SPWLA – Houston Chapter News

April, 2014

Luncheon Meetings

Northside **Mon, April 7, 2014** **The Greenspoint Club**	**A New Nuclear Logging Method to Locate Proppant Placement in Induced Fractures** By Harry D. Smith Jr. (Consultant)
Downtown **Wed, April 16, 2014** **Kinder Morgan**	**Major Advancement in Reservoir Fluid Analysis Achieved Using a New High Performance Nuclear Magnetic Resonance Lab System** By Dr. Robert Freedman (Schlumberger)
Westside **Wed, April 9, 2014** **BP Plaza Westlake 4**	**Practical Seismic Petrophysics: the Effective Use of Log Data for Seismic Analysis** By Tad Smith (Apache)

SPWLA Upcoming Events

Spring Topical Conference

"Petrophysics Meets Geophysics: A Multi-Disciplinary Approach to Reservoir Challenges"

Cohosted by the Geophysical Society of Houston
Chevron Auditorium, Downtown Houston, April 30th

55th Annual SPWLA Symposium

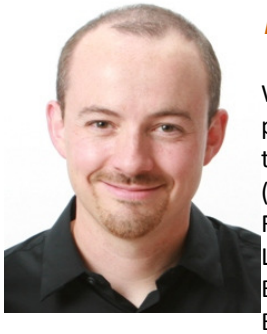
May 18th to 22nd
Abu Dhabi National Exhibition Center (ADNEC)

www.spwla2014.com

Complete Calendar of Events

President's Corner

April, 2014



Dear Chapter Members,

We are now approaching the end of our 2013/2014 Speaker Luncheons, with the last presentations taking place in early April. During March we, once again had three speaker sessions taking place at the usual locations around Houston. On the Westside Dave Amendt (ConocoPhillips) delivered a talk on "Mechanical Characterization in Unconvential Reservoirs; A Facies Based Methodology". On the Northside Songhua Chen (Haliburton) presented on "NMR Logging for Characterizing Unconventional Source-Rock Reservoirs" and Downtown we had Hani Elshahawi repeat his popular talk from February's Northside meeting on "Advanced Reservoir Evaluation Using Downhole Fluid Analysis and Asphaltene Flory-Huggins-Zuo Equation of State". Once again I would like to thank all those who attended these talks. During April we will have three more presentations before we break for the summer, returning to normal chapter activities in September. On the Westside, April's speaker will be Tad Smith (Apache) who will repeat his talk from February's downtown meeting on "Practical Seismic Petrophysics: The Effective use of Log Data for Seismic Analysis". On the Northside, Harry Smith (Carbo Ceramics) will deliver a talk on "A New Nuclear Logging Method to Locate Proppant Placement in Induced Fractures" and finally our Downtown speaker will be Dr Robert Freedman (Schlumberger) who will present on "Major Advancement in Reservoir Fluid Analysis Achieved Using a New High Performance Nuclear Magnetic Resonance Lab System". I look forward to seeing you there and would like to thank our 2013/2014 chapter VP's for their hard work in setting up and running the speaker session this year.

At the end of April we will be holding our Spring Topical Conference. As you may have seen from the announcements this year's topic will be "Geophysics Meets Petrophysics: A Multi-Disciplinary Approach to Solving Reservoir Challenges". This will take place on April 30th at the CVX Auditorium, downtown. Details on how to register for the conference are posted on the chapter website and we will be publishing the agenda and finalized speaker listings shortly. The aim of this year's conference is to highlight the ways that both Petrophysics and Geophysics can come together under the umbrella of Rock Physics. I encourage you to attend what will hopefully be an interesting and thought provoking conference. This year we are also opening attendance to members of the Geophysical Society of Houston and some of the GSH President will be in attendance to help answer any questions you may have in the society and its activities.

We are also holding a social event at the Top Golf facility in Katy, which is a first for the Houston chapter. This will take place on the evening on Friday May 2nd. Details are posted on the chapter website. I encourage you to purchase tickets for the event through our website in advance as we will not be able to accept walk ins on the day. Ticket prices include all golf games, full equipment rental, food, drink, fun and prizes. We would like to encourage members to bring their spouses/significant others so there is a discount offered for those purchasing two tickets. No previous experience is necessary and all equipment is provided so you don't have to bring anything.

There are sponsorship opportunities for both the STC and the Top Golf Social Event. Please contact me directly if you, or someone in your company, is interested in sponsoring one of these events. Finally the elections for the 2014/2015 chapter board will take place in April. The nominations are now closed and we will be sending out the election ballots soon. I would like to thank all of you for your support throughout the past year and it has been a pleasure serving as President of the chapter. Please join me in thanking all the members of the current board for their commitment to the Houston chapter and their work to ensure all the chapter events are a success. Finally…please vote for your new board!

Matt Blyth
Houston Chapter President
president@spwla-houston.org

Thank you to our sponsors!!!

ALLIED WIRELINE

HALLIBURTON

Weatherford®

Paradigm®
Deeper Insight into the Subsurface

CGG
Passion for Geoscience

Get more value from your data
Neuralog

Schlumberger

BAKER HUGHES

bp

ارامكو السعودية
Saudi Aramco

senergy

Chevron
Human Energy®

NMR Logging Course and Computing Lab

NMR Log Processing

There's still time to add *YOUR company* ad.

