good ones!

- If you want to streamline your frac to one chemical for slickwater, linear gel, or cross-linked gel, who do you call? **Binder:** One chemical can provide 70% drag reduction at 60% lower dosage. At half the viscosity of guar, this same chemical can place 150,000 lbs more sand per stage. And, the damage caused by crosslinkers is eliminated.

- If you want to eliminate the hydration tanks and hydrate at 33 F in less than one minute, who do you call? **Binder:** Eliminate the hydration tanks, feed to the blender and do it in 45 seconds.

- If you want to significantly increase your hydrocarbon recovery, who do you call? **Binder:** Binder polymers and flow-back chemistry pull more oil from the formation.

- If you want a green drilling system that is easy to run, great ROP and good hole stability, who do you call? **Binder:** The Binder Maxim System will do all of that at a fraction of the cost.

- When your drillstring is packed off or your coil is stuck, who should you use? **Binder:** Binder has freed 47 drillstrings and coiled tubing strings in the past 18 months.

Give us a call - we take innovative chemistry to the field
RESERVOIR

**SPE GCS Reservoir Technology Forum**

The Reservoir Technology Forum is the annual event hosted by the Reservoir Study Group designed to disseminate knowledge and technology needed to achieve the many objectives of reservoir management, including understanding risk, increasing production and reserves, and maximizing recovery. This year, we focus our attention on technical and practical aspects related to technology and innovation, EOR/IOR and unconventional resources. This Forum is also a great opportunity to network with oil and gas industry professionals in an engaging and dynamic environment. Please join the SPE GCS Reservoir Study Group for this event!

**AGENDA**

1. **Technology and Innovations**
   - Brendan Wyker – Shell
     Flow Monitoring and Production Profiling Using DAS
   - Maria Nass - Flowassureng
     The Importance of Production Forecasts for the Design of Subsea Developments
   - Trey Lowe - Devon
     Case History of Comprehensive Hydraulic Fracture Monitoring in the Cana Woodford

2. **EOR**
   - Long Nghiem – CMG
     Modeling and Optimization of Low Salinity Waterflood
   - Mojdeh Delshad – University of Texas
     Optimization of Chemical EOR Using Hybrid Processes

3. **Unconventional Reservoirs - A Service Company Perspective**
   - Fred Arasteh – Weatherford
     Challenged by Low Oil Price? How Can Modern Reservoir Engineering Techniques Add Value to Shale?
   - Marisela Sanchez-Nagel - OilField Geomechanics
     Practical Geomechanics for Oil and Gas Applications
   - Jorge Viamontes - Nuthech
     Case Study into the Successful Evaluation and Completion of Nonconventional Wells in Mexico

4. **Unconventional Reservoirs - An Operator's Perspective**
   - Jeff Ottmann – ExxonMobil
     Shale Reservoir Fundamentals, the Keys to Success
   - George King - Apache
     Refracturing: Why, When and When Not To

**EVENT INFO**

**Thursday**

5.14.15

8:00 AM TO 4:00 PM

**SPONSORS**

**Platinum:** Anadarko
**Gold:** RFD, Weatherford, CMG, Energy Navigator, Nutech
**Silver:** MicroSeismic, OPC-USA, Ryder Scott

**LOCATION**

Anadarko Conference Center
1201 Lake Robbins Drive
The Woodlands, TX 77380

**EVENT CONTACT**

Skip Davis
281-359-8556
skdavis@technologyintermediaries.com

**MEMBERS**

$80/$115 Walk-In

**NON-MEMBERS**

$115/$115 Walk-In
Reservoir Characterisation Using Tracer Technology

- Expertise in waterflood, injection gas, CO₂ and EOR chemical tracer applications
- Long term wellbore fluid inflow characterisation using no wires, fibres or well intervention
- Unconventional stage production measurement using Tracerco patented technology
- Global network of laboratories and operational capabilities providing local service provision to key oil and gas regions

Tracerco, 4106 New West Drive, Pasadena TX 77507 USA
Tel: +1 281 291 7769 Toll Free: 1 800 288 8970
www.tracerco.com/reservoir-characterisation

A Safe Biocide (Except for Bugs)

New from Universal Bacteria Specialist:
An environmentally friendly biocide with 1,450 ppm FACs.

ENVIROLYTE biocide offers you a safe, biodegradable alternative to toxic biocides for controlling bacteria in crude oil production and processing.
• 1,450 ppm free available chlorine and neutral 6.5 pH
• Can treat produced water before reuse
• Clears well of downhole micro-organisms
• Protects production equipment
• Eliminates microbial-induced corrosion

SAFE FOR PEOPLE. GOOD FOR PRODUCTION.

© 2014 Universal Bacteria Specialist (UCS1405/0614)
PERMIAN BASIN

Successful Evaluation and Completion of Two Unconventional Wells in a La Pimienta Formation in Mexico

In 2013, Pemex drilled the well Tangram-1, their fourth well in the La Pimienta Formation in Northern Mexico. Of the previous three, only one (Anhélido-1) had yielded positive results with an initial production of 333 BOPD and 1.9 MMCFPD of associated gas. The two other wells (Nuncio-1 and Kernel-1) had IPs below 2.9 MMCFPD of dry gas (Source: Pemex).

