



PBS-SEPM NEWSLETTER



January, 2011

PBS-SEPM 2010-2011 5

**Jan 11: WTGS
Lunch Meeting, 11:30
am, Midland Center.**

Speaker: Larry Stetler,
Topic: TBA— See
www.wtgs.org for more
details.

**Jan 18: PBS-SEPM
Lunch Meeting, 11:30
am, Midland Center.**

Speaker: Richard E.
Lewis, Schlumberger
Topic: Production of
Liquid Hydrocarbons
from Organic Shales”

**Jan 19: SIPES Lunch
Meeting, 11:30 am,
Midland Country Club.**

Speaker: Dr. Katharine
Hayhoe, Texas Tech
University. Topic:
Global Warming / Climate
Change

**Jan 20: SPE Reservoir
Study Group, ATC,
11:30 am**

Speaker:
Gary Perry, Geotrace,
Topic: “Oil and Gas find-
ers Unite! Exploitation
techniques can benefit
engineers, geologists and
geophysicists alike ”

**Feb 15: PBS-SEPM
Lunch Meeting, 11:30
am, Midland Center.**

Speaker:
Richard J. Erdlack, Ph.D.
Topic: Geothermal Energy
Production within the Oil
Patch”

**Feb 10-13- WTGS
Field Trip to the Tuc-
son Gem and Mineral
Show. See
www.wtgs.org for more
details.**

Richard E. Lewis— PBS-SEPM Luncheon Speaker

— Biography on page 3 —

— Tuesday, January 18, 2011 —

—11:30 am, Midland Center, Midland, TX—

RSVP by noon Monday, January 17th : 432-683-1573 or email: <wtgs@wtgs.org>

“Production of Liquid Hydrocarbons from Organic Shales”

ABSTRACT:

The domestic energy industry has undergone a revolution over the last eight years due to the production of gas from organic shale. The quantities of gas within these reservoirs are considerable, and shale gas accounts today for a significant fraction of U.S. gas production. This increase in gas production has led to a depressed price for gas when compared to the price of oil. Our industry has responded by focusing significant effort in producing oil from these same organic shale reservoirs.

Much of the producible pore volume in organic shale is believed to reside within the kerogen fraction. These nanoscale pores form during kerogen maturation, and they have very low water saturations. Fluids within these pores are believed to include adsorbed gas with either free gas, oil, or a combination of the two (this assumes a reservoir below the critical point). Liquids production can come from either the oil within the pores or from condensate that drops out of the gas as its pressure is reduced.

Gas production mechanisms are well demonstrated for organic shale reservoirs. Condensate production would follow the same flow mechanism until the bottom hole flowing pressure falls below the dew point. If the condensate does not build up in the nanopores, where it would reduce the relative permeability to gas, then the production of condensate could be significant. And this has been amply demonstrated in numerous condensate-producing organic shale wells.

Production of oil from the nanopores of an organic shale is more difficult to understand. Oil is 50 times more viscous than gas, so application of Darcy's law would suggest a very much lower flow rate for an equivalent pressure drop. The flow of a liquid through nanopores may not be governed by Darcy's Law; however, there really aren't any quantitative alternatives today. The production of oil from these reservoirs suggests 1) the matrix has a higher intrinsic permeability than typical gas shales, 2) there is a permeable network within the shale formed either through fractures or dissolution, or 3) a combination of the two.

Most oil production from shale occurs today in the Bakken. This production comes primarily from the middle member of the Bakken, a dolomitic silt encased within two organic shales. The middle Bakken is a poor quality conventional reservoir with intrinsic permeabilities less than 0.1 mD; however, these permeabilities are still around 1000 times greater than those encountered in gas shales. The application of drilling and completion practices initially developed for gas shales has been critical to the success of this play.

Bakken Shale equivalents may occur elsewhere in the United States. Potential targets would be tight reservoirs in intimate contact with source rocks. These source rocks would charge the reservoir and provide a seal. Potential examples from the Midland Basin will be discussed.

