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2024 - 2026

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2025 Q1 Technical Talks / Luncheon Meetings

Northside Baker Hughes 2001 Rankin Rd Houston, TX 77073	What is Rdeep (Deep Resistivity)? *By: Dr. Michael Rabinovich (bp)* Navigating the Energy Transition: The Evolving Role of Petrophysicists and Opportunities for Growth *By: Dr. Jesús Salazar (ConocoPhillips)*
Westside SLB - 6350 West Sam Houston Parkway North Houston, TX 77041	Rethinking Shaly-Sand Beliefs: Reconciling Paul Worthington's Model with Waxman-Smits and Dual Water. *By: David Kennedy* Small-Scale, Near-Site CCS: A Catalyst for Scaling Up Carbon Capture Projects *By: Zach Liu (Harvestone Low Carbon Partners)*
Downtown Virtual / webinar Chevron building 1400 Louisiana St Houston, TX - 77002	

Presidents Corner Q2 2025

April 15, 2025

Dear Members of the SPWLA Houston Chapter

Writing this message on Tax Day is more enjoyable than completing our tax filing; I hope all of you are done with yours (and will see a refund coming).

The first Quarter of 2025 is behind us and all I can say: “What a ride”, with a 21% drop in oil-price from the high in January, causing the usual angst in the industry.

The up & down cycles may be the only constant in our industry, which is still a flourishing “centuries later”. A true testament of its resilience. Not in the last part thanks to its workers, past, current, who all have -and are- contributing at moving the industry forward, reinventing, improving. Rest assured, our society members play a vital role in shaping the future of not just SPWLA, but the O&G industry in general.

Sadly, several of you have been forced to look for new employment opportunities. Not to say we saw this coming, but especially the lunch seminar by 2019 SPWLA President Dr. Jesus Salazar, “*Navigating the Energy Transition: The Evolving Role of Petrophysicists and Opportunities for Growth*” was very timely as Jesus spoke expertly about the changing role of petrophysics, transferrable skills of petrophysicists and how -and where- these can be applied.

Two weeks later, his predecessor, 2018 SPWLA President Zach Liu served as living example of just that, speaking about “*Small-Scale, Near-Site CCS: A Catalyst for Scaling Up Carbon Capture Projects*” in front of a large audience, triggering a lively discussion. Zach’s presentation showed without a shadow of doubt that there will be continuing demand and exciting -and challenging- opportunities for petrophysicists for a long time to come.

Except, in the future, we may no longer be called petrophysicist and I can only wonder if the name of the SPWLA will also change to reflect that, when the time comes?

Allow me to repeat my closing comment of my previous note: as we constantly strive at improving and taking feedback from our members seriously, we welcome your feedback, ideas and suggestions and are also ready to schedule your (technical) presentation for an upcoming luncheon meeting.

Ron J.M. Bonnie
Houston Chapter President.

Sponsors and Friends of the Houston Chapter Q2 2025

SPWLA – Houston Chapter News		Q2 2025
Thursday, Feb 27th, 2025 11:30 am – 1:00 pm	**Baker Hughes, 2001 Rankin Rd, Houston, TX 77073**	Northside Technical Talk / Luncheon Meeting

What is Rdeep (Deep Resistivity)?