The Tangram-1 well offered a range of challenges given the exploratory nature of the play. Some sources quote La Pimienta Formation as showing similarities with the Haynesville Shale in the U.S. Both formations are Upper Jurassic source rocks and have TOC of around 3% and like the Haynesville, the Pimienta Formation was expected to be in the gas window with thermal maturities above 1.4% (Source: EIA/ARI World Shale Gas and Shale Oil Resource Assessment). However, the results of the Anhélido well showed potential for oil production to the south of the play as well as other significant differences.

As is the case with any unconventional play, heterogeneity and modeling of the geomechanical properties are critical factors in completion design. This is amplified in a new play like La Pimienta. The evaluation and completion optimization of Tangram-1, therefore, required the utilization of the experience and advanced tools to calibrate as many properties as possible and access to the extensive database of unconventional wells available at NUTECH to characterize the formation.

NUTECH Solution:
1. Run core analysis on the available cuttings to calibrate the petrophysical model.
2. Characterize the formation and provide a petrophysical and geomechanical model for the well.
3. Design the completion of the well and optimize it based on the requirements of Pemex and the service company to improve the production in La Pimienta Formation.

The Tangram-1 became the best dry gas producer in La Pimienta with over 10MMCFPD IP.

ROMAN HERNANDEZ

Roman Hernandez joined NUTECH in 2005 and is currently the Commercial Director for Latin America. Mr. Hernandez is leading NUTECH’s efforts in Mexico during the implementation of the oil and gas reform. He has been involved with Pemex operations since he joined NUTECH and has been responsible for the technical and managerial aspects of the projects. Mr. Hernandez has 16 years of professional experience in the oil and gas industry with roles including wireline operations and management, petrophysics, business development, technical consulting, and management for Schlumberger and NUTECH. Mr. Hernandez has a Bachelor of Science in Electrical Engineering and Electronics and a Master of Business Administration, both from the University of Manchester in the UK.
Whether you’re exploring a basin, producing a well or completing a shale play, time is money. That's why Weatherford Laboratories brings a suite of formation evaluation technologies right to the wellsite. Utilizing mud gas and cuttings, these technologies provide detailed data on gas composition, organic richness, mineralogy and chemostratigraphy in near real time. As a result, operators now have an invaluable tool to assist with sweet spot identification, wellbore positioning, completion design and hydraulic fracturing. We call it Science At the Wellsite. You’ll call it money well spent.

When time is money, Wellsite Geoscience is money well spent.

Whether you’re exploring a basin, producing a well or completing a shale play, time is money. That's why Weatherford Laboratories brings a suite of formation evaluation technologies right to the wellsite. Utilizing mud gas and cuttings, these technologies provide detailed data on gas composition, organic richness, mineralogy and chemostratigraphy in near real time. As a result, operators now have an invaluable tool to assist with sweet spot identification, wellbore positioning, completion design and hydraulic fracturing. We call it Science At the Wellsite. You’ll call it money well spent.

Optimize every completion with industry expert training

Hydraulic Fracturing - Houston, TX May 18 - 22
Applied Fracture Pressure Analysis - Houston, TX May 11 - 15
StimPlan™ User Course - Tulsa, OK July 14 - 15
Courses Led by Dr. Michael B. Smith

REGISTER NOW at nsitech.com

SPE Latin American and Caribbean Health, Safety, Environment, and Sustainability Conference
7-8 July 2015, Bogotá, Colombia

Register by 8 June and Save USD 100!
Join oil and gas industry leaders in an exploration of technologies and their effects on sustainability, through technical paper presentations and discussion sessions.

www.spe.org/go/REGLAHS

When time is money, Wellsite Geoscience is money well spent.

Whether you’re exploring a basin, producing a well or completing a shale play, time is money. That's why Weatherford Laboratories brings a suite of formation evaluation technologies right to the wellsite. Utilizing mud gas and cuttings, these technologies provide detailed data on gas composition, organic richness, mineralogy and chemostratigraphy in near real time. As a result, operators now have an invaluable tool to assist with sweet spot identification, wellbore positioning, completion design and hydraulic fracturing. We call it Science At the Wellsite. You’ll call it money well spent.
Increase Efficiency and Reliability in Oil and Gas

Falling oil prices and collapsing profit margins are driving the industry to reduce costs in any way possible. While reducing labor costs and gaining supplier concessions can help, output must continue if not increase, especially on completed wells to meet commitments to buyers. Some in the industry may persist in using time-tested manual methods and localized automation, but the economics of continuing to do so just don’t add up nor do they scale as new drilling and completion techniques increase service densities along with operating complexities.

This presentation focuses on advanced automation architectures and software techniques that leverage data analytics and system modularity to achieve greater operational efficiency and reliability. Doing ‘more with less’ is highlighted through specific technologies that combine advanced hardware and software into unified platforms. We will focus on applications to comprehensively analyze the benefits, efficiencies, and robustness of these technologies and architecture design concepts.

JEFF JENSEN

Jeff Jensen is an Oil and Gas Application Engineer for Siemens Industry Inc., specializing in automation and networking. His primary role is in designing controls architectures for onshore and offshore applications such as: blow out prevent (BOP), cranes, pipe racking systems (PRS) etc. He brings additional previous software experience from outside of Siemens and holds a bachelor’s and master’s degree from Texas A&M in electrical engineering.
The task of identifying key production drivers in unconventional reservoirs remains challenging, even after decades of exploration and production in North America during which tens of thousands of horizontal unconventional wells have been drilled and completed. Tens to hundreds of variables, categorized as reservoir quality, well architecture, completion, stimulation, and production metrics, are involved, and there are many different interrelationships among the variables to be considered. Further, formation evaluation is typically minimal, and there are unknown variables in the system that can only be guessed at, ignored, or proxied.