Bio—Permian Basin Section SEPM Speaker—January 18, 2011

Richard (Rick) E. Lewis

Rick Lewis is the Shale Petrophysics Technical Manager for Schlumberger Oilfield Services in Oklahoma City. Rick was a developer of the gas shale evaluation workflow that was initially fielded eight years ago and has been applied to well more than 1000 wells in North America.

In his current position, Rick manages a group responsible for the continual improvement for this workflow, and for its introduction and application to the international market. He is also the interface to the Schlumberger research and engineering groups for the development of evaluation technologies for organic shales. Prior to this assignment, Rick was responsible for wireline interpretation development for the central and eastern United States. Rick has also worked for Shell Oil and the U.S. Geological Survey. He received a BS degree from UCLA and MS and PhD degrees from Cal Tech, all in geology.



Figure 1. Map showing Williston Basin Province boundary (in red), Bakken-Lodgepole Total Petroleum System (TPS) (in blue), and major structural features in Montana, North Dakota, and South Dakota.

Map is taken from a USGS Oil and Gas Fact Sheet — April, 2008

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“One of the most pervasive effects during times of biotic crisis is the massive disruption of tropical and low-latitude ecosystems, and the relative non-disturbance of high-latitude and polar ecosystems.”

George R. McGhee, Jr., “Catastrophes in the History of Life”, 1989



President's Column

Teri McGuigan



We like being oily! The New Year has certainly kicked off in a positive fashion for the Permian Basin area. NYMEX shows West Texas intermediate crude oil for February closed at \$88.03. The price is down \$0.35 at closing, but is still hovering close to the \$90.00 mark.

The American Association of Professional Landmen puts out the bi-monthly publication *Landman* 2 which provides industry highlights from I.H.S., Baker Hughes and field updates from landmen active in various basins. The latest publication I have is from November, 2010, and the data motivated me to poke around a bit.

According to Baker Hughes, total active rig count on land in the lower 48 is 1695. Of the 1695 active rigs, 728 are presently drilling in Texas and there are 69 active rigs in New Mexico. Combined, the Texas and New Mexico active rigs account for almost 50% of the total rig activity in the lower 48. As a comparison, rig count in Texas one year ago was 496 showing an increase of 232 rigs in Texas over the one year period. Of importance and more close to home to those involved in west Texas operations, the Permian Basin maintains close to 50% of the Texas/New Mexico rig count with nearly 300 rigs as reported by Tyner in November, 2010, in the *Landman* 2 Permian Basin update. The most significant increase in rig activity over the one year period as recounted by Baker Hughes was in Texas Railroad Commission District 8 with an increase from 106 to 194 rigs over the one year period.

Another area that caught my attention was the split in oil and gas production. I.H.S. shows that the oil and gas split in 2008 was 20% oil and 80%

gas. As of September, 2010, I.H.S. data revealed that oil had edged past gas with the mix of 52% oil and 48% gas. However, on their January 7, 2011 report, Baker Hughes data gives gas a slight edge over oil with a 54% / 46% split respectively. Whatever numbers one feels comfortable with, it appears oil production has made a significant gain and will overcome gas production in the near future if it has not already done so.

Brett Clanton made an insightful statement in the *Houston Chronicle* on January 30, 2010 – Texas' famed graying grand dame has polished up her star and is climbing back onto center stage due to the resilience of oil price. There have been many of us that have come a long way with this old basin and have observed the same unfortunate process of graying. I hope everyone is feeling the same new spark of life as the basin is feeling.

PBS-SEPM prides itself on continuing to fulfill the pertinent educational needs of the geological community. With oil on everyone's minds, PBS-SEPM invited Dr. Richard E. Lewis from the Schlumberger office in Oklahoma City, Oklahoma, who will give his talk "Production of Liquid Hydrocarbons from Organic Shales" on January 18. I have not met Rick personally, but George Asquith speaks very highly of him and so I was very eager for Rick to get to Midland and give this talk.