By: Dr. Michael Rabinovich

Abstract

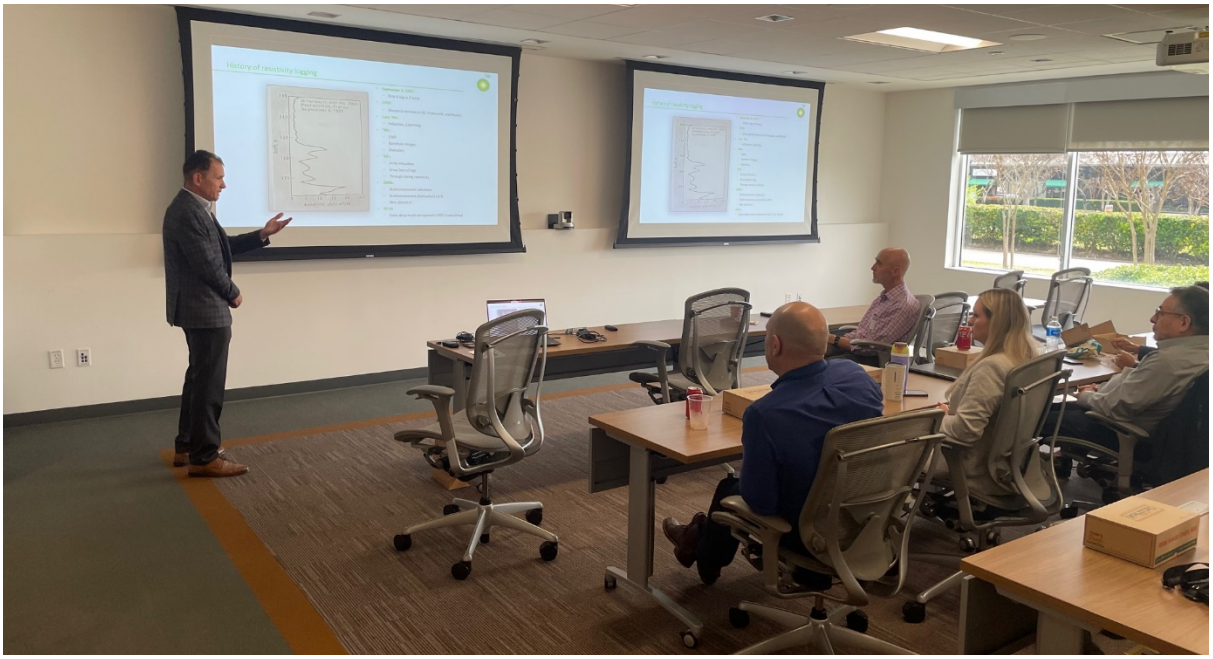
Rdeep (Deep Resistivity) is an outdated concept that has been relevant for focused wireline measurements when invasion is the main environmental effect to worry about. Unfortunately, this concept is still very much in use in operating companies when petrophysicsits select just one resistivity curve to use in their petrophysical workflows and water saturation calculations. Currently, Rdeep usually means the apparent resistivity curve which is the least affected by environmental effects and closest to Rt, but selecting Rdeep could be tricky especially from unfocused LWD resistivity curves because:

a) different environmental effects affect different curves differently.
b) several environmental effects may affect simultaneously.
c) in the same well different curves should be selected as Rdeep in different sections.

The best way to understand environmental effects and correct for them or/and select Rdeep if necessary is to use resistivity modeling and inversion. Ultimately, we recommend using Rt instead of Rdeep.

Biography

Michael Rabinovich is a Principal Subject Matter Expert in Resistivity Logging and Geosteering at bp Central team. Before joining bp in 2012, he was with Baker Hughes for 18 years as a scientist, Sr. Manager of Computational Physics group, and later as Deputy Director of Research of Drilling and Evaluation. He received his Msc degree in 1983 from the Moscow Institute of Oil and Gas industry and his PhD degree in 1989 from the Russian Academy of Science, both in Geophysics. He is an author/coauthor of more than 100 publications and 44 patents.



SPWLA – Houston Chapter News		Q2 2025
Thursday, March 27th, 2025 11:30 am – 1:00 pm	**Baker Hughes, 2001 Rankin Rd, Houston, TX 77073**	Northside Technical Talk / Luncheon Meeting

Navigating the Energy Transition: The Evolving Role of Petrophysicists and Opportunities for Growth

By: Dr. Jesús Salazar

Abstract

The energy transition is a pressing topic, inspiring both optimism and concern. Key questions arise: Will renewable energy fully replace fossil fuels? What role will hydrocarbon's exploration and production professionals play in the decades ahead? According to the International Energy Agency, by 2050, approximately 50% of the world's energy consumption will still rely on fossil fuels. This highlights the crucial role petroleum engineers and geoscientists will continue to play in building a sustainable, energy-efficient economy. Petroleum Engineers, particularly formation evaluation specialists are uniquely positioned to drive the exploration of new energy resources and foster the development of cleaner technologies, while also remaining leaders in the responsible exploitation of fossil fuels.

In this presentation, I will discuss the evolving role of petrophysicists in both the current oil and gas industry and the future energy landscape, sharing insights from my own career journey. Additionally, I will provide strategies for refining both technical and soft skills, helping to build a resilient, long-lasting professional career.