The author’s team has combined Geographical Information Systems (GIS) analysis and multivariate analysis using boosted regression trees for improved data mining results as compared to univariate methods. The purpose of this presentation is to discuss key elements of data mining in unconventional reservoirs, in order to raise awareness of cutting-edge statistical tools and methods being brought to bear in the industry. The presentation will provide highlights of real world examples of data mining projects in three different shale plays.

If there were only one idea for audiences to take away from the presentation, it would be that exploiting unconventional reservoirs is a highly complex task with many moving parts, and data mining is a needed tool to better understand the importance of specific well productivity drivers. Another way to say it is that the talk is intended to provide the audience with improved statistical methods for the “statistical” plays so that multi-million dollar decisions can be truly data-driven.

Randy LaFollette is the Director, Applied Reservoir Technology, for Baker Hughes Pressure Pumping. Mr. LaFollette holds a BSc degree in Geological Science from Lehigh University, Bethlehem, Pennsylvania. He has 37 years of experience in the industry. He is active in SPE and AAPG, aiding with conference organization and presenting on various reservoir, completion / stimulation, and data-mining topics. Mr. LaFollette is a subject matter expert for Baker Hughes and leads a team of experts responsible for structuring and implementing geospatial and data-mining studies of stimulation effectiveness linking reservoir quality, well architecture, well completion, and treatments performed to production results.
When re-pressurizing a producer well by directly pumping into the wellbore or by indirectly fracturing into it, one will preferentially provoke shear slips in the depleted section. These events can be detected by microseismic monitoring methods and collected into a 3D description of the depleted volume. We describe the concept of Microseismic Depletion Delineation, MDD, and explore some case studies of its implementation in the field. We will see how important MDD is as a constraint because it shows the effective fracture dimensions and therefore eliminates the basic uncertainty between matrix perm and fracture length encountered when performing reservoir simulation. The critical value of making the MDD measurement is seen in the following three outputs:

- Knowing the footprint of the drainage pattern helps with judging drainage efficiency and well spacing.
- Knowing the formations contacted provides important information about reserves and STOIP.
- Using magnitudes to develop an understanding of the degree of depletion gives important feedback about fracture design.

Examples of how this data might be used to provide better horizontal well completions and field development strategies will be discussed.

TED DOHMEN
Ted Dohmen is involved in researching geophysical technology for application to Hess Corporation assets. He is a member of the Unconventional Technology group at Hess where he has worked for three years. A 32-year retiree from ConocoPhillips, Ted holds a Master’s of Science degree in Geophysics from Stanford University.
30 May, 2015

2015 PROFESSIONAL ENGINEERING EXAM RESULTS FOR PETROLEUM ENGINEERING

First Timers 71%  Second+ Timers 3%
National Average Pass Rate 57%

PE Exam Application Deadline Date: July 1, 2015
Next Petroleum PE Exam Date: October 30, 2015

2015 HOUSTON COURSES
AUGUST 24 – 28 / OCTOBER 5 – 9

P: 405-822-6761 | E: bingwines@cox.net
winrockengineeringinc.com

281.955.2900
www.stress.com

ARMSTRONG & ASSOCIATES
OVER 25 YEARS SERVING ENERGY PROFESSIONALS

CONTRACT REVIEW / NEGOTIATION
EMPLOYMENT
NON-COMPETES
SEVERANCE
CIVIL RIGHTS LITIGATION
COMPETITIVE RATES

440 LOUISIANA STREET, SUITE 900
HOUSTON, TX
ARMSTRONGATLAW.COM

Deepwater Drilling Training

John Shaughnessy – SPE – Drilling Engr – presents learnings from 36 years of experience: equipment, procedures, potential problems. Classes -

Deepwater Drilling: 5 days
Accelerated Deepwater Drilling: 2 Days
HTHP Drilling: 3 Days
Basic Drilling: 1 Day

Customized and In-House Classes Available

For info visit shaughnessydrillingtraining.com or e-mail
johnshaughnessy@sbcglobal.net

2015 SPE-GCS CONNECT

1.832.300.3660
askus@top-co.us

www.top-co.us

Fit-for-Purpose Casing, Cementing, and Completion Solutions®

Type 346 Top Reach Glider

Reduced Friction - Long Length - No Blade Overlap
Thermoset Polymer - Wear Resistant

The Archetype for all Polymer Centralizers

Subject Matter Experts

Design
Analysis
Testing

Stress Engineering Services Inc.

Houston • Cincinnati • New Orleans • Baton Rouge • Calgary

ShockForce™ Drilling Jar

www.nov.com/drillingtools

NOY Wellbore Technologies
Argentina Outlook: The New Hydrocarbon Law and the Challenges Operators Will Face

After more than 12 years of very low activity in their domestic hydrocarbon industry, Argentina depends on imported gas via LNG and from Bolivia. The Argentine government is trying to reverse the situation. Dr. Guzzetti will present a brief summary of the situation in Argentina after 12 years of low activity and a description of the activity that has taken place in Vaca Muerta over the last 5 years. Additionally, he will summarize the position that the main players have today in Vaca Muerta, and their plans over the next 5 years.