The February 15 talk will be on geothermal energy and presented by Dr. Richard Erdlac. Richard is currently acting Chair and Industry VC of the EMD Geothermal Committee for the AAPG. The initiation of this committee demonstrates the AAPG's in-

terest in the growth of this alternative power source.

PBS-SEPM and Dr. Xavier Jansen of UT-BEG notoriety have scheduled the spring field trip for May 13-15, 2011. Xavier will run the trip to the Mississippian mud mounds in the Sacramentos. We are working on the details now and flyers will be out in the near future.

My final thoughts are about the upcoming term of 2011-2012 and how you can support the PBS-SEPM. I hope each of you will think seriously about and consider volunteering your time to be a part of this exceptional organization. Whether it is through executive board involvement, serving on a committee or supporting the society through membership, your involvement is what keeps the society alive and able to continue to provide outstanding events for the geological community. If you have an idea to share or questions you need answered, please get in touch with any one of the board members.

I hope to see all of you at the luncheon on January 18.

Teri McGuigan

**President, PBS-SEPM
2010-2011**

<http://www.pbs-sepm.org>

"The man of science has learned to believe in justification, not by faith, but by verification." *Thomas H. Huxley (1825-95)*
English biologist.

New PBS-SEPM Executive Board (June, 2010—May, 2011)

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Do you have an idea for an interesting luncheon talk? Have a core workshop you'd like to present? Have some suggestions on how PBS-SEPM can better serve the geologic community? Just click on the e-mail above and drop us a note—your PBS-SEPM Executive Board would **LOVE** to hear from you!



"Man will occasionally stumble over the truth, but usually manages to pick himself up, walk over or around it, and carry on".

- Winston S. Churchill

Corporate Sponsors (2010-2011) see others on p. 3

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For additional information **contact:** PBS-SEPM office (432) 683-1573.

Richard J. Erdlac— PBS-SEPM Luncheon Speaker

—Speaker Biography on p. 8—

— Tuesday, February 15, 2011 —

—11:30 am, Midland Center, Midland, TX—

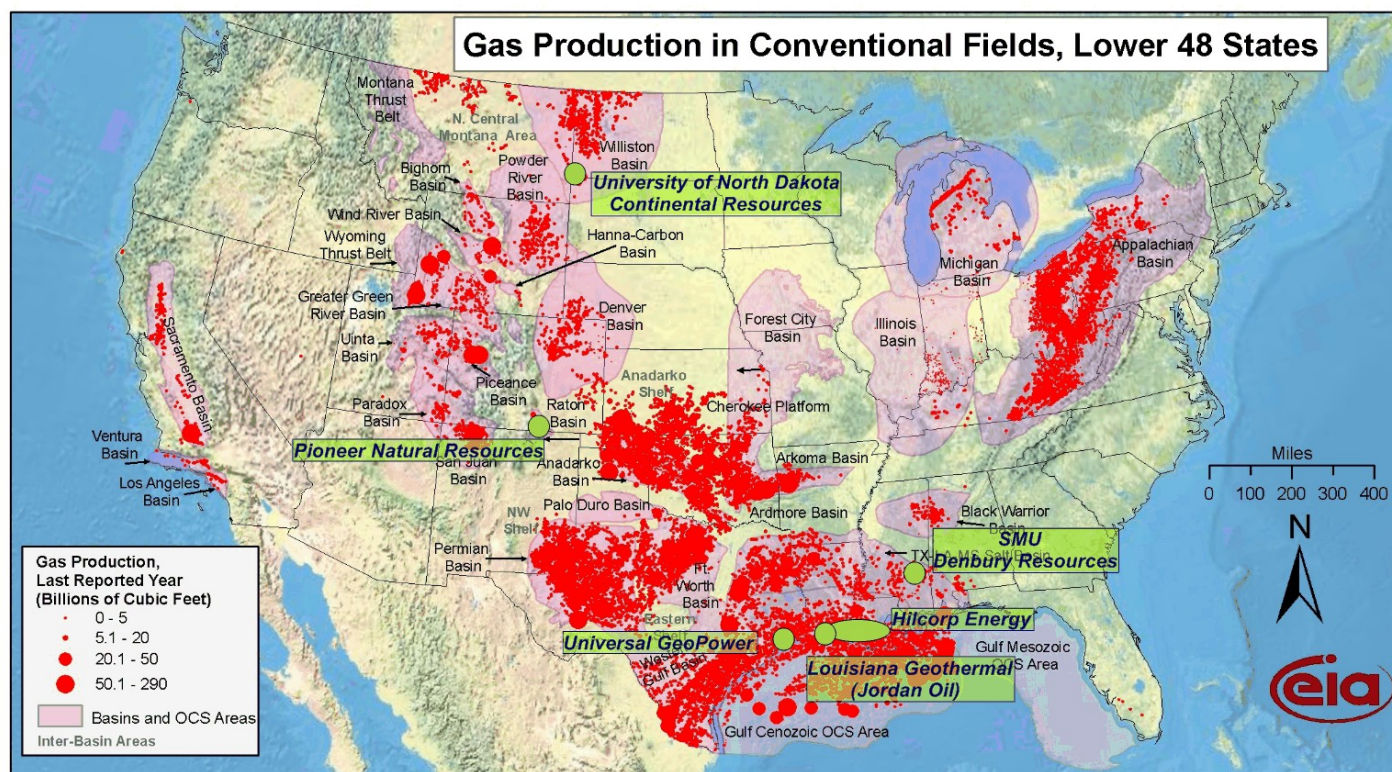
RSVP by noon Monday, February 14 : 432-683-1573 or email: <wtgs@wtgs.org>