Biography

Jesús M. Salazar earned his Ph.D. and M.Sc. in Petroleum Engineering from the University of Texas at Austin and his B.Sc. in Physics (with honors) from the Central University of Venezuela. In 2024, Salazar re-joined ConocoPhillips upon the acquisition of Marathon Oil in Houston where he works as a Petrophysicist for the Gulf Coast and Rockies Region, following various roles with Marathon Oil, ConocoPhillips, Occidental, and PDVSA across the U.S., Canada, Australia, and Venezuela, working in various technology, exploration, and operations positions for over 25 years. He served as President and VP of Technology for the Society of Petrophysicists and Well Log Analysts (SPWLA), Executive Editor of the peer-reviewed *SPE Reservoir Evaluation and Engineering* journal, and Associate Editor of *Petrophysics*. Jesús is currently Associate Editor for the *SPE Journal* and was recognized with the SPE Peer Apart Award in 2020 and selected one of SPE's Distinguished Lecturer for the 2022–2023 season. Dr. Salazar has published numerous papers in peer-reviewed journals and conferences, winning the Best Paper Award in *Petrophysics* in 2006. An avid traveler who has visited over 40 countries, Jesús enjoys running, hiking, watching movies, TV series, and MLB Baseball, and, above all, sharing these experiences with his wife and two children.

SPWLA – Houston Chapter News		Q2 2025
Thursday, March 20th, 2025 **11:30 am – 1:00 pm**	SLB - 6350 West Sam Houston Parkway North Houston, TX 77041	Westside Technical Talk / Luncheon Meeting

Rethinking Shaly-Sand Beliefs: Reconciling Worthington's Model with Waxman-Smits and Dual Water

By: David Kennedy

Abstract

In 1985 Paul Worthington published his Evolution of Shaly-Sand Concepts in Reservoir Evaluation paper. Figure 2 in Paul's paper has been used as a generic model to explain the effect of clay on bulk reservoir rock conductivity. Note the 'clean' sand trend line is straight and intercepts the origin since bulk rock conductivity must vanish as Cw $\rightarrow$ 0. According to the figure if the quartz grains comprising a clean sand are replaced grain-by-grain with an equal volume of conductive clay mineral, then the bulk rock would become more conductive, the trend would shift up in the plot parallel to itself, except on the left side of the plot where the increase in conductivity is non-linear. Seems reasonable, right? Indeed, considering the slope of the line is 1/F = j m this plot embodies the Waxman-Smits 'shaly-sand' model, C0 = j m(Ce + Cw) where Ce = BQv. A C0 Cw plot is an experiment performed on a single core and is therefore at constant porosity. The slope of the line is j m; if this model is to be accurate, not only is the porosity constant, m must also be constant. Now, m is correlated with pore geometry. The question is: can clay mineral crystals replace quartz without a concomitant change in pore geometry and therefore m? The data supplied in the Waxman-Smits paper (using their 115 core plug specimens) seem to answer this question with a "No!" Figure 3 in the Waxman-Smits paper provides the clue. Core 2 and core 26 have approximately the same porosity (0.212 vs. 0.229); core 2 is 'almost clean' (Qv = 0.052) whereas core 26 is 'clay rich' (Qv = 1.47). If Worthington's model were accurate then the expectation would be that the core 26 trend would shift up in the plot parallel to the core 2 data. Conversely, if the clay in core 26 were replaced with quartz, the expectation would be the trend would shift down until it intercepted the origin. The observations belie these expectations. So, what's wrong? The clue is in the slope of the trends. Since the slope is given by j m and j is constant, we must conclude that the mineral replacement must be accompanied by an increase in pore geometry complexity and a concomitant increase in m. Examining the entire W-S data set I saw this behavior in every porosity bin, and no example to support Worthington's model. Implications for the W-S and dual water models: the W-S model behaves similarly if m is a function of Qv. The dual water model automatically produces a rotation of the trend as quartz is replaced with clay, but not enough to reproduce the observations, which also requires that m increase with clay content.

Biography

Dave needs little introduction; he has been a member of SPWLA since 1975 and was VP of Publications, first editor of *Petrophphysics*, VP of Technology and President. As a young adult, Dave was an infantry platoon leader in the Vietnam war. Back to civilian life, Dave finished his physics degree at Georgia Tech in 1972. He ended up Schlumberger, where he was introduced to formation evaluation. Skeptical of much he saw, Dave felt petrophysics and formation evaluation might be a field where he could make significant contributions. Dave's name is on six patents as inventor or coinventor and about sixty papers as author or coauthor on a variety of topics covering induction instrument responses and forward modeling, conductivity anisotropy, the theoretical petrophysics of conductivity in reservoir rocks, and most recently shaly sand models. Throughout his career, Dave worked for operators and service companies and had various roles and assignments with Schlumberger, Arco, Sohio. Lockheed, Mobil, Exxon, Baker-Hughes, Pathfinder, and Southwestern Energy

