



# SPWLA

## —Houston Chapter News

### October 2008 LUNCHEON MEETINGS

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#### **Westside**

BP Plaza  
Wednesday, Oct 8

Residual Hydrocarbons - An E & P Impact Overview

by Paul A. Connolly

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#### **Northside**

Halliburton  
Wednesday, Oct 29

Petrophysical Methods for Characterizing and Predicting  
Reservoir Performance in Deepwater Siliciclastic Environments

by Brian E. O'Neill

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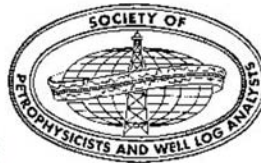
#### **Downtown**

Hess Office  
Wednesday, Oct 22

Integration of Log, Downhole Testing and Core Data to  
Optimize Stimulation Design in Gas Shales

by Rick Lewis

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October 2008

Just as everyone now is recovering from the effects of Hurricane Ike I would like to remind you of a few happenings with the SPWLA for the month of October.

Our Chapter will be hosting the Second Annual Houston SPWLA Golf Tournament on Friday October 19 at the Jersey Meadow Golf Club in Jersey Village. This will be a good afternoon to get out of the office, network with your colleagues, and enjoy some golf. Registration begins at noon with tee-off at 1 pm. Cost for all participants is \$50. Please contact Jose Silva ([westvp@spwla-houston.org](mailto:westvp@spwla-houston.org)) for your reservation.

We will also be holding our usual series of luncheon talks during the month of October, so grab your colleagues and head over to your nearest location. Meeting rooms have been packed at all three locations and we are continually happy to bring you high quality speakers and talks. Please note that the Northside meeting will held on October 29 instead of the 3rd Wednesday of the month due to a scheduling problem.

Looking forward a few months, the Annual Software Show at the OMNI Hotel is scheduled for Wednesday December 10th from 10 am to 2 pm.

**Joe Comisky**  
**Houston Chapter President**



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## Westside Luncheon Meeting

*Residual Hydrocarbons - An E & P Impact Overview*

*by*

*Paul A. Connolly*

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Date:	Wednesday Oct 8	Place:	BP Plaza Conference room next to the Cafeteria. Westlake 4 200 Westlake Park Blvd.	Reservations:	Email: jose.silva@techsia.com
Time	Lunch: 11:30 am Talk: 12:00 Noon	Price:	Purchase lunch in cafeteria and bring to adjacent conference room.	Parking	BP Plaza Garage
Special Instructions	Everyone MUST sign in AND out at the Lobby Security desk! After receiving security badge, get your lunch and come to the 3rd floor. Follow the SPWLA signs to the conference room.				

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### Abstract

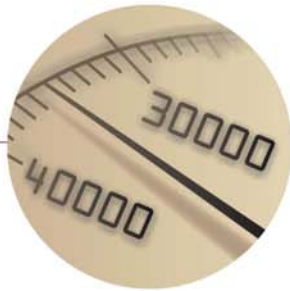
Residual hydrocarbons are those left in a reservoir in the aftermath of a natural or production-induced imbibition process which has reduced the hydrocarbon saturation to levels well below those initially present in the original accumulation. For dominantly water-wet systems, they are generally immobile under primary production, but have often been the targets for tertiary EOR projects, having been left behind in the swept portions of waterflood projects. Identification of hydrocarbons as residuals in exploratory ventures can be key to avoiding costly mistakes - running pipe on dry holes, conducting production tests of non-producible zones, and drilling seismic "bright spots" caused by residual gas saturation ("fizz gas") in breached traps, etc. Rudimentary evaluation techniques for identifying residuals will be shown, and laboratory rock property measurements useful in understanding the expected saturation level of residual hydrocarbons in a given rock will be discussed. Finally, examples illustrating the exploration and production impact of proper identification and characterization of residual hydrocarbons will be shown.