As a conclusion, he will present a summary of the new hydrocarbon reform law, and the political situation today in Argentina as the country prepares for a presidential election on October 25, 2015.

DR. GUZZETTI

Dr. Guzzetti has over 30 years of project evaluation experience in negotiations, engineering, and operations. He began his career working for Shell Argentina as a Project Engineer in 1981. He has worked as a reservoir engineer and a chief evaluator for Pérez Companc, as a contract manager for Tecpetrol S.A., and as Engineering Manager and General Manager for Hunt Oil Company in Lima, Peru. He has also taught Petroleum Engineering at Louisiana Tech. Since 2008, Dr. Guzzetti has worked for Gaffney, Cline & Associates as a Principal Advisor and General Manager. He holds a BS in Mechanical Engineering from the University of Buenos Aires, a PhD in Petroleum Engineering and a MBA from Louisiana Tech University.
EXCELLENCE DELIVERED.
It’s what we do. It’s who we are.

- Casedhole Solutions
- Directional Services
- Coiled Tubing
- Fracturing

Experience you trust. Service you expect.
cjenergy.com

Geosteering Services
Highly qualified personnel with 20+ years DD & LWD experience
24/7 Real-time monitoring or reports from LAS files
Proprietary software
Geosteering Software
TST interpretation for GR only measurements
Image displays / interpretation of azimuthal GR, resistivity or density measurements
Resistivity modelling / interpretation for LWD propagation resistivity
Software sales, training and technical support

info@geoesteering.com
Call 281 573 0500

ORDER TODAY!
ENVIRONMENT 24/7
Building a Culture of Environmental Awareness
by Gregory M. Anderson, Richard C. Haut, PHD and Tom Williams

Learn more and order your copy today!
www.environment247.org

Advanced Drilling Mechanics Solutions
Software, Expertise, Services, Training

Innovative Custom-Engineered Drilling and Completion Solutions
Serving the Oil and Gas Industry Since 1917
Tel: 713-729-2110 Fax: 713-728-4767 www.tiwtools.com

How is the industry adjusting to both the recent oil price shock and the continued downward slope of gas prices?

Are Buyers and Sellers becoming aligned?

What are the drivers of the recent equity infusions and how are they impacting the M&A&D market?

Where do debt holders stand? What areas and what plays are in favor and conversely, out of favor?

Please join us for this informative discussion. The popular format of a Business & Social Networking hour, with complimentary Hors d’oeuvres and a cash bar, followed by an hour-long program, including a Q&A session, will begin at 5:00 pm in the Mezzanine.

Bulls and Bears - US M&A&D Activity, Capital Markets, Recent Trends, and Driving Themes in the E&P

EVENT INFO

Wednesday
5.27.15
5:00 PM TO 7:00 PM

SPEAKER
TBD
Please check online http://www.spegcs.org/events/2641 for updates!

LOCATION
Four Seasons Hotel
1300 Lamar
Houston, TX  77010

EVENT CONTACT
Matt Bormann
281-345-8019
mbormann@wwtco.com

MEMBERS
$35

NON-MEMBERS
$40
SAFETHERM™ aqueous-base or water-miscible insulating packer fluid system is designed to minimize convective and conductive heat loss to assure flow in deepwater and other low temperature environments. The system is proven to control annular pressure build up and maximize produced fluid quality.

An operator in West Africa used SAFETHERM insulating packer fluid to slow the cooling of stationary crude in the production line. As a result they successfully tested four deepwater wells with zero installation problems or QHSE incidents.

miswaco.com/completions

*Mark of M-I LLC

Integration at your fingertips

At Petrolink we provide best-of-breed analytical tools as well as the integration platform and infrastructure required to see the comprehensive picture.

**The Independent Leader in Real-Time Data and Report Management**

Find your solution at www.petrolink.com
Oil Patch Orientation

This seminar is the most popular SPE program. The course is designed as a non-technical audio-visual guided tour through the oil patch, illustrating the basic equipment and techniques used in the discovery, development and production of petroleum.

- Introduction/Outline of the Day
- The Economics & Future of the Petroleum Industry
- Theory of the Origins of Hydrocarbons
- Reservoir Parameters (eg: Porosity/Permeability)
- Geology of Petroleum & Geophysics
- Drilling Basics
- Well Logging
- Well Completions
- Reservoir Drive Mechanisms
- Production Equipment (sub-surface & surface)
- Midstream & Downstream Topics

JOHN FARINA provides petroleum engineering consulting and technical training services to the international and domestic petroleum industry. He has over 30 years experience in production and reservoir engineering, working on projects in Texas, Oklahoma, the North Sea and Siberia. John has a BS in petroleum engineering from West Virginia University, and has previously worked for Shell Oil and Sneider and Merkel Associates. John was a distinguished lecturer for the American Association of Petroleum Geologists in 1989 on the subject of formation damage and its effect on well evaluation and performance and is an active member of SPE, serving on the Gulf Coast Section Continuing Education Committee.

RON HINN is a Vice President of PetroSkills, a worldwide leader in training and development of E&P Technical Professionals. He specializes in the area of knowledge management, competency development and technical training. Through his career, Ron has held various supervisory, consulting and engineering positions with Oxy, Altura Energy, Amoco and Mobil. A petroleum engineering graduate of Tulsa University, Ron is very active within the SPE, having served in positions at the worldwide, regional and local levels. Ron, a veteran instructor of the GCS Oil Patch Orientation, has a strong interest in sharing unique insights and facts associated with the E&P industry - giving particular emphasis to its importance within the worldwide economy.

