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2012 – 2013

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SPWLA – Houston Chapter News

November, 2012

Luncheon Meetings

| | |
|---|---|
| Northside Mon, Nov 5, 2012 The Greenspoint Club | Overview of High-Angle and Horizontal Well Formation Evaluation by Quinn R. Passey, ExxonMobil Expl. Co. |
| Downtown Wed, Nov 12, 2012 Chevron Auditorium | Capillary Condensation in Kerogen Pores and NMR Relaxation Time in Unconventional Shale Hydrocarbon Resources by Jinhong Chen, Baker Hughes |
| Westside Wed, Nov 14, 2012 BP Plaza Pond View 1-2 | Impact of Experimental Studies on Unconventional Shale Reservoir Mechanisms presented by Richard Rosen, Marathon Oil |

Local SPWLA Upcoming Events

Houston SPWLA Technology Show
December 7, 2012 10 am – 2 pm
Omni Hotel – 13210 Katy Freeway, 77079
Event Sponsors needed, contact Rob Hengel

Golf Tournament
March 15, 2013 (Blackhorse Golf Club)
Event Sponsors needed, contact Rob Hengel

54th Annual SPWLA Symposium
June 22nd to 26th
New Orleans, LA

[Complete Calendar of Events](#)

President's Corner

November, 2012



Dear Chapter Members,

We are gearing up for the 2012 Annual Software and Vendor Exhibition, which will take place at the OMNI hotel in the Westside on Friday, December 7th. Whether you are an exhibitor or a participant, please, mark your calendars for the traditional networking luncheon and to check out the latest technology in formation evaluation. Please, contact Rob Hengel (treasurer@spwla-houston.org) or any of the officers for more information.

Our luncheons in October offered a variety of topics from horizontal well completion optimization in the Northside by Eric Wigger (Schlumberger), whose presentation attracted almost 60 attendees, through petrophysical characterization of tight-gas sands by Shujie Liu (BP America), and advances in rotary coring by Chris Tevis (Schlumberger). Do not miss out the luncheons in November as these will be the last technical presentations of the year.

Thanks to those members who are making their payments in advance through Paypal when registering for the Northside and Downtown venues. We kindly ask those members who are not currently using Paypal to start using this option as it facilitates the meeting logistics. Advance payments through widely available web-based technology significantly reduce check-in time and secure your seat at the luncheon. If you don't feel comfortable using Paypal or you did not have the chance to timely RSVP, we still welcome you but payments with checks will be the preferred payment method onsite.

Finally, I would like to thank all our sponsors and the Houston members for their continued support to our local Chapter. If you have questions or would like to give us your feedback or your suggestions, please, contact any of the officers. For more information about the Houston Chapter and upcoming events, visit our website (www.spwla-houston.org).

Well wishes to all our members and their families as we head towards the festive season and we look forward to new adventures in 2013!

Thaimar Ramirez
Houston Chapter President
president@spwla-houston.org

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Northside Luncheon Meeting

Date: Monday November 5, 2012

Lunch: 11:30 Talk: 12:00

Reservations: Email [Mitch Pavlovic](mailto:Mitch.Pavlovic@exxonmobil.com)

RSVP before 9:00 A.M., Thurs. Nov. 1st.

Walk-ins are welcome; lunch may not be available without advance payment.

Place: The Greenspoint Club
16925 Northchase Drive, Houston, TX 77060

OVERVIEW OF HIGH-ANGLE AND HORIZONTAL WELL FORMATION EVALUATION

Q. R. Passey¹, H. Yin², C. M. Rendeiro², and D. E. Fitz²

¹ExxonMobil Upstream Research Co., Houston, Texas

²ExxonMobil Exploration Co., Houston, Texas

Abstract

High-angle and horizontal (HA/HZ) wells are commonly drilled and often the logging suite is selected primarily to aid geosteering the well to a specific target. In many situations, these wells penetrate zones or portions of the reservoir for which no vertical appraisal wells are available. In these situations, the logs acquired will be used for routine formation evaluation of net-to-gross, porosity, and possibly water saturation. Comparison of log responses in a given formation from vertical wells to responses in HA/HZ wells indicates that significant differences can exist. Thus, routine formation evaluation approaches for vertical wells may not be adequate for accurate characterization of formations and fluids in HA/HZ wells. Many causes for different responses exist, but most relate to the fact that many logging tools were designed for vertical wells with near-horizontal strata. In extremely high-angle to horizontal wellbores, our interpretation schemes must be modified to account for 1) geometry of beds relative to the borehole, 2) circumferential direction of the measurement, 3) formation anisotropic effects on resistivity, acoustic, and nuclear responses, 4) unusual invasion profiles, and 5) gravity causing eccentricity of tools and cuttings bed accumulation on the bottom of the wellbore. Although borehole image logs may be the best approach for characterizing relative bed dip, in near-horizontal wellbores, issues still exist in obtaining sufficiently accurate dips. Since logging of these wellbores is challenging, it is critical to establish a protocol for distinguishing poor log responses from "unusual" log response just due to geometry, anisotropy, and other borehole effects.



Biography

Quinn R. Passey graduated from Brigham Young University in 1978 with a BS (*Magna Cum Laude*) in Geology, and continued his graduate studies at the California Institute of Technology with a M.S. (1979) and PhD (1982) in Planetary Science and Geology. Currently, he is the Senior Formation Evaluation Consultant for ExxonMobil Upstream Research Company (URC).