SPWLA – Houston Chapter News		Q2 2025
Thursday, April 10th, 2025 **11:30 am – 1:00 pm**	SLB - 6350 West Sam Houston Parkway North Houston, TX 77041	Westside Technical Talk / Luncheon Meeting

Small-Scale, Near-Site CCS: A Catalyst for Scaling Up Carbon Capture Projects

By: Zach Liu

Abstract

This presentation delves into the challenges and opportunities of launching CCS projects, addressing key economic barriers, infrastructure requirements, public perception concerns, and competition from emerging technologies. Drawing on the Harvestone Blue Flint CCS project as a real-world case study, it illustrates how smaller-scale, near-site CCS projects can provide a practical and impactful entry point for meeting emissions reduction targets. The session also emphasizes the importance of innovation in overcoming technical and regulatory hurdles, the need for strategic investment to unlock scalability, and the crucial role of public engagement in building support for CCS initiatives. Ultimately, it advocates for leveraging small-scale projects as a stepping stone to accelerate the wider deployment of carbon capture technologies and realize global decarbonization goals.

Biography

Zach Liu, PE, PG, CFA, is the Director of Subsurface CCUS at Harvestone Low Carbon Partners, where he oversees one of the few active Class VI CO2 injection operations at the Blue Flint CCS site in North Dakota. With over 25 years of experience in oil and gas, including 15 years focused on CCUS at Kinder Morgan and Harvestone, Zach has built a strong track record of success, having drilled more than 100 CO2 wells.

He is a licensed Petroleum Engineer, Professional Geologist in Texas, and a CFA charter holder. In 2018, he served as President of SPWLA International. Outside of work, Zach enjoys golf and once hit a 202-yard hole-in-one with a 5-iron.

SPWLA Houston Chapter Networking Event

When: last Thursday of each month, 5:00 – 8:00 pm
Location:Cedar Creek Bar & Grill, 1034 West 20th Street, Houston, TX 77008

The SPWLA Houston Chapter invites all members to join Chapter Board members for an evening of casual conversation and networking with fellow petrophysicists and peers from other disciplines also. Petrophysics, Geology, Geophysics, Reservoir Engineering, and Management are all represented at most meetings. Often, there was also the opportunity to meet current and past SPWLA international board members and recognized industry leaders. We look forward to seeing you there!

SPWLA Houston is committed to hosting engaging and enjoyable activities for our members. If you're interested in sponsorship opportunities, feel free to reach out.

Future Events and Details

SPWLA – Houston Chapter News		Q2 2025
Wednesday, Apr 16th, 2025 **11:30 am – 1:00 pm**	Baker Hughes 2001 Rankin Rd Houston, TX 77073	Northside Technical Talk / Luncheon Meeting

Enhanced AI-driven automatic dip picking in horizontal wells through deep learning, clustering and interpolation, in real time

By: Alexandre Perrier (SLB)

Abstract

The analysis of borehole image logs is important for subsurface studies but becomes especially crucial when extracting real-time structural information for geosteering in horizontal wells. Indeed, these images help extract data about bedding surfaces, fractures, and faults, which enable the construction of 3D reservoir models and optimal well placement for future production optimization. Borehole images in horizontal wells are challenging for dip picking: we observe mainly lengthy parallel and ovoid bedding dip traces called "bull eyes", as the well trajectory may be subparallel to the bedding. This deviates considerably from the classic model of dip picking, which extracts only sinusoids. So far, the delineation of non-sinusoidal bedding features has relied on marking the trace by a series of manually picked segments. In this paper, we present a method that enables the precise automatic extraction of segments from non-sinusoidal features using an AI model and propose an automated grouping mechanism of the segments. Such a solution is applicable in real-time scenarios, facilitating geosteering guidance.