### Biography

**Paul Connolly** is the Chief Petrophysicist for EOG Resources, Inc. He graduated from Michigan Technological University in 1976 with a BS degree in Applied Physics, and joined Shell Oil Company that year as a Petrophysical Engineer working the Michigan Niagaran Reef trend. From 1976-1983, he held various Petrophysical Engineering assignments in Shell's Mid-Continent Division covering the Michigan, Permian, Delaware, Anadarko, Ardmore, and Arkoma basins. From 1983-1994, Paul held various Petrophysical Engineering supervisory positions in the Shell Companies, including Division Petrophysical Engineer for areas of California and the Gulf of Mexico, Research Manager, and Technical Manager in Pecten International Company. After nearly 19 years with Shell Companies, Paul joined EOG Resources as a Petrophysical Specialist in 1994, working new venture evaluation and the Trinidad and India international projects, and was moved into his current position in 1995.

**Highest pressure:**

30,440 psi (210 MPa)  
LWD world record  
Gulf of Mexico, 2006



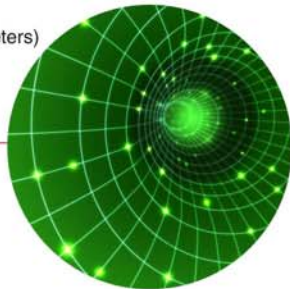
**Highest temperature:**

379°F (193°C)  
LWD world record  
North Sea, 2005



**Highest dogleg:**

61° per 100 feet (33 meters)  
LWD world record  
Middle East, 2007



**Deepest offshore:**

34,189 feet (10,421 meters)  
Including deepest  
LWD data transmission  
Gulf of Mexico, 2005



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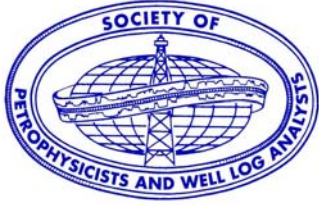
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## Northside Luncheon Meeting

*Petrophysical Methods for Characterizing and Predicting Reservoir Performance in Deepwater Siliciclastic Environments*

by

*Brian E. O'Neill*

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Date:	Wednesday Oct 29	Place:	Halliburton Patio Cafe, Bldg D 3000 N. Sam Houston Pkwy East	Reservations	none required
Time	Lunch: 11:30 am Talk: 12:00 Noon	Price:	Select food and pay (typically \$3-6)	Parking	Enter Halliburton, proceed to the "T" just past Bldg A, turn right to park.