SUSAN HOWES is Organizational Capability Consultant in the Reservoir Management department at Chevron, with prior assignments as Reservoir Management Consultant in the Reservoir Management Framework group and as Manager of the Horizons Program. Susan Howes is formerly Learning and Organizational Development Manager at Anadarko. Susan Howes is a petroleum engineering graduate of the University of Texas and is a Past President of the Chevron Women’s Network. Susan Howes currently serves as Chair of the SPE Soft Skills Committee, was the 2010 Chair of the SPE Talent Council, and is an SPE Distinguished Member.

KEN ARNOLD is a Senior Technical Advisor at WorleyParsons with fifty years of experience in projects, facilities and construction related to upstream oil and gas developments. He spent 16 years at Shell in engineering, and engineering research management and then formed Paragon Engineering Services in 1980. Ken is the author, co-author or editor of several textbooks and numerous technical articles in addition to teaching courses at the University of Houston and Israel's Technion University. He is currently president of The Academy of Medicine, Engineering and Science of Texas. Ken received Houston’s 2003 Engineer of the Year by the Texas Society of Professional Engineers, and is the recipient of the SPE Production Engineering and Public Service Awards and the DeGolyer Distinguished Service Medal.

SPEAKER BIOS CONTINUED ON PAGE 32
MARTY STETZER leads EKT Interactive, Inc. in Houston, an e-training company specializing in design and delivery of large-scale, customized safety and technical content training programs. His career included 18 years of P&L experience with Schlumberger, Superior Oil-Mobil, Wilson industries and Exxon, in a variety of USA and international assignments. Marty also has 13 years of energy consulting experience with PricewaterhouseCoopers in projects across upstream, midstream and downstream. He has worked with national and international oil & gas companies in the Middle East, Russia, India, Italy and Europe. Marty has a BSME from Kettering Institute in Michigan, and an MBA from Carnegie Mellon. He is active in the SPE and often presents at other industry forums.

DR. TERRY N. GARDNER is a mechanical engineer who spent over 35 years with Exxon and BP working to advance deepwater technology. He led research on deepwater riser VIV; development of a high-current Riser Centralizer System, which was installed in the GoM; development of one of the earliest TLPs, which was installed in the Norwegian North Sea; and numerous riser and production platform innovations for deepwater. He has taught undergraduate engineering at Cornell and Rice and leads tours about oil and gas technology in the Houston Museum of Natural Science. He received a PhD from UCLA and an MS and BME from Cornell in Engineering Mechanics.

FRIDAY

FRIDAY

LOCATION
For the final meeting until fall, the Auxiliary will again gather at a restaurant for an informal get-together with separate checks. More information about the venue will be provided later.

CONTACT
If you or someone you know is interested in knowing more about this group, please contact Nancy Giffhorn at rgiffhorn@aol.com or at 281-360-4631. We look forward to beginning another wonderful year in September.
15th Annual Sporting Clays Tournament + 2nd Annual Food Frenzy Competition

Diamond Sponsor $7,500
As a diamond sponsor, your company will be recognized as a Corporate Sponsor of the tournament and the company name will appear on the sponsor board. Your sponsorship entitles you to four (4) complimentary teams in the tournament and V.I.P parking.

Platinum Sponsor $5,000
As a platinum sponsor, your company name will appear on the sponsor board. Your sponsorship entitles you to two (2) complimentary teams in the tournament and V.I.P parking.

Gold Sponsor $3,500
As a gold sponsor, your company name will appear on the sponsor board. Your sponsorship entitles you to one (1) complimentary team in the tournament and V.I.P parking.

Silver Sponsor $2,000
As a silver sponsor, your company name will appear on the sponsor board. Your sponsorship entitles you to V.I.P parking.

Bronze Sponsor $1,500
As a bronze sponsor, your company name will be on the sponsor board. Your sponsorship entitles you to V.I.P parking.

Corporate Sponsor $500
As a corporate sponsor, your company name will be on the sponsor board.

Gun Cleaning Sponsor (Limit 1) $300
As a gun cleaning sponsor, your company name will appear on the sponsor board. You are responsible for providing gun cleaning products and set up to accommodate gun cleaning.

Course Beverage Sponsor (Limit 3) $300
As a course beverage sponsor, your company will appear on the sponsor board. As part of the sponsorship, you will be asked to set up a tent at an assigned course to provide beverage refreshments for shooters throughout the day. Only one sponsor per course.

Food Frenzy Competition $300
As a Food Frenzy Competitor, your company will appear on the sponsor board. As part of the competition, you will set up adjacent to the pavilion to provide entertainment and food which can consist of breakfast and/or lunch/dinner. Each shooter will be given two tickets to vote for best competitor. First and second place trophies will be awarded to the two teams with the most tickets.

Friday June 5th

COST
$850 per 4-person team
Includes a 100-round course

LOCATION
Westside Sporting Ground
10120 Pattison Rd.
Katy, Texas 77493
www.wsg-clay.com

REGISTRATION
Yim Szeto
832-816-8966
361-798-3862 Fax
Yimlun@gmail.com

REGISTRATION INFO
Limited to first 700 shooters
At least one shooter must be a current SPE member
Shooters provide own ammo (No. 7½, 8, 9 shot ONLY)
Starting time and station sent to team captain only
Sponsors will receive first consideration
Station will be double caged

ENTRY FORM
NEED URL???

