PBS-SEPM NEWSLETTER

October 2009

Highlights in this Newsletter

- Nov 3rd from 8:30—11:30 "Introduction to Seismic Fundamentals". A Continuing Education opportunity—
- Where is that Core! Help with the Permian Basin Core location project.

President's Column:

Fred Behnken

The only constant in geology is CHANGE. CHANGE is a constant, in our selves, our families, the market place, and the earth. As geoscientists, you and I understand that the earth and its climate are parts of a dynamic system, with interacting variables being summed to resulting in change, often disrupting perceived "equilibrium."

As scientists we know that the earth's climate is warming. I shake my head when I hear and read that since the earth is warming, human activity must be the controlling factor. We caused it so we can slow or stop global warming. Imagine such hubris.

Scientifically replicable research demonstrates significant global climate change throughout earth history, but especially within the last 2,300 years. From approximately 250 BCE to 600 ACE, termed the Roman Warm Period, global temperatures were 2 -3 degrees warmer than the warmest temperatures today. This warm period is noted for the dramatic expansion of the Roman Empire From 600-900 ACE, evidence shows global temperatures dropping, resulting in shorter, cooler growing seasons, poorly adapted crops and meager harvests, and longer winters. Written records document the climate changes and the resulting collapse of major cities during this time [Dark Ages, and the Plague]. From 900-1200 ACE, crop harvests reached epoch levels due to a warming climate with longer growing seasons. This is the Medieval Warm Period, coinciding with expansive European building—grand cathedrals and public works. Vikings colonized Greenland. Later in the 1300's. the colonies failed due to global cooling [Little Ice Age]. The Little Ice Age impacted human history from 1300 to approximately 1850. European colonists and the Puritans landed in New England during the coolest part of the Little Ice Age. Today we live in an overall warming period that started in the 1850's. Temperatures are warming from the Little Ice Age, but are still below the highs of the Roman and Medieval warm periods.

Global warming is happening, but it is part of a cyclic pattern of changing climate. We are not the prime causative agents of global warming; however, we can be better stewards. See "www.CO2science.org"

Mark Your Calendars!

October

- **9-11: WTGS Fall Field Trip** – Pennsylvanian Section of North - Central Texas
- **20: PBS-SEPM Luncheon Mtg:** George B. Asquith, Ph.D. Title "Well Logs and Log Interpretation" Texas Tech University.
- **28 - 30: WTGS Fall Symposium** - Midland Center.

November

- **3: PBS-SEPM Continuing Ed Opportunity**-8:30-11:30 am, Introduction to Seismic Fundamentals. Midland Cntr
- **10: WTGS Luncheon:** Speaker TBA
- **17**: **PBS-SEPM Luncheon** Robert Trentham, Phantom Discoveries and Completions Associated with Residual Oil Zones CEED, UTPB.

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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!

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PBS-SEPM Luncheon Talk: October 20

TITLE: Well Logs and Log Interpretations

SPEAKERS: Dr. George B. Asquith, Texas Tech University, Lubbock

ABSTRACT: The talk is designed to illustrate the importance of knowing the rock and pore type of a zone when doing log analysis. Two examples of Pennsylvanian ooid grainstones reservoirs one from the Oklahoma Panhandle and the other from southeast New Mexico used in the log analysis.

The Pennsylvanian Virgilian ooid grainstone from the Oklahoma Panhandle using conventional log analysis appears to be a straight forward example of a thick (33') ooid reservoir with a thin oil column (10'; Sw = 16% - 26%) above water (Sw = 100%). This interpretation is based on the assumption that the entire 33 feet is an ooid grainstone with intergranular porosity. A more detailed log analysis reveals that the lower 23 feet does have intergranular porosity, however the upper 10 feet is oomoldic and WET. The sample description from the mud log is as follows: Ooid grainstone with abundant oomoldic porosity decreasing oomoldic porosity with depth. No shows of oil or gas NO fluorescence or cut.
The water saturations calculated in the upper 10 feet are wrong because the assumption of the pore type was incorrect.