He has numerous external publications on topics ranging from planetary geology, meteoroid breakup, earth-crossing asteroids, isostatic rebound, and various aspects of petrophysics – including papers on source rock evaluation from well logs, interpretation of high-angle and horizontal wells, and an AAPG book addressing thin-bed formation evaluation. He is recipient of the 2011 SPWLA Distinguished Technical Achievement Award, and has been an SPWLA Distinguished Speaker several times.

Current research is on understanding the geological and petrophysical aspects of fine-grained reservoirs, a topic for which he is a 2012 AAPG Distinguished Lecturer, and he is currently developing an AAPG short course on this topic.

Downtown Luncheon Meeting

Date: Monday Nov. 12th, 2012
Lunch: 11:30 Talk: 12:00
Reservations: Email [Libny Leal](#)
RSVP before 4:00 P.M., Thursday, Nov 8th
Cost: \$30 (includes lunch*) Please, use PayPal.

Place: **Chevron Auditorium**, Ground Floor
1500 Louisiana St., Houston, Texas 77002

Capillary Condensation in Kerogen Pores and NMR Relaxation Time in Unconventional Shale Hydrocarbon Resources

Presenter: Jinhong Chen, Baker Hughes



Abstract

Although hydraulic fracturing and horizontal drilling are now routinely used to dramatically improve the production of hydrocarbons from unconventional shale reservoirs, there is still an urgent need for an improved understanding of the fundamental rock and fluid physics in the source shale. This understanding provides the key model to evaluate the production potential of the shale play and to interpret the logging data from various formation evaluation technologies. The current model of gas in place estimation is the summation of the adsorbed gas and free gas. In this model the adsorbed gas is approximated as a monomolecular layer of gas molecules adsorbed on the surface of the organic pores in the kerogen and the majority of free gas stays within the pores. This model does not consider the extremely favorable conditions for capillary condensation to occur in the source shale: the kerogen pores are in the range of a few to a few dozen nanometers and the pore surface is hydrocarbon wet. Capillary condensation has significant implications on permeability, gas in place estimation, and Nuclear Magnetic Resonance (NMR) signals in source rock shales.

In this paper we will present the successful experimental realization of capillary condensation in source shale cores in the lab. The experiments show that gaseous hydrocarbons condense into the liquid state in the kerogen pores in shale core plugs. NMR measurements were also performed on these samples and the relaxation time of the hydrocarbon inside the kerogen pores was obtained. We will also present experimental results of the effects of pore size and surface wettability on the NMR relaxation time for the hydrocarbon and water signals in source rock shales.

Biography

Jinhong Chen joined Baker Hughes as a research scientist at HTC in May 2010. During 2002-2010, he was a senior scientist at Memorial Sloan-Kettering Cancer Center at New York. From 2000-2002, he was a researcher at Harvard Medical School and a visiting scientist at MIT.

He has a Ph.D. in Physics and has worked on NMR for 18 years.

He has published more than 30 peer reviewed journal papers and authored a book chapters and patents.

He is now focused on developing NMR applications in unconventional reservoirs.

Westside Luncheon Meeting

Date: Wednesday, Nov. 14th, 2012

Lunch: 11:30 Talk: 12:00

Reservations: Email [Matthew Blyth](mailto:Matthew.Blyth@spwla.org)

RSVP before 3:00 P.M., Tuesday Nov. 13th

Place: BP Plaza Terrace **Pond View 1&2**, next to cafeteria
501 Westlake Park Boulevard, Houston, TX 77079

Impact of Experimental Studies on Unconventional Shale Reservoir Mechanisms

Presenter and author: Richard Rosen, Marathon Oil

Additional Authors: Tobi Kosanke¹, Munir Aldin-Sharf¹, William Mickelson¹, Robert Patterson¹, Faraz Mir², Meghana Paiangle², Basak Kurtoglu¹, Ben Ramirez¹, and Tom Baker¹

¹Marathon Oil, Houston TX

²Metarock Laboratory, Houston TX



Abstract

Physical properties of rocks are controlled by composition and texture. Texture can be considered the result of the many geologic processes imposed upon a rock throughout time. This includes the effects of deposition and diagenesis. Pore systems, and how they connect, are intimately related to these processes. The science of petrology is devoted to understanding these influences and provides the critical link between the geosciences and engineering applications. As such, it is a commonly held belief throughout the history of petroleum science that laboratory core measurements need to be made at representative conditions. This has always been accepted for conventional reservoirs and is no less true for unconventional ones.

Apparatus have been developed for both steady- and unsteady-state methods for nano-Darcy (nD) range fine-grained shale material. The steady state method is based upon a dual pump system at high pressure using super critical fluids. Super critical fluids have the unique advantage of having low viscosity, low compressibility, and miscible at appropriate conditions. Low viscosity allows measureable flow rates and low compressibility minimizes the amount of time to achieve steady-state equilibrium by reducing the length of time of unsteady-state transients. Specially designed and configured pump systems, seals and sleeves reduce leak rates to allow Darcy permeability determination below 1 nD. In this report we present a summary of over 200 such measurements and additionally document many of the same reservoir mechanisms long known in conventional reservoirs: stress dependency for both matrix and fractures, hysteresis, and rate dependent skin. Taken together for dual porosity reservoirs composed of matrix storage feeding fracture systems forms the basis of simulation models for these types of reservoirs. Examples are presented from Woodford, Haynesville, Bakken and Eagle Ford formations.

Biography

Richard Rosen joined Marathon in 2010 as a Senior Technical Consultant. Prior, he worked at Shell for 30 years, 7 months and 18 days. During part of that time he was leader of the Petrophysical Sciences Lab and Principle Technical Expert in Coring and Core Analysis. He holds a Master of Science Degree in Geophysics from Colorado School of Mines and a Bachelor of Arts in Geology from State University of New York at New Paltz