Topic :

“Geothermal Energy Production Within the Oil-Patch: A Presentation of On-Going Activities”

Abstract:

In the last 2 years interest in developing geothermal energy beyond the traditional hydrothermal activity found in many western states has blossomed. In particular, several oil and gas companies and individuals with oil and gas expertise have acquired either government funding or private funding to investigate and develop geothermal energy in sedimentary basins within the United States. These sites stretch from the Williston Basin south to the Texas and Louisiana Gulf Coast. Geothermal energy is being developed at several sites as a coproduced fluid along with oil or gas as ways to cut operating expenses and use some of the hot water to generate electricity for on site usage. Others are working to develop geothermal production as a focused business plan for electricity sales to utility grids and



The figure above shows the general location of six ongoing projects that are working to develop geothermal energy in sedimentary basins. These sites include coproduced geothermal energy along with oil production, reentry into orphaned or plugged oil or gas wells for geothermal production, and sites being targeted for new drilling specifically for geothermal development.

to take advantage of other available incentives as a new energy cash flow. This presentation will provide a broad overview of ongoing activities involving geothermal development in the oil-patch along with selected research activities directed to enhancing geothermal development within sedimentary basins.

Speaker Bio

Ricard J. Erdlac, Jr. Ph.D., P.G.

Dr. Erdlac is an active geoscientist with 30 years of energy industry and academic related experience. He has worked in the oil and gas industry as a geoscientist, employing the techniques of exploration geophysics and geology as needed. Areas of oil and gas exploration activity include the Gulf of Mexico the entire Permian Basin, minus the Eastern Shelf, and the Tatum and Tucumcari Basins of New Mexico. He conducted economic risk analysis of prospects when employed by the Midland District Gulf E&P office. He has also been advocating and working to expand the future of geothermal energy production by promoting its development within sedimentary basins, using bypassed hot water from deep oil/gas wells as an energy resource either for on-sight use by the oil and gas industry or for electrical power production and dissemination into the electrical grid as a renewable energy resource.

