SOCIETY OF PETROPHYSICISTS AND WELL LOG ANALYSTS

QATAR CHAPTER

SPWLA Qatar Chapter Virtual Event

Guest Speaker

CHRIS SMART

Independent Consultant

DATA DRIVEN, A RESISTIVITY-FREE EVALUATION METHOD FOR NON-ARCHIE MICRITIC CARBONATE FORMATIONS

Zoom Meeting ID: 897 3270 3358

Meeting Passcode: 675014

Registration Required

Society of Petrophysicists and Well Log Analysts
Qatar Chapter
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Qatar Section

Technical Talk

The SPWLA – Qatar Chapter cordially invites you to a technical talk

Date: **14th September 2020**
Time: **12 – 1pm Qatar Time**
Venue: **Zoom Virtual Meeting**
Details **Zoom Meeting ID: 897 3270 3358**
Meeting Passcode : 675014

Presenter: **Chris Smart - SME Petrophysics & Subsurface Integration**
Topic: **Data-Driven, A Resistivity-Free Evaluation Method for Non-Archie Micritic Carbonate Formations.**

In conventional petrophysics, resistivity logs are the main pay zones identifiers due to resistivity contrast between hydrocarbon and formation water. If, however, a pay zone exhibits saturation-dependent Archie exponents or conductive minerals, these logs become incapable of identifying the producing zones and providing further insights about water mobility. Because of these limitations, many potentially productive zones with high irreducible water saturations are overlooked in many fields in the Middle East and elsewhere around the world.

In an attempt to leverage the best of both worlds, the multi-method presented in this talk introduces an integration of physics-based and data-driven approaches to de-risk and quantify the initial production performance of low resistivity fine-grained carbonate formations. To begin with, the pore architecture of the latter rocks is derived from NMR and automated MICP deconvolution. Reservoir fluid properties and initial fractional flows (f_w) are then measured through formation testing and sampling. Then, the knowledge of pore architecture is propagated to data-scarce intervals and other wells by means of probabilistic machine-learning. Initial water saturation is subsequently calculated on the basis of the equilibrium between buoyancy and capillary forces after what, the Buckley-Leverett formalism is used to derive a formation-testing-calibrated f_w continuous log, thus further informing S_w and Free-Water Level (FWL) elevation.

The aforementioned multi-phase flow petrophysics method provides the practioner with a number of critical reservoir insights unrivaled by single-tool or data-driven-only approaches. Probability distribution function of S_w,initial f_w, transition zone evaluation and FWL identification are among the key outputs informing the final choice of completion strategy. The framework introduced along this talk also enables the pore architecture understanding constructed and ground-truthed at the well level to be exported and scaled to 3D reservoir models.

Biography:

Chris Smart has 40+ years of industry experience roughly evenly divided between service companies (Schlumberger & Western Atlas) and operators (Amoco, BP, Apache Corporation). Specializations include carbonate reservoir petrophysics, pore geometry, Routine & Special Core Analysis, analytical software development and large scale field studies. Chris has studied, lived or worked basins in over 100 countries. He holds degrees in Maths, Physics, and Nuclear Engineering from Virginia Military Institute & VPI.