SPWLA - Houston Chapter News
March 2011

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March 2011 Luncheon Meetings

Westside BP Plaza Terrace Room Wednesday, March 9, 2011	Deriving Formation Water Salinity in the Hydrocarbon Leg Using Cores and Logs *by Simon Clinch, Chevron*
Northside The Greenspoint Club **Monday**, March 7, 2011	Unlocking the Secrets for Viable and Sustainable Shale Gas Development *by Ed Tollefsen, Schlumberger*
Downtown Hess Office Wednesday, March 23, 2011	Pressure Prediction Challenges in the Bossier Shale, North Louisiana *By Brent Couzens-Schultz, Shell*

SPWLA Houston Chapter News and Upcoming Events

1st Formation Testing SIG Meeting
March 2, 2011 at Chevron Auditorium
1500 Louisiana, Houston, TX 77002
http://spwla-houston.org/pages/ftsig.htm

Images Source:
http://www.google.com/images?um=1&hl=en&biw=1445&bih=908&tbs=isch%3A1&sa=1&q=electric%2C+acoustic%2C+hydraulic+anisotropy&aq=f&aqi=&aql=f&oq=

For more information visit: http://www.spwla-houston.org/pages/events.htm

President's Corner

March 2011

Dear Chapter Members,

In February, all three SPWLA Houston meetings featured speakers with talks outside of mainstream "optimization of mature fields and improved technology for quantitative gas saturation analysis" subject areas. Westside had a talk on Production Petrophysics, Northside – on cased-hole formation evaluation, and Downtown meeting offered "Accelerated Development Model for Early Career Petrophysicists" - a presentation that attracted some unusual audience - HR personnel!

I would like to acknowledge all the effort our Technology VP's – Rob Hengel and Randy Mitchell – put into creating a diverse agenda for the luncheon meetings.

I would like to announce that 2011 SPWLA Houston Spring Topical Conference subject is "*Anisotropy: Electric, Acoustic, and Hydraulic and its applications*". We will start sending conference announcements shortly. If you have a good presentation on the given subject and would like to give a talk at the conference, please, send an abstract to president@spwla-houston.org

For more information about the luncheon seminars and any other Chapter's activities check our website http://www.spwla-houston.org/index.shtm

Best Regards,

Alexander Kostin
Interim Houston Chapter President

Westside Luncheon Meeting

Date: Wednesday, March 9, 2011 **Lunch:** 11:30 **Talk:** 12:00 **Place:** BP Plaza Terrace Room, 1st floor next to the cafeteria *501 Westlake Park Boulevard, Houston, TX 77079* **Map** **Parking:** BP Plaza Garage	Deriving Formation Water Salinity in the Hydrocarbon Leg Using Cores and Logs ***by Simon Clinch, Chevron*** **RSVP Alexander Kostin before 3:00 p.m. Tuesday, March 8** westvp@spwla-houston.org

Abstract

Water saturation in exploration, appraisal, and early development wells is usually computed from resistivity logs. The assumption that water properties in the aquifer are the same as those in the hydrocarbon leg needs to be proved, not assumed. The use of core and specialized logs can be used to obtain more representative formation water resistivity values, which will improve water saturation calculations in hydrocarbon bearing zones.

In aquifers, resistivity can be determined directly using two techniques; produced water samples or by centrifuging free water out of core cut with oil based mud. Aquifer water resistivity can also be indirectly estimated using Picket plots.

Obtaining formation water resistivity directly from the hydrocarbon bearing interval is not as simple. When conventional core is cut with oil-based mud (OBM), it is possible to estimate salinity directly. These techniques are not new but are often conducted incorrectly.

Core cut from a hydrocarbon leg with OBM can provide an estimate of the formation water salinity by extracting salts (Dean Stark crush and leach) or by expelling formation brine by ultra centrifuging the samples. Correctly calculating formation brine salinity from Dean Stark crush and leach protocol requires corrections for additional anion and cation produced by mineral dissolution and mineral reactions. If clays are present, then clay bound water corrections maybe required. Ultra centrifuging core samples may only produce a few drops of brine, particularly if core is high on structure and water saturations are at or near irreducible saturations. These few drops are sufficient to obtain ambient conditions measurement of water resistivity and complete chemical analyses if attention to sample handling and analysis protocol is strictly followed.

