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Society of Petroleum Engineers Denver Section

Dear ,

Last month, SPE held an Outreach Lunch and Learn to develop new ways our chapter can support our local education systems. As part of that, we've donated \$2000 to the Denver Metro Regional Science & Engineering Fair, \$1000 to the 2014 Long's Peak Science & Engineering Fair and \$2600 to the 2014 Colorado State Science & Engineering Fair. These events are also in need of volunteers to judge exhibits, see below for details.

SPE's 2014 Western North America and Rocky Mountain Joint Conference and Exhibition early registration deadline is approaching. Sign up before February 16, 2014 and save \$100. This is the first-time ever that the SPE Rocky Mountain Region and the Western North America Region joined force to offer this super-regional conference while the SPE Annual Conference takes place overseas. Please check out their website for more information.

Finally, the deadline for the SPE sectional, regional and international awards is coming up, February 15th. Nominate someone who deserves recognition for their outstanding work.

Cheers,

Kelly Wilson

Newsletter Editor

February 3, 2014

General Meeting

Topic: Characterizing Shale Plays - The Importance of Recognizing What You Don't Know

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| Speaker: Brad Berg, Reservoir Engineering Manager, Anadarko |
| Date: February 19th, 2014 |
| Time: 11:30am - 1:00pm |
| Place: Denver Athletic Club, 4th Floor - 1325 Glenarm Place, Denver, 80202 |
| RSVP: By Noon, February 17th, 2014 Click Here |

Shale plays typically exhibit much more uncertainty in individual well performance than conventional reservoirs. Understanding this uncertainty is particularly critical during the exploration drilling program when one has relatively few wells on which to base decisions. A systematic approach to understanding and managing this uncertainty can be used to address key questions during the early phases of a drilling program, including "how many wells do I need to drill before I have confidence in the results?" and "does the well performance I've seen to date provide the encouragement needed to keep drilling?" To answer these questions, one must quantify the uncertainty surrounding individual well results. Key elements of this evaluation process include: 1) identifying analogs that can provide insights into the level of well performance uncertainty to expect; 2) stochastically modeling the potential range of well results from the testing program; 3) deciding what level of risk is acceptable to the

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decision-makers; and 4) planning and executing a testing program that incorporates these elements.

The primary take-away from this presentation is that it is critical to recognize, and properly characterize, uncertainty in shale well production performance when planning an exploration drilling program in shale plays. Without such an approach, the commercial potential of a play may not be adequately characterized, leaving the decision-makers without the information needed to determine the path forward. Understanding the uncertainty in well performance, and planning for it, will lead to more efficient exploration activity, and better informed decision-making.

Biography

Brad Berg serves as Reservoir Engineering Manager for U.S. Onshore Exploration with Anadarko Petroleum Corporation, one of the world's largest independent E&P Companies. His responsibilities include advising senior management on the commercial viability of opportunities in the company's diverse exploration portfolio. In his current role, he has been instrumental in developing the methodology and tools that Anadarko uses to evaluate unconventional resource plays. His team has assisted in the evaluation, capture, and appraisal of Anadarko's positions in the Marcellus, Maverick EagleFord, Avalon, and Ohio Utica shale plays, and they continue to support exploration efforts in other promising areas of the U.S. onshore. Brad has also served as the Reservoir Engineering Manager for Anadarko's Gulf of Mexico deepwater exploration team, asset manager for the mid-continent U.S. region, and has also contributed to the development of several world class conventional reservoirs including the Prudhoe Bay, Kuparuk, and Alpine fields in Alaska.

Joint Session

Topic: Environmental and Social Responsibility Aspects of Hydraulic Fracturing in Colorado

Save the Date: 5:30 to 9:00pm, March 26 2014 at the Freidhoff Hall, Green Center, Colorado School of Mines.

The SPE Denver Section and Colorado School of Mines SPE Student Chapter are hosting the Annual Joint Session Meeting. Featuring a panel of speakers with various roles in the oil and gas industry and government who will be addressing the environmental, social and political issues that surround the controversial topic of hydraulic fracturing within the state of Colorado.

Western North America/Rocky Mountain Joint Conference and Exhibition

 **April 15-18th, 2014**


Sheraton Denver, Downtown

As you know, one of the most exciting SPE events in North America this year will take place in the beautiful mile-high city of Denver in mid-April. This is the first-time ever that the SPE Rocky Mountain Region and the Western North America Region joined force to offer this super-regional conference while the

Thanks to this Month's Newsletter Sponsor:



[AIPG 2014 LEGISLATIVE RECEPTION](#)

 5-7:30p, February 27, 2014

[University Club, Denver](#)

The American Institute of Professional Geologists' (AIPG) upcoming event, 2014 Legislative Reception, is a prime opportunity to meet with legislators. They can answer your questions regarding current and coming legislation and you can inform them about issues involving hydraulic fracturing, coal, uranium, rare earth minerals, water issues and many more!