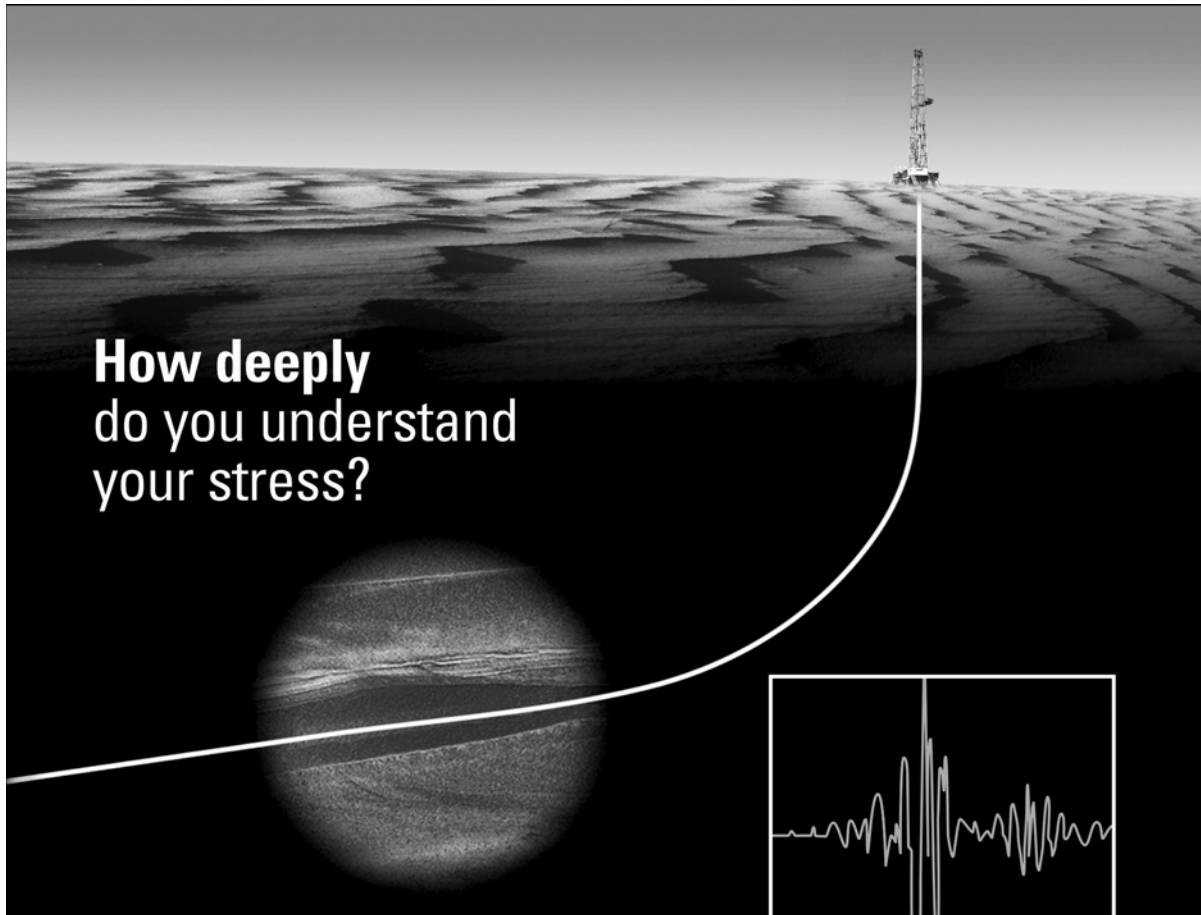
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### Abstract

Three of the major responsibilities of a petrophysicist in evaluating a given deepwater reservoir are to provide a realistic estimate of hydrocarbon reserve volumes, characterize reservoir performance, and provide key petrophysical input parameters used in reservoir modeling. Our ability to quantify permeability plays a key role in all three endeavors, particularly for predicting reservoir performance. Technologic advances in recent years have provided additional means for characterizing permeability; however, it is often challenging to maintain a consistent methodology for quantifying permeability from one project to another. Some of the more common techniques for permeability quantification are reviewed here. The primary purpose of this presentation is to share a unique workflow that assures a more direct linkage between petrophysical evaluation and reservoir performance. When applied in a consistent fashion, this workflow provides a more profound understanding of reservoir performance than offered by conventional techniques.

### Biography

**Brian E. O'Neil** - After completing his Masters Degree in Geology at The Ohio State University in 1985, Brian joined Core Laboratories as a Petrologist and later Manager of their Reservoir Geology Group. In 1991 he accepted a petrophysicist position with Texaco in New Orleans, within their Gulf Of Mexico Geotechnology Services Group. After serving as the Supervisor of Reservoir Engineering and Geology, he transferred to Texaco's International Exploration to perform petrophysical studies for their deepwater exploration teams. After the Texaco merger with Chevron (2001) he served as the Team Leader of Formation Evaluation Services. Brian joined Anadarko Petroleum in 2002 to work as a petrophysicist for their deepwater exploration and development teams, specializing in such areas as seismic amplitude evaluation, core analysis, depositional facies analysis, pore pressure, reservoir performance prediction, rock mechanics, and well log evaluation.