Some logging tools contain a signature of salinity, brine composition or brine volume in the reservoir. Tools that are covered in this talk are NMR antenna gain and neutron-gamma spectroscopy. Some of these measurements have a very shallow depth of investigation and can become very complicated when OBM invasion occurs. All tools have a borehole signature which must be removed before a formation signature can be derived.

Biography

Simon Clinch is a staff petrophysicist with Chevron. His current role is with exploration, appraisal and project in Chevron's Deepwater Gulf of Mexico business unit. Simon's primary areas of interest are: improving core analysis results, integrating core and log data, and extracting more information from the data already acquired. Previously, Simon worked for two independent oil companies, an independent consultancy company, and a core analysis company. Simon received an honours degree in Engineering from Adelaide University in 1990, and an MSc in Geology from the University of South Australia in 1995.

Northside Luncheon Meeting

Date: Monday, March 7, 2011
Lunch: 11:30 **Talk:** 12:00
Place: The Greenspoint Club
16925 Northcase Drive,
Houston, TX 77060

Unlocking the Secrets for Viable and Sustainable Shale Gas Development

by Ed Tollefsen, Schlumberger

RSVP Rob Hengel before 9:00 a.m. Monday, March 7
northvp@spwla-houston.org

Cost: $30 (with reservations)*. You can pay in advance using PayPal
Cash, Check or Credit Card is acceptable for payment. Receipts will be provided.
*This is a fixed meal package including Chef's choice of salad, chicken entrée served with vegetable and starch, dinner rolls, dessert, iced tea, and coffee. The salads, desserts and beverages will be pre-set menu.

Directions:
From I-45, go East on Greens Rd. Turn right at 3rd light, onto Northchase Drive. The Greenspoint club is 1/4 mile on the right.
From Beltway 8 (going West), Exit Imperial Valley and turn right. Turn left at first light onto Benmar. Stay on Benmar to Northchase. Turn right onto Northchase Drive. The Greenspoint club is on the left.
From Beltway 8 (going East), Exit and turn left on Greenspoint Drive. Go right at first light onto Benmar. Turn left at next light onto Northchase Drive. The Greenspoint club is on the left.
Parking: Ground, 4th and 5th Levels. To access the 4th & 5th levels, pull up to the contract parking gates. There is a call box on the left-hand side. Press the button, release and gates will open. Follow park signs to the 4th and 5th level. The Greenspoint Club is located on the 5th Floor.

Abstract

In shale plays where horizontal wells are often required achieve profitable drilling, a common industry practice is to start evaluation of the prospect by drilling verticals or low-angle well and performing extensive wireline. These wellbores will either be stimulated to test production or converted to a horizontal well via sidetracking. Interpretation of logging data from this vertical well is used to describe the local reservoir and determine horizontal well placement objectives, thereby avoiding the cost of horizontal wireline conveyance, additional rig time, and technical difficulties. The horizontal wells are commonly steered using simple gamma-ray measurements correlated with the vertical pilot wells. Detailed examination has revealed that steering results for such horizontal wells, using averaged gamma ray correlation technique and subsequent structural modeling, yield non-unique solutions. This may result in less than optimum reservoir exposure over the drilled interval. With the integration of Logging While Drilling (LWD) technology into the Bottom Hole Assembly (BHA), real-time formation evaluation measurements provide key information for detailed rock property assessment across the target structure, consistent with pilot or offset well evaluation methods, and facilitate accurate well placement. Additionally, real-time and pseudo real-time LWD measurements have been successfully used for hazard avoidance, enhanced penetration rates to reduce drilling time, and completion design optimization. While the LWD method offers some appreciation for the inconsistent rock quality and variable production results across wells, it also provides conclusive insight into the reservoir-production relationship. Understanding of this relationship provides for target refinement within the reservoir column and an optimized completion for an overall increase in reserve recovery.

