



October 2013

LOS ANGELES BASIN GEOLOGICAL SOCIETY MEETING ANNOUNCEMENT

October 24th (Thursday) **Steve Grayson**, Sales Development Engineer
Schlumberger - Ventura

will speak on: Advanced Monterey Evaluation and Dielectric Mobility Quicklook

Abstract

The Miocene Monterey formation contains many productive wells throughout California. There have been naturally fractured Monterey wells offshore that have produced more than 10,000 BOPD. Diatomite wells in the San Joaquin valley are hydraulically fractured to recover the vast quantities of oil stored there. And today, the Monterey shale is of great interest as an unconventional reservoir. Evaluation techniques have been developed for each of these three types of Monterey reservoirs.

Naturally fractured reservoir evaluation took a great step forward when resistivity imaging logging was introduced. Identifying, orienting and quantifying fractures by an image analyst were enabled with this evaluation method. However there are some limitations. Fracture permeability is difficult to evaluate from images. And shattered or brecciated zones are difficult for the image analyst to accurately quantify. Recent improvements in Sonic techniques now allow for the quantitative use of Stoneley waves, to assess permeability in fracture intersections with the borehole. And the use of high resolution NMR measurements allows the quantification of fracture porosity in highly fractured breccias zones.

Evaluation of the hydrocarbon producing potential of the Monterey shale is complicated by the lithologic heterogeneity, coupled with variations in quartz phase, and the presence of kerogen. Accurate petrophysics requires a complex, multi-component model, with many inputs. Attempting to use a simple Archie

evaluation technique, results in optimistic saturation calculations in zones of limited production potential. The recent introduction of advanced Neutron spectroscopy using both elastic and inelastic capture modes which provide a measurement of total organic carbon (TOC), combined with high resolution NMR, and spectral gamma ray data, provides the inputs for an analysis that quantifies the kerogen content, enhances the quartz phase determination, and identifies producible oil zones.

A technique using dielectric measurements at four depths of investigation has shown application in heavy oil sandstone reservoirs, to show variations in oil mobility with a wellsite quicklook, from a multi frequency dielectric dispersion tool. This technique has also shown application in both light oil and heavy oil Diatomite reservoirs. The technique compares dielectric, water-filled porosities at different depths of investigation to a total porosity from density or density-neutron. In water zones, the curves overlay, but in oil zones, the curve separation is determined by the oil saturation and oil movement in the region from 1-4" into the reservoir. Another benefit is that oil saturation is determined without requiring knowledge of R_w water salinity.

Several factors contribute to the oil movement observed between 1 and 4 inches. Oil viscosity, permeability, mud properties, wettability, and mud pressure vs formation pressure all affect the mobility observed. Diatomite is typically characterized as high porosity but very low permeability, requiring hydraulic or steam fracturing to produce. But the dielectric mobility quicklook has illustrated zones of enhanced

mobility in light oil as well as heavy oil diatomite reservoirs. This technique has identified zones that have been steam fractured from nearby wells, zones with permeability enhancement, and has predicted superior production in a field where wells show an enhanced mobility response.

Speaker's Biography

Steve Grayson is a Principal Sales Development Engineer for Schlumberger in Ventura. He received a BSEE from Rensselaer Polytechnic Institute and started as a logging field engineer in Michigan in 1977. Since then, he has worked in the Appalachian Basin, Canada, Texas, and Wyoming, in various positions over the past 36 years. He has authored papers involving logging and interpretation techniques in thin bedded, heavy oil, and fractured reservoirs in Appalachia, Texas, and California.

Meeting Time, Place, Cost and Reservations

Time:

Thursday, Oct 24th, 2013

Typical Meeting Agenda

Lunch Served: 11:30 AM to 12:00PM
Announcements: 11:45 AM to 12:00 PM
Guest Speaker: 12:00 PM to 12:30PM
Questions/Close: 12:30 PM to 12:45 PM

Place:

The Grand at Willow Street Conference Center located at 4101 East Willow Street, Long Beach, CA. (562-426-0555). Take Lakewood Boulevard south from the San Diego Freeway (405), turn west onto Willow Street and turn right onto Grand Avenue at the sign for the Center. Park free in the garage structure.

Cost:

Lunch and Speaker: \$20.00 with reservations
\$25.00 without reservations
Student: \$5.00 (Lunch and Speaker)

Meeting Reservations:

Make your reservations using our web site at www.labgs.org, or by calling Graham Wilson (562)-326-5278, or emailing gwilson@shpi.net. Reservations must be made by 10:00 AM Tuesday morning prior to Thursday's meeting to receive discount price noted above. As always walk-ins are welcome.

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