MAIL PAYMENTS TO
Yim Szeto
257 County Road 125
Hallettsville, Tx 77964
Yimlun@gmail.com

TOURNAMENT CHAIR
Paul Conover
713-582-1072
paul.connover@nov.com

SPONSOR COMMITTEE CHAIR
Greg Rachal
Ml-Swaco a Schlumberger Company
713-628-3341
grachall2@slb.com
Every year the Society of Petroleum Engineers Gulf Coast Section (SPE-GCS) holds a banquet to honor SPE Scholarship recipients, Young Professionals, the Legion of Honor, and the recipients of the SPE section awards.

The 2015 SPE Gulf Coast Section Scholarship and Awards Banquet will be held May 21, 2015, at the Red Oak Ballroom at the Norris Convention Center, City Centre Houston near the Sam Houston Toll Way at 1:10 from 6pm to 10pm.

The SPE-GCS gives over $250,000 annually in scholarships. The annual SPE-GCS Awards Banquet recognizes the high school seniors and college students who have received an SPE-GCS scholarship for the 2015 academic year. The scholarship recipients and their parents are invited to attend. This is a great opportunity to welcome outstanding students into the petroleum industry and to make a positive impression on members of the community. In addition, this event also recognizes our Legion of Honor award recipients as well as our SPE Sectional and Regional award winners. Members of the Legion of Honor have served SPE for fifty years and will be honored for their long-standing commitment to our professional society.

This year we are especially honored to present keynote speaker Karen Olson from Southwestern Energy.

Additionally we look forward to the return of our emcee Mark Vandermeer, the voice of the Houston Texans.

The Gulf Coast Section SPE has more members than any other section in the world. This night is your chance to show your support to those of us who are entering the industry, those of us who are leading the industry and those of us who have spent their lives in the industry.

Sign up to attend or sponsor today and let everyone know that you support the continued success of the Gulf Coast Chapter.

**REGISTRATION**
spe-gcs.org/events/2871/

**LOCATION**
Norris Center
City Centre
Red Oak Ballroom

**EVENT CONTACTS**
Jeremy Viscomi | jviscomi@pttc.org

James Roderson | James.rodgerson@bp.com

**SPEAKER**

KAREN OLSON | SOUTHWESTERN ENERGY

Karen Olson is Director of the Strategic Solutions Team which is accountable for bringing Southwestern Energy to Freshwater Neutral by 2016 as well as working with operations to develop operational opportunities that balance the economic and environmental impact of our operations. In her prior positions with Southwestern Energy, she was the Corporate Completion Engineering Chief and a Completion Expert for the Fayetteville in Houston, Texas. Previous work experiences have been 10 years with BP as a Completion Team Leader in GOM Deep Water as well as the Stimulation Team Leader in the North Sea and 14 years with Mobil where she worked both onshore US, offshore US, as well as the North Sea where she developed and or evaluated numerous fields from Exploration through development. She has been a Completion/Reservoir Engineer for over 30 years with expertise in the design/modeling (both pre and post) and operational execution of hydraulic fracturing. She has a Masters of Science from Texas A&M in Petroleum Engineering (1987) and a BS in Petroleum Engineering from LSU (1983).

Karen has been a committee member of numerous SPE forums, workshops and conferences related to hydraulic fracturing. For the last seven years she has been a Guest Editor for the Deepwater and Hydraulic Fracturing section of the JPT (Journal of Petroleum Technology). In 2009, she was awarded the SPE Gulf Coast Section Region Production and Operations Award. She was the 2014 and current 2015 Chairperson for the SPE Hydraulic Fracturing Conference. Dr. Dan Hill and Dr. Stephen Holditch have been the previous Chairs. She is also the subcommittee Chairperson for the 2014 ATCE Stimulation committee and recently honored as a Distinguished Member of SPE.

She holds a BS degree in Petroleum Engineering from LSU and a MS degree in Petroleum Engineering from Texas A&M. Karen currently sits on the Industry Board for the Petroleum Engineering Department at Texas A&M.
We want to thank the Young Professionals for submitting their photos this month from some of their volunteering and networking events. If you would like your group to be recognized in the Connect with your wonderful photos, please send your photos by the 25th of every month to the Connect editor at editor@spegcs.org.

In the photo, are (left to right) Austin Gardner (YP Communications Coordinator), Julia Clarke (Casino Night Chair), Fabian Vera, (YP Secretary), Simeon Eburi (YP Past Chair), Nii Ahele Nunoo (Career Development & Continuing Ed Chair), Trey Shaffer (GCS Board Director, HSSE-SR Study Group Chair, SPE International Board Health, Safety, Security, Environment and Social Responsibility Technical Director - that's a BIG mouthful, Trey!!), Dozie Ekweribe (YP Vice Chair), Lucy King (Treasurer), Jim Sheridan (Social Activities Chair), and Alex McCoy (Vice Treasurer).

SAVE THE DATE

Young Professionals

MONDAY

5.4.15
5:00 PM TO 8:00 PM

Come join the SPE GCS for an OTC Week Social! Anyone in our section is welcome, and please bring guests!

GASLAMP, MIDTOWN, 2400 BRAZOS STREET
Check our events page, spegcs.org/events/month/ for more information!
On 26 February 2015, the SPE Student Chapter at Texas A&M University hosted the 2015 Spring Career Enhancement Event (CEE). More than 100 students and 30 industry representatives participated in a full-day event to discuss the current status of the oil and gas industry and strategies for successful career management.