This paper investigates the use of gamma-ray measurements only for evaluation and geosteering, and then details the geosteering application using more robust formation evaluation and the subsequent completion optimization. Results are verified using micro-seismic monitoring and production data within a shale gas play. In this manner, structural models, formation evaluation and completion designs are combined to form the technological foundation that can unlock the secrets for viable and sustainable shale gas development.

Biography

Ed Tollefsen is a New Technology Business Development Manager for Schlumberger Drilling and Measurements. His focus for the last 2 years has been on utilization of formation evaluation measurements in horizontal wells to reduce drilling costs and improve production. He joined Schlumberger in 1990 and has held various positions. His field experience was in wireline evaluation services, formation testing and sampling, and seismic services. During his time in wireline, he did much to increase pressure ratings on tools, improve borehole seismic capabilities and make Logging While Fishing a standard means of conveyance. After transitioning to D&M, Ed was reservoir and seismic domain champion & M/LWD Operations for D&M services in the Gulf of Mexico. During this time, he has worked to improve LWD tool pressure ratings, extend functionality of tools particularly the sonicVISION, and novel methods to solve client problems.

Downtown Luncheon Meeting

Date: Wednesday, March 23, 2011 **Lunch:** 11:30 **Talk:** 12:00 **Place:** Hess Conference Center Room 1B/1C. First level of Allen Center 1, near the entrance below the walkway between Allen Center 1 and Allen Center 2. *500 Dallas Street* *Houston, TX 77002* **Parking:** Regency Parking, Allen Center Visitor Garage, various outdoor lots	Pressure Prediction Challenges in the Bossier Shale, North Louisiana ***By Brent Couzens-Schultz, Shell*** *Kostia Azbel, Kirk Hansen, Jon Jincai Zhang, Brian Driskill, Lisa Ashabranner, Claudia Hackbarth* **RSVP Randy Mitchell before 3:00 p.m. Tuesday, March 22** ramitchell@hess.com

Abstract

Drilling for gas in the Upper Jurassic Haynesville shale in northwestern Louisiana and northeastern Texas presents many challenges, including depths greater than 10,000 ft and high subsurface pressures and temperatures. In the Bossier shale, above the Haynesville and beneath the Knowles Lime member of the Cotton Valley Group, the pore pressure gradient increases from mild overpressures to 15-18 ppg mud weight equivalent. The rate that pore pressure increases and the magnitude of that increase, appears variable across the play. Pressures "kicks" in the Bossier shale are common drilling events and are problematic as they can exceed fracture strength in the Knowles. Uncertainty in where these kicks may occur drives a conservative approach to set intermediate casing just beneath the Knowles. Pore pressure studies focused on understanding the causes and distribution of overpressure were undertaken to create predictive tools that could positively impact drilling and help exploration identify which leases to maintain or obtain.

The geologic environment is unfavorable for traditional pore pressure techniques and therefore a broad range of options had to be considered in order to create a predictive model. Determining the mechanisms responsible for pressure generation and retention in the Bossier/ Haynesville is a complex problem made more difficult due to gas effects on compressional velocity and bulk density measurements. Nevertheless, initial results imply that disequilibrium compaction played a small part in pressure generation while pore fluid expansion and unloading were much more important; presence or absence of coarser clastic material within or capping the Upper Bossier also strongly influences the present-day pressure distribution.

A multi-well calibration of log properties to pressure was constructed and used to constrain a large 3D model covering all or parts of 13 Texas counties and 10 Louisiana parishes. A basin model covering the same area was used to gauge the effects of Cretaceous and Tertiary uplift and erosion on pressure generation. Drilling mudweights, pressure kicks, minifrac test data, core tied to image log interpretations, isotope geochemistry, geomechanical parameters, stratigraphy, and paleogeography were all used to calibrate and constrain the 3D pore pressure model.

Biography

Brent Couzens-Schultz joined Shell in 1997 after completing a PhD in geology at Texas A&M University. He is a specialist in structural geology and worked on fault seal related research when he first joined Shell. More recently, he has worked on pore pressure and rock properties prediction problems for exploration. He is currently the focal point for the Global Pore Pressure Prediction Team (GP3T) at Shell.