Dr. Erdlac has conducted exploratory and regional energy investigations for a large number of majors and independents, as a direct employee or as a consultant. He has generated prospects and conducted regional tectonic analyses, developing both subsurface and surface geologic maps using available geologic and geophysical data. He has mentored and taught students when Chair of the nonprofit West Texas Earth Resources Institute and when employed through The University of Texas of the Permian Basin. He has written a number of grants for companies and received financial, data, and software support from federal and state agencies, private industry, and from foundations that total over \$13,000,000. He has managed federal and state grants for projects and supervised technical personnel on energy projects. Dr. Erdlac is an accomplished author and technical presenter to various sized groups and audiences including state and federal agency bodies, with over 100 publications and presentations. He has developed varying skill levels using different software platforms throughout his career. Dr. Erdlac has degrees in Physics and Geology, is a registered professional geologist in Texas and Pennsylvania, and is a member of a number of professional societies. Presently he is the Acting Chair and Industry VC of the EMD Geothermal Committee of the AAPG and Director, Energy Exploration, Calnetix, Inc.





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We're on the Web!
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**"And some run
up hill and down
dale, knapping
the chucky
stones to pieces
wi' hammers,
like so many
road makers
run daft. They
say it is to see
how the world
was made. "**

**Sir Walter Scott
St. Ronan's Well 1824**

PBS-SEPM is the Permian Basin Section of SEPM—the Society for Sedimentary Geology. However, you do not need to be a SEPM member or a geologist to join PBS-SEPM.

Our non-profit society relies upon the efforts of dedicated volunteers to serve the geological community—primarily through educational events. These events include monthly luncheon talks, core workshops, annual field trips, and special geological publications. Thanks to our Education Committee we are involved in MISD 5th grade geology presentations to interest elementary students in pursuing a career in geosciences. We would like to increase our exposure on college campuses—reaching out to future earth scientists through scholarships, discounted memberships, and offering full-time geology students the ability to participate in professional-grade field trips at little to no cost.

If you would like to join PBS-SEPM, you may visit our website (www.pbs-sepm.org) to learn more about us, discover how to get involved and download a membership form.

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West Texas Fence after a snow—photo by Mark Russell, Odessa TX

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PBS-SEPM Core Repository Location Project

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Now we need your help. What do you do when you need to find a core? Do you know of any repositories that aren't in the list below ? Do you know what your employer or other operators have done or plan to do with their core? Please contribute any such information to this effort by contacting the committee: David M. Orchard, Chair, david.m.orchard@conocophillips.com, 832-486-2314; Dr. Emily Stoudt, stoudt_e@utpb.edu, 432-552-2244; and Andrew Parker, andrew.parker@whiting.com, 432-686-6784 office.

The following lists of portals and core repository facilities represent our first compilation

PORTALS TO INFORMATION
<p>PTTC has a portal to the holdings of several public repositories. You can sort by repository and display their holdings in map view. http://inside.mines.edu/Research/PTTC/Core%20Locator/</p>
<p>AGI has a list of repositories of various geologic data, including cores. It provides contact information and accesses data through a map interface. http://www.agiweb.org/ngdrs/overview/datadirectory.html</p>
<p>Tony Troutman's website http://www.carbonates.us/cores.htm has a list of storage sites, including several state repositories.</p>
PUBLIC AND COMMERCIAL STORAGE FACILITIES
<p>The USGS has a storage facility in Denver that has Permian Basin material. Their collection can be searched online at http://geology.cr.usgs.gov/crc/. 303-202-4851.</p>
<p>The Bureau of Economic Geology (BEG) holds Permian Basin cores in their Midland, Houston, and Austin facilities. See http://www.beg.utexas.edu/facilities.php for information and contacts. Their catalog is called IGOR which has a link on above address. IGOR will be replaced soon by a more advanced database.</p>
<p>New Mexico Bureau of Geology and Mineral Resources has Permian Basin cores in Socorro. Request a list of the collection at http://geoinfo.nmt.edu/libraries/subsurface/home.html</p>
<p>CEED (Center for Energy and Economic Diversification) at UT Permian Basin (http://ceed.utpb.edu/) has Texas and New Mexico cores. 432-552-2020.</p>
<p>The International Sample Library at Midland has cores and core chips. Their collection is not in a database and must be searched through index cards. 707 Connell St, Midland, TX , 79701. 432-682-2682.</p>