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## Downtown Luncheon Meeting

*Integration of Log, Downhole Testing and Core Data to Optimize Stimulation Design in Gas Shales*

*by*

*Rick Lewis*

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Date:	Wednesday Oct 22	Place:	Hess Office One Allen Center 500 Dallas Street	Reservations:	Make reservations as early as possible. Call 713-609-5960 and leave a message for SPWLA Reservations or email at Kkemp@hess.com
Time	Lunch: 11:30 am Talk: 12:00 Noon	Price:	\$15 with reservation	Parking:	Regency Parking at 1100 Smith Allen Center Visitor Garage Various outdoor lots
Special Instructions:	One Allen Center is at the corner of Smith and Dallas. The Hess lobby is on the second level adjacent to the Smith Street entrance. You will need to check in through Security. Please arrive prior to 11:30 am to allow time to check in and get to the meeting room. There are numerous parking places in the area, a few of which are listed above.				

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### Abstract

Hydraulic fracture containment is a critical factor in gas shale plays because a poorly contained hydraulic fracture can provide a pathway to an aquifer that can kill the well; conversely, internal stress boundaries within a gas shale may limit well performance.

Fracture containment estimations use sonic and density logs to calculate Poisson's Ratio (PR), Young's Modulus (YME) and, ultimately, the minimum horizontal stress ( $\sigma_h$ ). In the typical situation, where a vertical borehole intersects horizontal bedding, a conventional sonic log estimates mechanical properties only in the vertical dimension perpendicular to bedding. Shales, particularly organic-rich ones, are typically highly laminated. The presence of these laminae creates a rock fabric that may lead to differences in the sonic and mechanical properties parallel and perpendicular to them.

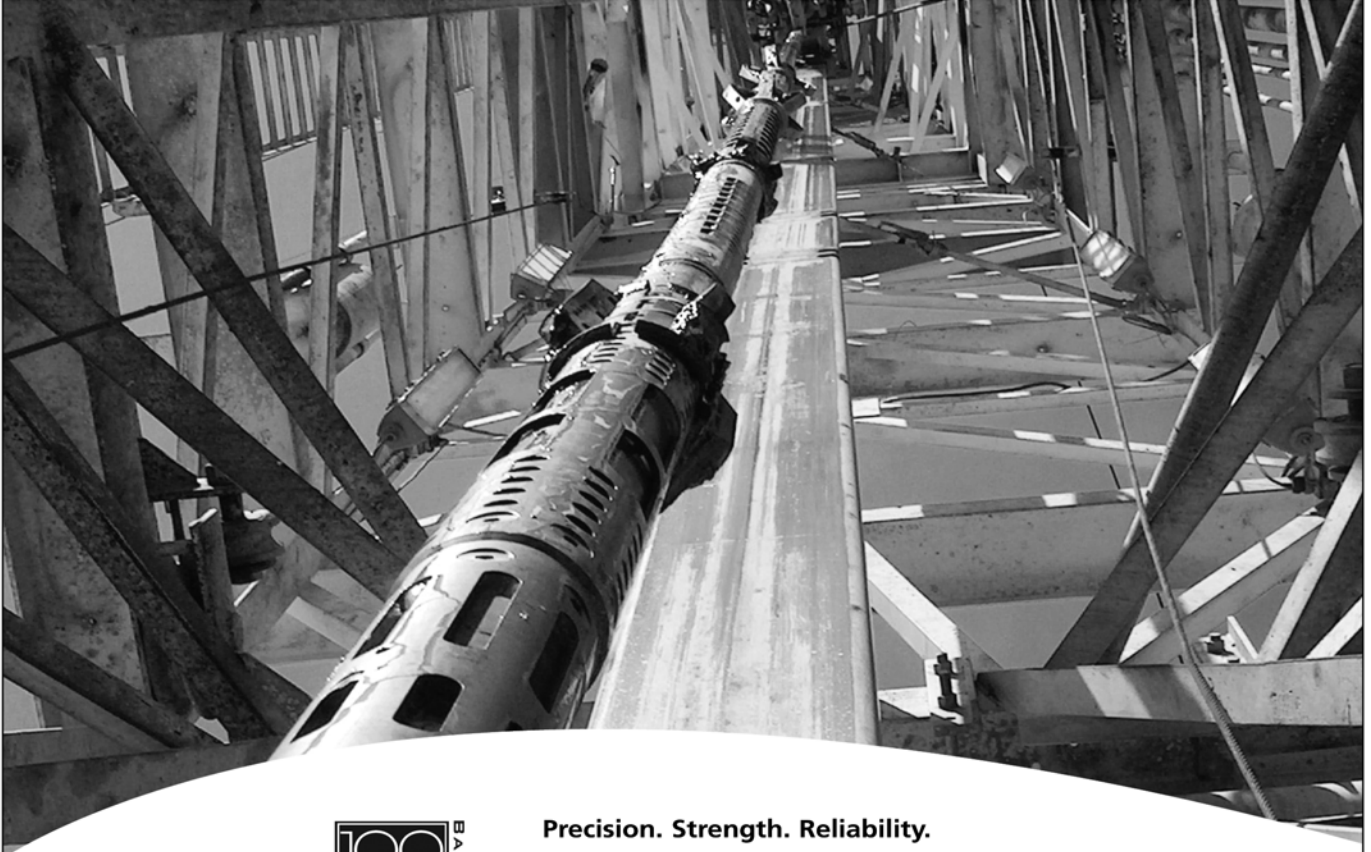
Application of an advanced sonic logging tool permits the calculation of shear slowness in three dimensions, including parallel to horizontal laminae. These results are used to calculate a Laminated Stress Profile (LSP) that includes PR and YME, both parallel and perpendicular to the laminae, and a  $\sigma_h$  that accounts for anisotropy. Calibration to core data is an essential ingredient for accurate calculations. The LSP  $\sigma_h$  is significantly different from that calculated using conventional methods in gas shale reservoirs, and it has been confirmed in multiple wells with stress measurements made by wireline testing