Northside Luncheon Meeting

Date: Monday, April 7th, 2014
Lunch: 11:30 Talk: 12:00
Reservations: Email Robin Slocombe
RSVP before NOON, Friday 4th April
Place: The Greenspoint Club,
16925 Northchase Drive, Houston, TX 77060
Parking: Visitor parking is available in the parking lot below the Greenspoint Club
Cost: $35 (please use PayPal)
Lunch is included.

A New Nuclear Logging Method to Locate Proppant Placement in Induced Fractures

Presenter: Harry D. Smith Jr. (Consultant)
Co-authors: Robert J. Duenckel and Xiaogang Han (CARBO Ceramics, Inc)

Abstract

Traditional proppant placement evaluation in hydraulically induced fractures utilizes detection of radioactive tracers such as iridium 192, scandium 46 and antimony 124, which are manufactured in nuclear reactors, and then shipped to the wellsite and pumped downhole with the frac slurry. Although this technique has proven useful, it involves environmental, safety, and regulatory concerns/issues. Recently a new technology has become available that offers a viable alternative to radioactive tracers, and with these concerns/issues eliminated. The new technology utilizes a non-radioactive ceramic proppant that contains a high thermal neutron capture compound (HTNCC). This high thermal neutron capture compound is inseparably incorporated into each ceramic proppant grain during manufacturing in sufficiently low concentration that it does not affect any proppant properties. The non-radioactive tracer proppant (NRT) taggant is detected using standard pulsed neutron capture tools (PNC) or compensated neutron tools (CNT), with detection based on the high thermal neutron absorptive properties and/or capture gamma ray spectral properties of the tagged proppant relative to other downhole constituents. The presence of proppant is indicated from: (1) decreases in after-frac PNC and/or CNT detector count rates relative to corresponding before-frac count rates, (2) increases in PNC formation and borehole component capture cross-sections (Σfm and Σbh), and/or (3) increases in the PNC derived elemental yield of the neutron-absorbing tag material, computed from the observed capture gamma ray energy spectra. In some applications, enhancements to these methods have also been developed to eliminate the requirement for the before-frac log. Monte Carlo modeling data and several field examples will be given in this presentation which demonstrates the viability of both the PNC and CNT non-radioactive tracer proppant detection technologies. NRT applications to gravel packing and frac packing will also be briefly discussed.

Biography

Harry D. Smith Jr. is sole proprietor of Harry D. Smith Consulting. Harry was employed in Halliburton R&D for 28 years, during the last seven of which he was the Director of HES Research. He worked in Texaco Logging Research for 10 years prior to joining Halliburton. Harry was selected as an SPE Distinguished Lecturer twice, and has three times been an SPWLA Distinguished Speaker. He has been president of the Houston SPWLA chapter and a member of the SPWLA Board of Directors. He is the first person in SPWLA to have received both the Distinguished Technical Achievement Award and the Gold Medal for Technical Achievement. Harry has had numerous SPWLA and SPE publications and has 90 issued US Patents, including three US Patents assigned to CARBO Ceramics dealing with the use of non-radioactive tagged proppant to locate induced fractures in downhole formations. He also holds basic patents in the fields of carbon/oxygen logging, pulsed neutron capture logging, density and neutron logging, and natural gamma ray and tracer spectroscopy logging.

Downtown Luncheon Meeting

Date: Wednesday, April 16th, 2014
Lunch: 11:30 Talk: 12:00
Reservations: Email Michael Ashby
RSVP before NOON, Friday April 14th
Place: We have changed location – Kinder Morgan – First Floor Conference Room
1001 Louisiana St Houston, TX 77002
Cost: $30 (includes lunch*) Please, use PayPal.

Major Advancement in Reservoir Fluid Analysis Achieved Using a New High Performance Nuclear Magnetic Resonance Lab System

Presenter*:* Dr. Robert Freedman, Schlumberger

Abstract

This talk will discuss recent advances in reservoir fluid characterization using Nuclear Magnetic Resonance (NMR). These advances were made possible by major breakthroughs in low-field NMR instrumentation for high pressure measurements on reservoir fluids and in the development of a new model-independent inversion method capable of predicting accurate fluid properties from NMR measurements.

We designed and built a revolutionary high-performance low-field NMR instrument capable of acquiring high quality NMR data on live reservoir fluids at the very high pressures and temperatures often encountered in worldwide oil reservoirs. The new system can rapidly acquire high quality NMR data on live oils at pressures and temperatures up to 25,000 psi and 175 C. The signal-to-noise ratio of 250 (for a single measurement on a water sample at room temperature) and the temperature and pressure specifications of the new system far exceed those of any known low-field NMR system in the world.