Company presentations, a networking lunch, and two panel sessions featuring several industry leaders comprised the core of this event. The first panel introduced the topic “Understanding Downturns in the Industry” providing a historical analysis on the causes behind price fluctuation and examining strategic impact on production, companies, and the long-term oil market. The session was moderated by Josh Froelich (Southwestern Energy) and panelists were David Pursell (Tudor, Pickering, & Holt), Todd Montgomery (Murphy Oil), Andy Zitterkopf (Southwestern Energy), Todd Levesque (Sabine Oil & Gas), and Marcelo Laprea (Samson Resources).

“Creating Opportunities in Challenging Environments” was presented during the second panel session. The discussion focused on entrepreneurial ideas and how leaders transformed low cycles into opportunities. The session was moderated by Jennifer Wilding (Chevron) and panelists were Eric Calderon (TXE Capital), Wade Wilson (Eagle Reservoir Services), Cliff Zwahlen (Concho Resources), Stacy Newman (ARC Pressure Data), and Sam Stroder (Chesapeake Energy).

The 2015 Spring Career Enhancement Event created an exceptional forum for students to gain further insight into the oil and gas industry and to emphasize the major role we play as petroleum engineers. The need for students to manage their careers, both in terms of opportunities and challenges, has never been more important, but for those willing to invest time and effort, the E&P sector of the petroleum industry remains one of the most fulfilling and rewarding careers available to engineers. We would like to thank all sponsors, recruiters, and panelists for allowing the 2015 Spring Career Enhancement Event to be a memorable success.
SPE GULF COAST SECTION
DIRECTORY
YOUR GUIDE TO YOUR ORGANIZATION LEADERS

Gulf Coast Section 2014–2015 Chairs

CHAIR
Jeanne Perdue, Occidental
713-215-7348
jeanne_perdue@oxy.com

VICE CHAIR
Ivor Ellul, RPS Knowledge Reservoir
713-595-5100
iellul@knowledge-reservoir.com

SECRETARY
Sunil Lakshminarayanan, Occidental
713-344-1249
sunil_lakshminarayanan@oxy.com

TREASURER
Lucy King, Miller and Lents, Ltd
713-308-0343
lking@millerrandles.com

VICE TREASURER
Alex McCoy, Occidental
713-366-5653
alexander_mccoy@oxy.com

CAREER MANAGEMENT
Nii Ahele Nunoo, NOV
507-304-5416
Nii.Nunoo@nov.com

COMMUNICATIONS
Subash Kannan, Anadarko
832-636-7679
subash.kannan@anadarko.com

COMMUNITY SERVICES
Marissa Davis, Baker Hughes
281-231-3418
marissa.brower@gmail.com

EDUCATION
Gabrielle Guerre, Ryder Scott
713-750-5491
gabrielle.guerre@ryderscott.com

MEMBERSHIP
Xuan Vandeberg
832-444-5143
stem.fields@gmail.com

PAST CHAIR
Mike Strathman, Trinity Group
713-614-6227
mike-strathman@att.net

PROGRAMS
David Tumino, Consultant
281-717-5123
tuminospe@hal-pc.org

SOCIAL ACTIVITIES
Jim Sheridan, Baker Hughes – retired
281-740-0913
sherim@operamail.com

TECHNOLOGY TRANSFER
Carol Piovesan, APO Offshore
281-282-9291
cpiovesan@apooffshore.com

YOUNG PROFESSIONALS
Pavitra Sainani, ExxonMobil
832-624-0505
pavitra.a.sainani@exxonmobil.com

DIRECTORS 2013-15
Trey Shaffer, ERM
832-209-8790
trey.shaffer@erm.com

John Lee, Univ. of Houston
713-743-4877
wjlee3@uh.edu

Deepak Gala, Shell
281-544-2181
depak.gala@shell.com

DIRECTORS 2015-16
Jenny Cronlund, BP Exploration
281-366-8966
jenny.cronlund@bp.com

Torrance Haggerty, T.R. Consulting
281-714-5472
thaggerty06@gmail.com

Eric Kocian, ExxonMobil
832-624-7962
eric.m.kocian@exxonmobil.com

SPE GULF COAST NORTH
AMERICA REGIONAL DIRECTOR
Bryant Mueller, Halliburton
281-818-5522
bryant.mueller@halliburton.com

Committee Chairs

AWARDS
Jeremy Viscomi,
Petroleum Technology Transfer Council
785-864-7396
jviscomi@pttc.org

CASINO NIGHT
Julia P. Clarke, Fugro Consultants, Inc.
713-369-5400
jpclarke@fugro.com

ESP WORKSHOP
Noel Putscher, Newfield
281-674-2871
nputscher@newfield.com

GOLF CO-CHAIRS
Cameron Conway, KB Industries
281-217-0660
cconway@kb-industries.com

Robin Smith, Consultant
713-907-1694
Robin77095@att.net

INTERNSHIPS
Gabrielle Guerre, Ryder Scott
713-750-5491
gabrielle.guerre@ryderscott.com

NEWSLETTER
John Jackson, Unimin Energy
832-247-0233
jsjackson@unimin.com

OILSIM COMPETITION
Kristin Obenhaus, Frontline Group
281-453-6037
kobenhaus@frontline-group.com