### Biography

**Rick Lewis**- Technical Projects Leader for Schlumberger Oilfield Services in Oklahoma City. Rick is responsible for wireline interpretation development for the the central and eastern United States. Most of his activities focus on the evaluation of unconventional reservoirs that include gas shale, coal bed methane, and immature clastic formations. Prior to his transfer to Oklahoma City, Rick led a group that applied oilfield logging technologies to non-conventional markets that included ground water, mining, environmental, and nuclear repositories. 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.



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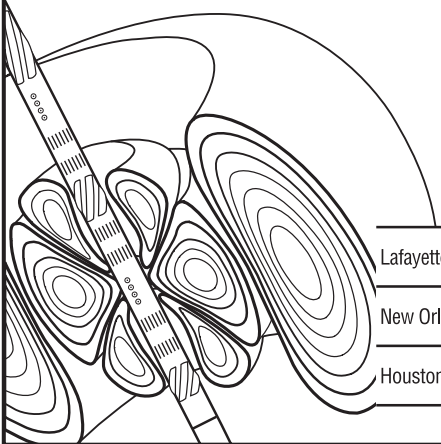
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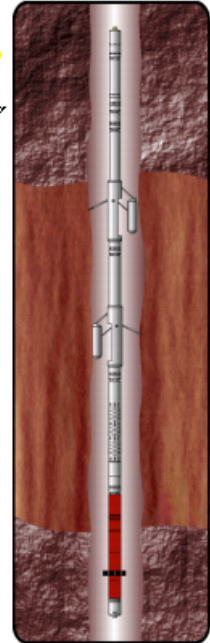
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## SPWLA Houston Chapter News - October 2008

### The Resistivity Modeling Special Interest Group of the Log Characterization Consortium

The **Resistivity Modeling Special Interest Group** was one of the first SIGs to be established under the auspices of the **Logs Characterization Consortium**, an independent, member-run, not-for-profit organization that allows representatives from different organizations to come together in *ad hoc* groups to discuss technical issues without legal concerns regarding collusion.