**WALK-INS WELCOME,
\$20 AT THE DOOR**

*Be Sure to Invite Your
Legislator*

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SPE Continuing Education

Feb 25-26, 2014

Water Treating for Hydraulic Fracturing

Mar 25-26, 2014

Shale Evaluation and Development

**34th Annual SPE
Handball/Racquetball
Tournament**

SPE Annual Conference takes place overseas. Please register now to save money before the registration price goes up on February 16.

We have a special panel session with representatives from various state Oil and Gas Conservation Commissions confirmed to discuss "Regulatory and Other Rules Facing the Industry on the Move." If you want a heads up on upcoming rules regarding exploration and production, this is a must-attend event. See the [technical program](#) for more information.

- [Exhibition Info](#)
- [Exhibitor Floor Plan](#)
- [Sponsorship](#)
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- [Luncheons/Networking Event](#)
- [Panel and Poster Sessions](#)

[Register now and view more information about the conference>>](#)

SPE Outreach/Volunteer Opportunities

Denver SPE is providing financial sponsorship to Local/State science fairs as noted in the opening statement. The following two science fairs are in need of volunteer judges. Please email denver.spe@gmail.com if you want to get involved!

- Denver Metro Regional Science & Engineering Fair - Mar 5-6, 2014 at Museum of Nature and Science
- Long's Peak Science & Engineering Fair - Feb 27th at the University of N. CO UC Ballrooms

The mission of the Denver SPE Community Outreach Committee is to support all levels of our local education systems in developing their abilities in STEM-Science, Technology, Engineering, and Mathematics through scholarships and mentorships opportunities. We also want to enhance the image of the Oil and Gas Industry through disseminating knowledge and being an active member of the local community.

See [WEBSITE](#) for more ongoing information about opportunities for volunteering.

Regional/Sectional SPE Awards

Regional and Section awards recognize members who contribute exceptional service and leadership within SPE, as well as making significant professional contributions within their technical disciplines at the SPE Regional level. To nominate a colleague for any of the following awards please contact Jon Schmidt at jon_schmidt@eogresources.com. Deadline to nominate is February 15, 2014.

Technical Awards

- Completions Optimization and Technology Award
- Drilling Engineering Award

Friday, Feb 21, 2014
12:00 PM 'til finished
Denver Athletic Club

[Sign Up Now](#)

All Skill Levels Welcome

Funds to benefit the Denver Section SPE Scholarship fund

SAVE THE DATE

SPE-YP / DGS 2014 SKI TRIP

March 28th at Arapahoe Basin

\$25- Includes: RT charter bus, Coffee, Breakfast, Lunch, Beverages Door Prizes

Weatherford will be providing BBQ on A-Basin's famed "beach"

Possibly free ski demos...

SPORTING CLAY TOURNAMENT

 Friday April 11, 2014
Register by Mar 11, 2014

Colorado School of Mines is hosting its annual sporting clay tournament. Make a team and sign up!

[For Location and Details to Sign Up >>](#)

SPE Denver needs your help with the following volunteer positions:

Drilling Study Group Chair

Awards Committee

Community Outreach Committee

Please [email us](#) if you would like to volunteer for any of these positions!

Welcome New SPE Members:

Danielle Beevers
Steve Biggs
Antony Cambell
Michael Cassidy

- Formation Evaluation Award
- Health, Safety, Security, Environmental and Social Responsibility Award
- Management and Information Award
- Production and Operations Award
- Projects, Facilities and Construction Award
- Reservoir Description and Dynamics Award

Professional Awards

- Distinguished Achievement Award for Petroleum Engineering Faculty
- Distinguished Corporate Support Award
- Service Award
- Young Member Outstanding Service Award

For more information please visit www.spe.org/awards

Young Professionals

Topic: Ballot Issues- Possible Outcomes, Methods and Strategies

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| Speaker: Tim Wigley, President, Western Energy Alliance |
| Date: February 12th, 2014 |
| Time: 11:30am - 1:00pm |
| Place: Sanjel Office Suite; 511 16th Street, Suite 300 |
| RSVP: By Monday, February 10th, to yp-denver@spemail.org |

With upcoming ballot issues (local control, anti-fracking) that target our industry, Tim will discuss what outcomes are possible, and methods and strategies for educating our friends and neighbors. As well, he will present results from recent Western Energy Alliance research efforts related to polling opinion, message testing, and oil and gas knowledge among the general public – with suggestions for “what now? / what next?”. Tim is a very dynamic and interesting speaker, and looks forward to questions and discussion. A not-to-be-missed L&L – that’s for sure!