The second example is a Pennsylvanian Canyon ooid grainstone from southeast New Mexico. In this example there are two wells one which had a water-free completion [918mcfgpd + 3bopd NO WATER] and the other well IP'D WATER No shows of oil or gas. Like our first example the pore type in the well that IP'D WATER was assumed to be intergranular when the Canyon is oomoldic. During the presentation all the method used in the log analysis of these two examples will be outlined in detail.

BIO: George B. Asquith, Ph. D

George B. Asquith is the former Pevehouse Chair of Petroleum Geology and Emeritus Professor of Geosciences and Center for Applied Petrophysical and Reservoir Studies Director at Texas Tech University. He received his B.S. in geology from Texas Tech and his M.S. and Ph.D. from the University of Wisconsin-Madison. His 25 years of petroleum industry experience include work as research geologist, Atlantic-Richfield Co.; staff geologist, ALPAR Resources; chief geologist, Search Drilling Co.; district geologist, Pioneer Production Corp.; and project leader, Mesa Limited Partnership. His industry projects have included the determination of the reservoir architecture and remaining gas reserves in the Hugoton and West Panhandle fields and exploration and reservoir characterization of selected reservoirs from the Gulf Coast (onshore and offshore), Permian, Alberta, San Juan, Williston, Arkoma, Cooper (Australia), Neiva (Colombia), Maracaibo (Venezuela), and Anadarko basins. He has authored 123 publications including 5 books in the fields of petrophysics, computer geology, and carbonate and clastic sedimentation and petrology. His book, *Basic Well Log Analysis for Geologists* won the AAPG best book award in 1984 and is the top selling book in the history of AAPG. During 1991-1992, *Log Evaluation of Shaly Sandstones: A Practical Guide* was one of the top 3 selling AAPG publications. His numerous awards include the Distinguished Service and Best Paper Awards from the Society of Professional Well Log Analysts (1994); Leverson Award for best paper at the AAPG Southwest Section meeting (1996); AAPG Distinguished Educator Award (1997); Educator of the Year Award presented by the AAPG Southwest Section (1999); West Texas Geological Society Distinguished Service Award (1999); and the Monroe Cheney Science Award from the Southwest Section of AAPG and Dallas Geological Society (2001).

"Life is ambiguous; there are many right answers—all depending on what you are looking for. But if you think there is only one answer, you will stop when you find one."

Roger von Oech

A Whack on the Side of the Head

(March 2002)

PBS-SEPM Continuing Education Opportunity—

Registration Form

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2009 PBS-SEPM Continuing Education

Introduction to Seismic Fundamentals

Midland Center, Midland TX
November 3, 2009—8:30—11:30 am

"Introduction to Seismic Fundamentals" facilitated by Jay May will provide a basis for understanding and using seismic data for the non geophysicist. The course begins with an introduction into seismic data acquisition, processing and interpretation and progresses into a hands—on—example demonstrating consequences of seismic resolution using the relationship of frequency and velocity measurement, tying of seismic data with sonic-log derived synthetics and implications of polarity and signal to noise to prospect development.

The goal is to provide the participant with simple tools to quickly get a handle on seismic data and recognize its potential and limitations. Attendees need to bring a calculator and a pencil with an eraser. **Enrollment is limited to 30-35 attendees so register now.**

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PBS-SEPM Luncheon Talk: November 17th

TITLE: Topic: Evaluation of the Economic Potential of Residual Oil Zones {ROZ} Beneath Mature Fields, West Texas.

SPEAKERS: Bob Trentham, Ph.D., Director, Center for Energy and Economic Diversification, UTPB

ABSTRACT:

The first basin wide study of Residual Oil Zones (ROZ's) in the upper Guadalupian carbonates of the Permian Basin, supported by the Research Partnership to Secure Energy for America (RPSEA), has been initiated. Production from ROZ's and anecdotal evidence from exploration wells, coupled with the theory/model of the development of ROZ's, has led to the belief that there are potentially billions of barrels of additional producible tertiary reserves in the Permian Basin and elsewhere. ROZ's have historically been interpreted as being long Transition Zones. Although the upper portions of TZ's/ ROZ's have long been assumed to contribute to production in some fields, until recently, their potential as a CO2 recovery target was not exploited.