Our solution is an automated workflow detecting and picking non-sinusoidal bedding dip traces in real-time in horizontal wells borehole images, and computing the corresponding orientation of the structure. The workflow starts with borehole images and the associated segments provided by the "auto dip picking" algorithm. A convolutional neural network detects bedding features and categorizes them as sinusoidal or non-sinusoidal bedding features. Subsequently, segments are regrouped within each bedding feature, creating comprehensive data sets for each feature. Single-segment sinusoidal features are preserved, while multi-segments ones undergo an advanced clustering mechanism based on orientation and on derivative of the sinusoidal function associated to the segment. Meanwhile, parallel and "bull eyes" structures undergo a transformative process: a recursive approach connects segments within the same layer. Then we compute each layer's global orientation. Our study yielded significant outcomes by automatically detecting non-sinusoidal bedding features and computing associated dips from borehole images in horizontal wells. The integration of our advanced workflow reduced manual intervention. In addition, this workflow is versatile, catering not only to horizontal wells but also to vertical ones. We provide a solution capable of handling simultaneously non-sinusoidal bedding and sinusoidal bedding features automatically with just one click. By embracing automation, we also eliminate subjective interpretations, ensuring a standardized and efficient analysis process..

Biography

Alexandre Perrier is a geologist and Interpretation Development Engineer at the SRPC Engineering Center in Clamart, France, with over three years of experience in oil and gas field development. He began his career at TotalEnergies in 2019, focusing on dynamic reservoir simulations, before moving to the academic research team RING of the Université de Lorraine and CNRS in 2020, where he worked on automating sequence stratigraphy analysis. In 2021, Alexandre joined SLB, where he specializes in the interpretation of borehole imagers.

He holds a Master's degree in Geosciences and another in Reservoir Modeling and Simulation. Currently, his work centers on developing innovative answer products and digital solutions for both the Oil & Gas industry and new energy applications. An active member of SPWLA, Alexandre has also published and presented a technical paper at the 2024 SPWLA Symposium, highlighting his research in SLB on automating dip picking in horizontal wells.

SPWLA – Houston Chapter News		Q2 2025
Thursday, Apr 24th, 2025 **11:45 am – 1:00 pm**	Virtual Event	Downtown Technical Talk / Lunch Webinar

Application of the New Sonic-Based Saturation Model to Conventional and Unconventional Oil Reservoirs

By: Sheyore John Omovie *(*Goshey Energy Services LLC*)*

Abstract

It is well established in rock physics that when the fluid filling the pore spaces of a reservoir is primarily gas or light oil there is a significant change in the bulk modulus but little to no changes in the shear modulus when compared to fully brine-saturated reservoirs. This in turn leads to a lower velocity ratio in gas or light oil reservoirs. This concept underlies and has been extensively used in the fluid identification of conventional siliciclastic reservoirs in seismic interpretation. Yet not so much in the use of higher-resolution sonic logs. Here we ask the question, can we use sonic logs to not just identify but quantify hydrocarbon saturation in gas reservoirs? Using sonic logs, can we accurately estimate water saturation with uncertainties that are similar to those obtainable from conventional saturation models? If possible, this would have significant implications in the evaluation of shaly sand reservoirs as well as low resistivity low contrast reservoirs, where conventional saturation models may not be as effective. Given P-wave and S-wave velocities computed from measured compressional and shear sonic logs, a new empirically derived saturation model for estimating water saturation is presented. One that does not require formation resistivity or brine salinity. The new model is based on the lower bulk modulus or velocity ratio observed in gas reservoirs. Assuming the reservoir is fully brine saturated, the deviation of the measured P-wave and S-wave velocities from the fully brine saturated velocities is used to invert for water saturation. The new model is shown to be consistent with theoretical rock physics models. We have applied the new model to compressional and shear sonic well log data acquired in several reservoirs. The reservoirs range from an organic gas shale reservoir to a gas sand reservoir offshore the Gulf of Mexico. In one of the organic shale examples, the Haynesville shale, average water saturation from the new model was 33% compared to 34% from the conventional saturation model that has been calibrated to tight rock core analysis. In the Gulf of Mexico gas sand example, the model yields 24% average water saturation compared to 21% average water saturation from core calibrated Archie saturation model. In a low resistivity low contrast shaly sand reservoir where conventional saturation models indicated the reservoir is wet, the new model yields results that are consistent with gas production from the reservoir. We also present the results of the application of the new model to a gas condensate reservoir in the North Slope of Alaska and an oil reservoir offshore the Gulf of Mexico.

Biography

Sheyore John Omovie is a Petrophysical Consultant at Goshey Energy Services LLC with over 2 decades of experience working in several basins in the US and internationally. He has worked for Apache Corporation, Oxy, EOG, and Baker Hughes. He received a PhD in Geophysics from the University of Houston. His research focuses on rock physics, and rock mechanical properties. He is also a licensed professional geoscientist in the state of Texas, USA.

Registration

https://www.spwla-houston.org/seminar-detail.php?id=88