Biography

[Tim Wigley is the President of the Western Energy Alliance](#) – a Denver-based regional trade association representing the interests of over 450 oil and natural gas companies at the federal level. He has been focused in political campaign management / consulting and natural resource issues since 1980, with a strong track record on negotiating challenging ballot measure campaigns. A native of Oklahoma City and a graduate of Southwestern Oklahoma State University, Tim spends his “spare time” playing drums for a Denver-based band.

Reservoir Engineering Study Group

Topic: How does an organization use its reserve report if they are not selling their assets?

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| Speaker: Wayne W. Williamson, Managing Partner, Plexus Capital, LLC |
| Date: February 27th, 2014 |

Juliana Chikaloff
Christin Doetterl
Shane Holunga
Zachary Limban
Peter McCall
Paul Meier
Nathan Retta
Jose Rocha
Sharon Sadle
Brian Wagner
Pingkan Zaremba

Welcome SPE Members Transferring to Denver:

Daniel Anderson
Kent Bartschi
Michelle Burnham
Jared Flott
Geoffrey Gullickson
Hongxue Han
Elizabeth Jinks
Adam Larsen
Craig McMillin
Beau Moore
Lawrence Pekot
Daniel Petrick
Michael Ratway
Jason Reed
John Sackett
Heather Schiller
Philip Smith
Matthew Thompson
Tyrel Woodworth

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|--|
| Time: 11:30am - 1:00pm |
| Place: Halliburton's office: 1125 17th St, Suite 1900, Denver |
| RSVP: By Monday, February 24th, to Deb Ryan at dryan@mhausa.com |

Biography

Plexus Capital has raised in excess of \$1 billion in private debt and equity, primarily for private E&P enterprises. We assist the client in determining their capital requirements and advise alternative solutions for accessing capital. From 1997 until the formation of Plexus in 2003, Wayne served as CFO for Aspect Energy, LLC, primarily involved in capital formation, providing the financial capability for Aspect to grow from a \$20 million enterprise to \$180 million. He created innovative non-conforming debt structures in addition to Aspect's senior bank facility that funded an aggressive capital investment program. These structures included a "land bank" for funding undeveloped property acquisitions for seismic acquisition; a guaranty by a gatherer/purchaser to enable mezzanine financing for drilling; and a structured financing for a SPE to purchase Aspect producing properties and transferring reserve risk while allowing Aspect owners to keep the upside of the properties in the SPE. Prior to joining Aspect, Wayne was the CFO for General Atlantic Resources, Inc. and played a key role in its IPO in 1993 and subsequent merger with UMC Petroleum in 1994. Wayne received a BSBA in management from the University of Denver in 1975, participating in the Honors Program, and held various international and domestic accounting positions with Marathon Oil and Trend Exploration until joining General Atlantic in 1989. Wayne is currently on the boards of Three Forks Reserves, LLC, The Erie County Investment Company, ACE Scholarships, and Save Our Youth.

EHS Study Group

Topic: Progress of Driver Training in the Oilfield Service Industry

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| Speaker: John Regan, Regional QHSE Manager, M-I SWACO |
| Date: February 11th, 2014 |
| Time: 11:30am - 1:00pm |
| Place: Schlumberger Training Room; 7th floor 1675 Broadway, Denver CO 80202 |
| RSVP: By Monday, February 10th, to Meagan Miller at mmiller@bayswater.us |

The Environmental Study Group is now the "Environmental, Health and Safety Study Group." Look for more future topics to include this wider range of our industry.

Biography

John Regan is the Regional QHSE Manager for the US Land area for M-I SWACO, A Schlumberger Company. He has been in the Oilfield Service industry for 3 years and has been responsible for process safety the Retail and Production sectors for over 20 years.

Completions and Production Study Group

Topic: Stretching the Boundries of Darcy Flow in Nano-Porous Unconventional Reservoirs

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| Speaker: Erdal Ozkan, Colorado School of Mines |
| Date: February 18th, 2014 |
| Time: 11:30am - 1:00pm |
| Place: Halliburton's office: 1125 17th St, Suite 1900, Denver |
| RSVP: By Monday, February 17th, to Wendell Salas at Wendell.Salas@halliburton.com |

The notion that the conventional perception of flow and transport in porous media is incapable of explaining oil production from unconventional, nano-porous reservoirs has been widespread in the industry and research communities. Efforts to adopt and adjust the conventional understanding and reservoir engineering tools have reached their limits in the early days of the unconventional reservoir boom and the future of unconventional reservoir production requires a more comprehensive approach with a sound physical basis and reliable predictive capabilities.

Nano-porous unconventional reservoirs often exhibit a variety of heterogeneities, such as fractures, fissures, micro, macro, and inter-aggregate pores, and the conglomerations of organic matter. These properties pose challenges to our ability to characterize the formation and fluid phase behavior. The heterogeneity of the microscopic structures causes preferential flow at the macroscopic level by creating a highly nonuniform velocity field. Preferential flow in the non-uniform velocity field leads to nonequilibrium conditions with respect to pressure and concentrations of hydrocarbon components, which further complicate our ability to model and predict flow and transport in such heterogeneous media. What separates these characterization and modeling challenges from those in conventional reservoirs is the lack of a clear scale separation in unconventional reservoirs.