Please note that, due to damage inflicted by Hurricane Ike, there has been a change of venue for the next Resistivity Modeling SIG meeting.

- The next meeting of the **Resistivity Modeling SIG** is on Tuesday, October 21, 2008
- **Hilton Houston North (formerly Wyndham Greenspoint), 12400 Greenspoint Drive, Houston, Texas 77060**
- Room, Breakfast & Lunch are provided courtesy of Halliburton
- The agenda will be distributed by email, prior to the meeting. Please submit your presentations for the meeting!

If you are interested in attending, but do not normally receive eMails from the SIG, please contact one of the Co-chairs: Peter Day (PDay@MarathonOil.com) or Abbas Merchant (Abbas.Merchant@BakerHughes.com) so that you receive an invitation. A link to the SIG can be found on the SPWLA website, and will contain pertinent information.

An introduction to the role played by the **Resistivity Modeling SIG**, provided below, is based on material from W. David Kennedy, Baker Hughes INTEQ, to whom we are, as always, deeply indebted.

Resistivity logging using focused laterolog and induction tools started to replace unfocused normal and lateral tools in the early 1950s. One attractive feature of these technologies was the apparent ease of estimating *R<sub>TRUE</sub>* when compared to the prior devices. In 1957, Martin, Tixier, and Dumanoir<sup>1</sup> claimed, with some caveats, that *R<sub>APPARENT</sub>* from induction logs in the Gulf of Mexico "can be used without correction" for *R<sub>TRUE</sub>*. Those working in low-resistivity pay and thin beds had reason to doubt this statement, but had no means to engage in quantitative discussion.

Resistivity logging instruments were, and still are, under-characterized because of the difficulty in studying their responses. However, thanks to Moore's Law, by the late '70s it was possible to numerically model non-trivial scenarios: service companies and many oil company research labs began to include modeling of resistivity tool responses in their formation evaluation.

In the mid-1990s, two events gave rise to what became the **Resistivity Modeling SIG**: first was the commercialization of a graphical user interface for resistivity modeling developed by an oil company; second was the formation of the LCC. SIGs for LWD and the AIT were founded early on, and these had much in common with the **Resistivity Modeling SIG**; for characterizing LWD and AIT responses, modeling is really the only option. Once this was recognized, the LWD and AIT SIGs merged with the **Resistivity Modeling SIG**, which continues to address the spectrum of original interests.

The **Resistivity Modeling SIG** has met two, occasionally three, times per year since 1994. Members come from service and oil companies, consulting organizations and academia, and membership is open to all interested individuals. In addition to presentations given at each meeting, the SIG takes on special projects: Notable accomplishments are two compilations by L. C. Shen - *Comparison of modeling codes for resistivity and MWD instruments - Part 1, 1-D radial invasion<sup>2</sup> and Part 2, 1-D thin beds<sup>3</sup>* - as well as the compilation by Q. Zhou of an *Updated Survey of MWD Resistivity Tools<sup>4</sup>*.

The **Resistivity Modeling SIG** provides an informal setting for service providers and consumers to get together and share information. For users of logging services, difficult-to-interpret logs can be presented and discussed with experts in the industry. Service company scientists and engineers receive input from customers unfiltered by sales and marketing.

With the merging of companies, and the retirement of senior staff, the SIG meetings are a venue where we hope future industry petrophysical and tool design experts will come to meet and get to know one another. We especially welcome younger formation evaluation specialists to attend our meetings, as there is no better opportunity to expose oneself to current research and accumulated wisdom in the interpretation of data from wireline, LWD and surface-array or time-domain EM devices.