We also developed a new model-independent inversion method that can be used to predict accurate reservoir fluid properties from NMR measurements of relaxation times and diffusion. These breakthroughs in hardware and interpretation both exceed what was previously possible by a very wide margin. The new NMR system was installed at the Schlumberger DBR Reservoir Fluids Center in Edmonton, Canada. A database consisting of hundreds of NMR and reservoir fluid properties measurements on live oils was acquired. The NMR measurements were performed at multiple temperatures and pressures on a suite of 18 live oils whose properties are representative of those typically sampled by fluid sampling tools. The database was used to construct model-independent mapping functions using radial basis functions (RBF). The RBF mapping functions are used to predict accurate values of oil fluid properties such as viscosity, molecular composition, density, compressibility, GOR, SARA, and formation volume factor from NMR relaxation time and diffusion measurements.

The talk will discuss the conventional sensor design used in all commercial low-field NMR systems and show how our innovative design overcomes the limitations of these systems. I will also discuss the key concepts underlying the new model-independent inversion method for predicting accurate reservoir fluid properties from NMR measurements and explain why existing inversion methods are not accurate for complex systems such as crude oils. Plots of NMR relaxation times and diffusion measurements on live oils measured at multiple temperatures and pressures will be shown and discussed. The RBF mapping function method of inversion will be explained and the accuracies of the fluid properties that can be predicted from NMR measurements will be discussed.

Biography

Dr. Bob Freedman is currently a Scientific Advisor in Schlumberger's Houston Formation Evaluation Center in Sugar Land, TX. Bob holds a Ph.D. in condensed matter physics from the U. of California at San Diego. He has worked for Schlumberger

for 28+ years. Bob played a leading role in the development of Schlumberger's Pulsed NMR Logging Tool technology. Prior to joining Schlumberger Bob worked for 5 years in operations and research for Shell and for 5 years as an independent formation evaluation consultant. During his 38+ year industry career he has published more than 60 SPE, SEG, and SPWLA papers in many different areas of formation evaluation and has been granted more than 35 US patents on well logging technology. He has won numerous top paper awards for papers presented at SPE, SPWLA, and at internal Schlumberger technical conferences. Bob's work has been recognized by both the SPE and SPWLA and he has served as a Distinguished Lecturer for both organizations and also as a Distinguished SPE Author. He served as the VP of Technology for the SPWLA in 2008. Bob received a 2009 SPWLA Award for Distinguished Technical Achievement and the 2004 SPE Cedric Ferguson Certificate.

Westside Luncheon Meeting

Date: Wednesday, April 9th, 2014
Lunch: 11:30 Talk: 12:00
Reservations: Email Shujie Liu
RSVP before NOON, Tuesday April 8th
Place: We have changed location -- BP Plaza Westlake 4– Townhall Room 107
200 Westlake Park Boulevard, Houston, TX 77079
Parking: Visitor parking is available at Westlake 4 overflow lot
Cost: Free
Lunch is not provided, bring your own or purchase in the BP cafeteria.

Practical Seismic Petrophysics: the Effective Use of Log Data for Seismic Analysis

Presenter*:* Tad Smith (Apache)

Abstract

The conditioning and analysis of log data for quantitative seismic interpretation is often simply categorized as "rock physics." Unfortunately, rock physics workflows often overlook or oversimplify the proper editing and interpretation of log data, the result of which can be unrealistic expectations and interpretations of seismic amplitude responses. The more encompassing phrase "seismic petrophysics" better describes the necessary linkage between petrophysics and rock physics. Seismic petrophysics not only includes rock physics, but also includes the proper conditioning and interpretation of log data that should occur prior to the application of rock physics and seismic models. This is especially true in conditioning log data for shear-wave velocity estimation, fluid substitution calculations, and AVO modeling.

This talk will focus on the important role of "seismic petrophysics" in the quest to extract additional information from subtle seismic responses. Topics covered will include various aspects of log editing, petrophysical interpretation (including integration of other data sources- core, fluids, pressures, etc.), and some common pitfalls associated with the "workhorses" of rock physics (invasion corrections, shear velocity estimation, and elements of fluid substitution). It is important to recognize that log data should not simply be recomputed to fit prior expectations as defined by a rock physics model. Instead, rock physics models should be used as templates, which allow the interpreter to better understand the underlying physics of observed log responses and how they are governed by local petrophysical properties. Case studies will be used to reinforce critical concepts.

Biography

Tad Smith manages the petrophysics group at Apache Corporation. Prior to joining Apache, Tad held a variety of positions as a geologist and petrophysicist at various companies, including Amoco, BP, Newfield Exploration, VeritasDGC, CGGVeritas, and ConocoPhillips. In 1995 – 1996, he participated in the Amoco Petrophysics Training program, where he developed a keen interest in petrophysics and seismic rock properties ("seismic petrophysics"). He has been actively engaged in the process of integrating petrophysical data into geophysical work-flows ever since. In 2011 he was the North American Honorary Lecturer for the SEG, with the topic of his tour being "Seismic Petrophysics". Tad has a PhD in geology from Texas A&M University, and is a member of AAPG, SEG, SPWLA, SPE, GSH, and the HGS. He is currently president of the Geophysical Society of Houston. When he's not working on interesting petrophysical problems, he enjoys time with his wife and son, riding bikes, spending time with good friends, and listening to good music.