Models of flow and transport in porous media traditionally rely on the validity of continuum methods, which assume small or finite spatial correlations of process variables. The premise that a scale separation exists imposes certain constraints on rock properties and process parameters. The constraints of the continuum assumption become dubious in nano-porous unconventional reservoirs not only because of the types of heterogeneity caused by the varying scales of pores and the contrast between the matrix and fracture characteristics, but also due to the strong scale dependency of the phase behavior and local gradient of the mean process variables. To improve the modeling of nano-porous unconventional reservoirs, it is imperative to incorporate the non-local, scale-dependent effects in flow and transport models.

In the last two decades, non-local, memory-dependent descriptions of flow and transport have gained notable popularity among scientists, engineers, and mathematicians focusing on applications in various forms of nano-porous systems. These efforts have not attracted much attention in the oil-field applications due to the dominance of advective flow in conventional reservoirs. Nano-porous unconventional reservoirs possess multiple flow mechanisms at different scales. Advection is the fastest of all; however, its contribution to total flow is the minimum because of the small proportion of the pores in which Darcy flow occurs. In nano-pores, much slower diffusive processes occur. The cause of the diffusive flows may be the concentration gradient and osmotic pressure caused by pore

proximity and heterogeneity. The local diffusion is, on the other hand, a function of the global pressure distribution; i.e., the advective flow. This problem lends itself to a non-local flow and transport formulation. An approach for non-local modeling of flow in nano-porous unconventional reservoirs with long-range interactions is to use a fractional diffusion equation. The fractional Laplacian operator acts by a global integration, instead of a pointwise differentiation, which represent the nonlocal character of the process. This representation presents a new approach to reservoir characterization and flow modeling.

Biography

Erdal Ozkan is a professor of Petroleum Engineering at the Colorado School of Mines. He is also the director of Unconventional Reservoir Engineering Project (UREP) Consortium and the co-director of the Marathon Center of Excellence for Reservoir Studies (MCERS). He has BS and MS degrees from Istanbul Technical University and a Ph.D. degree from the University of Tulsa, all in Petroleum Engineering. He has over twenty-five years of teaching and research experience at Istanbul Technical University, University of Tulsa, and Colorado School of Mines.

Dr. Ozkan's main research interests are reservoir engineering, modeling fluid flow in porous media, pressure-transient analysis, unconventional reservoirs, and horizontal and multilateral well technology. He has presented and published over 100 papers, co-authored a book, and contributed to several others. Dr. Ozkan has been actively involved in the organization of many technical conferences and served as the executive and associate editor of leading petroleum-engineering journals, such as the SPE Reservoir Evaluation and Engineering, Journal of Petroleum Science and Engineering, Journal of Energy Resources Technology, and Journal of Natural Gas Science and Engineering. He also serves as a referee for several US and international research foundations. He was a member of the SPE Reservoir Description and Dynamics Advisory Committee and a Technical Director of the SPE Research and Development Technical Section.

Dr. Ozkan is a Distinguished Member of the Society of Petroleum Engineers (SPE), the recipient of the SPE Lester C. Uren Award (2013), SPE Formation Evaluation Award (2007), and a 2011-2012 SPE Distinguished Lecturer on shale-gas reservoirs. He is also member of the American Society of Mechanical Engineers (ASME) and Society of Industrial and Applied Mathematics (SIAM).

Membership Report

Denver Section Membership- As of January 15, 2014

During the months from December to January our section saw a net loss of 222 members. At the beginning of January, we had a total of 2569 full members, of whom 763 are designated as Young Professionals (29.7% of total). As of the beginning of December, we had 263 student members. At the beginning of January 2013, our full member count was 2378 (increase of 8.0% YOY) and our student member count was 230 (increase of 14.3% YOY).

Society of Petroleum Engineers - Denver Section

Americas

222 Palisades Creek Dr.
Richardson, TX 75080-2040 USA

Asia Pacific

Level 35, Gardens South Tower
Mid Valley City, Lingkaran Syed Putra
59200 Kuala Lumpur, Malaysia

Europe

1st Floor, Threeways House
40/44 Clipstone Street
London W1W 5DW UK

Middle East

Fortune Towers, 31st Floor
Offices 3101/2, JLT Area
P.O. Box 215959, Dubai, UAE

+1.972.952.9393 | E-mail |

SPE members receive periodic emails on events and programs related to the section to which they belong. If you no longer wish to receive emails from this section, please opt-out. You may also choose to review your email preferences with SPE International.