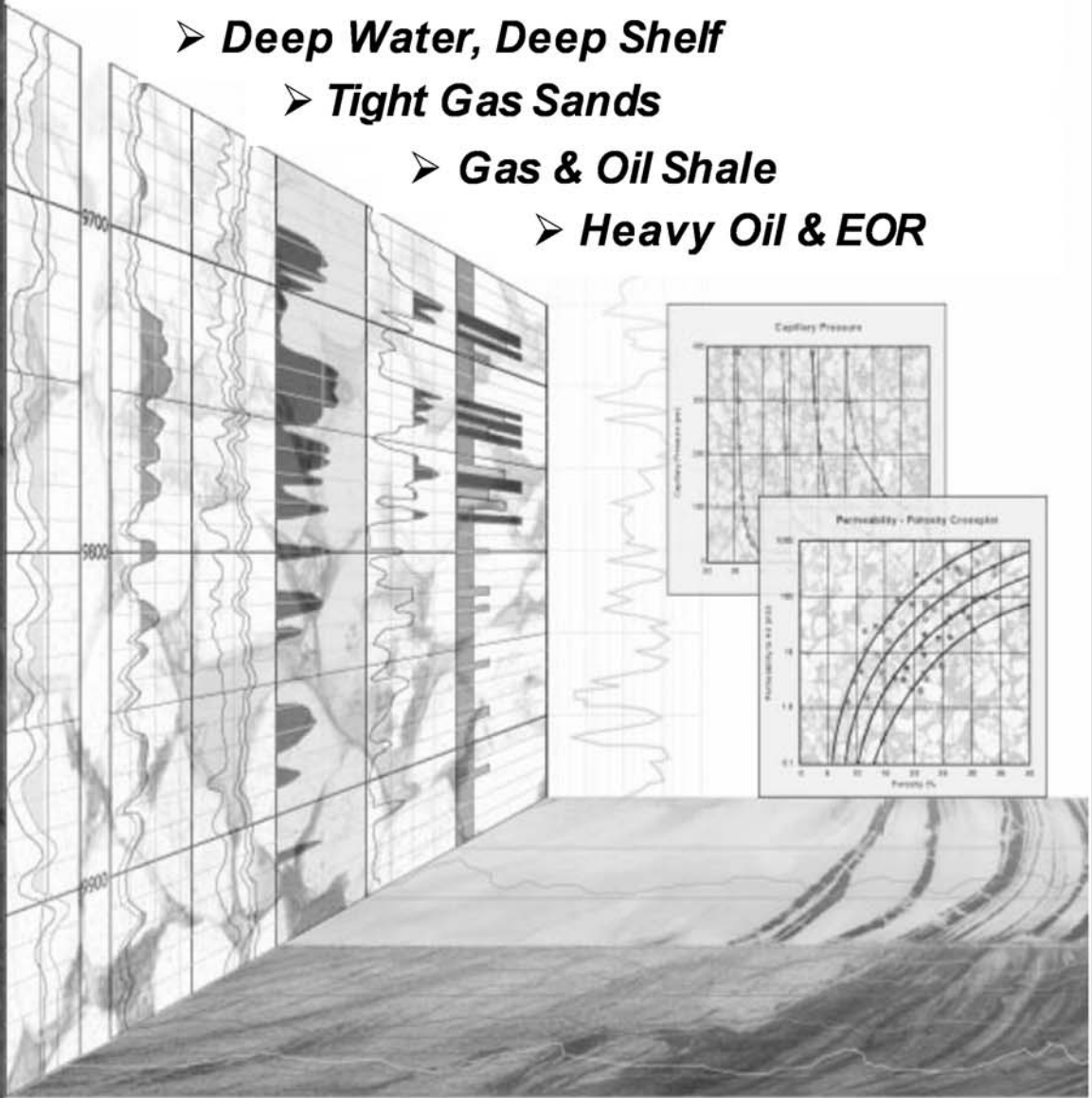
1. Petroleum Technology, IX 7, 1957
2. Petrophysics, 41 3, 2000
3. Petrophysics, 43 1, 2002
4. SIG Technical Note, 2004

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