ROZ's appear to be common in Leonardian and Guadalupian carbonates on the Central Basin Platform and Northwest Shelf. Exploitation of thick ROZ's associated with many of the major San Andres fields has begun with CO2 projects underway at Wasson, Seminole, Vacuum, Means, Goldsmith, and Hanford Fields, with others planned. Development wells scheduled to test deeper horizons, have often been drilled through zones with good shows in samples, porosity and oil saturation in core, and where the zones are expected to be oil productive based on log calculations. These wells have a poor record of successful completions. However, in many fields, these tantalizing results suggest that there are well bores available to test the tertiary recovery potential of ROZ's.

The anecdotal evidence from a growing number of exploration wells documents examples of what can be interpreted as ROZ's. Often, the wells were plugged and considered unsuccessful as there was no associated primary production to develop. From discussions with a number of explorationists and review and reinterpretation of research articles on Permian Basin fields, a set of common ROZ characteristics is developing: The presence of sulfur crystals in the carbonates; Enhanced porosity developed as the result of meteoric dissolution of sulfates; Sample shows of oil and/or gas; Sulfur water produced on DST's or attempted production tests; Core with 20-40% oil saturation; Log calculations that suggest producible hydrocarbons; Tilted oil/water contacts in fields; Multiple stages of dolomitization, at least one of which is associated with the meteoric flushing; Tight updip facies with poor production associated with porous down dip facies that are swept.

The tectonically associated meteoric flushing which is responsible for the development of the Residual Oil Zones occurred beginning ~60 MMY ago, during the Laramide Orogeny, and continuing through the Basin and Range Uplift. The recharge areas and entry points for the meteoric water were the large uplifted areas between the Rio Grande Rift and the easternmost outcrops of Leonardian and Guadalupian carbonates in the Guadalupe and Sacramento Mountains. The large sulfur deposits in

"A discovery is said to be an accident meeting a prepared mind."

Albert Szent-Gyorgyi

1937 Nobel Prize for Medicine

BIO: Bob Trentham, Ph.D.

Dr. Bob Trentham is the Director of the Center for Energy and Economic Diversification (CEED), and a Senior Lecturer in the Geology at the University of Texas of the Permian Basin UTPB. He received his BS and MA in Geology from the CCNY and his DGS in Geology from UT El Paso. He has been a geologist in the Permian Basin for over 29 years: working for Gulf Oil, Chevron Corp., and as a consultant for a number of companies. He has worked a variety of both carbonate and clastic reservoirs and responsible for both new field and new pool discoveries.

He is Co-Principal Investigator on the RPSEA Commercial Exploitation and Origin of ROZ's project, and the DOE Modular Training for Student in Industry Standard CO2 & EOR Methodologies He is also working on the DOE sponsored Carbon Capture and Storage Regional Technology Transfer and Training project. He also serves as an instructor on team-taught industry CO2 and Waterflood classes, and worked on brine aquifer sequestration for the Permian Basin FutureGen Task Force.

Bob is a member of WTGS, PBS-SEPM, AAPG, SEPM, GSA and NSS. He is on the board of the CO2 Annual Flooding Conference and is Chairman-Elect of APTA, and on the Midland City Water Resources Committee. He is past President of the WTGS, PBS-SEPM, and the Midland Energy Library. He has written or co-authored over 50 papers and presentations.

PBS-SEPM Core Repository Location Project

We Need Your Assistance !

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
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/
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
Tony Troutman's website http://www.carbonates.us/cores.htm has a list of storage sites, including several state repositories.
PUBLIC AND COMMERCIAL STORAGE FACILITIES
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.
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.
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
CEED (Center for Energy and Economic Diversification) at **UT Permian Basin** (http://ceed.utpb.edu/) has Texas and New Mexico cores. 432-552-2020.
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.

PBS-SEPM Digital Publication Project

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We're on the Web!
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" We usually find oil in new places with new ideas. When we go to a new area, we can find oil with an old idea. Sometimes, also, we find oil in an old place with a new idea, but we seldom find much oil in an old place with an old idea."

Parke Dickey, 1958, in Dickey, 2002, p. 36.

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

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