Lindsey Ferrell, Frontline Group
512-913-7112
lferrell@frontline-group.com
PUBLICITY
Open

SCHOLARSHIP
Tanhee Galindo, Nexeo Solutions
832-823-1511
gcs-scholarship@spemail.org

SPONSORSHIP
John Vozniak, Archer Oil Tools
713-502-0981
jvozniak@mac.com

SPORTING CLAYS
Paul Conover, NOV
713-346-7482
paul.conover@nov.com

TENNIS
James Jackson, Halliburton
713-366-5704
james.jackson@halliburton.com

WEB TECHNOLOGY
Shivkumar Patil, Aker Solutions
713-369-5352
Shivkumar.Patil@akersolutions.com

SECTION MANAGER
Kathy MacLennan, SPE-GCS
713-779-9595 x 813
kmaclennan@spe.org

Study Group Chairs

BUSINESS DEVELOPMENT
Ricardo Concha, Credit Suisse
713-890-1400
ricardo.concha@credit-suisse.com

COMPLETIONS & PRODUCTION
Mark Chapman, CARBO Ceramics
281-921-6522
mark.chapman@carboceramics.com

DIGITAL ENERGY
Rick Morneau, Morneau Consulting
281-315-9395
rickmorneau@outlook.com

DRILLING
Ernie Prochaska, NOV Downhole
832-714-3842
ernie.prochaska@nov.com

GENERAL MEETING
Raja Chakraborty, Shell
281-544-2148
Raja.Chakraborty@shell.com

HSSE AND SOCIAL RESPONSIBILITY
Trey Shaffer, ERM
832-209-8790
trey.shaffer@erm.com

INTERNATIONAL
Barry Chovanetz
713-212-3591
Gaffney, Cline & Associates,
Barry.Chovanetz@gaffney-cline.com

NORTHSIDE
Robert Estes, Baker Hughes
713-879-4414
robert.estes@bakerhughes.com

PERMIAN BASIN
Amy Timmons, Weatherford
713-836-6563
amy.timmons@weatherford.com

PETRO-TECH
Jessica Morgan, Blackstone Minerals
713-929-1633
jmorgan@blackstoneminerals.com

PROJECTS, FACILITIES,
CONSTRUCTION
Chris Shaw, Shell
281-544-6796
C.Shaw@shell.com

RESEARCH & DEVELOPMENT
Skip Davis, Technology Intermediaries
281-359-8556
skdavis@technologyintermediaries.com

RESERVOIR
Rafael Barroeta, Occidental
713-366-5356
rafael_barroeta@oxy.com

WATER & WASTE MANAGEMENT
Barbara Denson, Weston Solutions
281-701-6891
barbara.denson@westonsolutions.com

WESTSIDE
Sandeep Pedam, ConocoPhillips
832-486-2315
sandeep.pedam@conocophillips.com

CONNECT

INFORMATION

NEWSLETTER COMMITTEE
CHAIRMAN | John Jackson
editor@spegcs.org

AD SALES | Pat Stone
starlite1@sbcglobal.net

BOARD LIAISON | Subash Kannan

NEWSLETTER DESIGN | DesignGood Studio
designgoodstudio.com

SPE HOUSTON OFFICE

GULF COAST SECTION MANAGER
Kathy MacLennan | kmaclennan@spe.org

GCS ADMINISTRATIVE ASSISTANT
Sharon Harris | sharris@spe.org

HOURS & LOCATION
10777 Westheimer Road, Suite 1075
Houston, Texas 77042
P 713-779-9595 | F 713-779-4216
Monday - Friday 8:30 a.m. to 5:00 p.m.

PHOTO SUBMISSIONS
We are looking for member photos to feature on the cover of upcoming issues! Photos must be at least 9" by 12" at 300 DPI. Email your high resolution picture submissions to: editor@spegcs.org

CHANGE OF ADDRESS
To report a change of address contact:
SPE-GCS Member Services Dept.
P.O. Box 833836
Richardson, Texas 75083-3836
1.800.456.6863 | service@spe.org

CONTACT
For comments, contributions, or delivery problems, contact editor@spegcs.org.

ADVERTISE YOUR BUSINESS IN THE SPE-GCS NEWSLETTER

Connect is printed 12 times per year and contains premium positions for advertisers wanting to reach some of the most influential oil & gas professionals in the world.

For information on advertising in this newsletter or on the SPE-GCS website, please contact: Pat Stone, Star-Lite Printing, Inc 281-530-9711 / starlite1@sbcglobal.net
Why can Weatherford deliver more real time data at the wellsite than any other mudlogging company?

Our Global Operations Manager for Surface Logging Systems, Tim, is all smiles these days. That’s because he and his team recently designed a new state-of-the-art mudlogging cabin. The spacious interior makes room for more laboratory services at the wellsite. New exploration companies have access to more data in real time, so they can make better decisions faster. It’s one more way Weatherford Mudlogging is committed to Excellence from the Ground Up.

---

**May Calendar**

<table>
<thead>
<tr>
<th>Sunday</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Young Professionals</td>
<td>3 4 5 6 7 8 9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Petro-Tech Water &amp; Waste Management Northside OilPatch</td>
<td>10 11 12 13 14 15 16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Permian Basin PF &amp; C</td>
<td>17 18 19 20 21 22 23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>International Business Development</td>
<td>24 25 26 27 28 29 30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>