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Oil and gas training specialists

Nuclear Magnetic Resonance Petrophysics

Dr Paul Basan

LONDON 20 – 24 March 2017
ATYRAU 22 – 26 May 2017
KUALA LUMPUR 11 – 15 September 2017
PERTH 25 – 29 September 2017

More than 60 years ago Archie said "If it were possible to measure the fundamental properties (exact pore size and fluid distribution) in situ of formations penetrated by the bore hole, the volume of the hydrocarbon in place and the productivity of the could be calculated. However, it is practically impossible as yet to get a direct measurement of the factor, porosity, permeability, hydrocarbon saturation, and thickness of the layer in place by coring or other physical measurements".
Modern NMR makes Archie's dream possible both as a laboratory and downhole measurement. Interestingly, the results are "non-Archie", which means NMR provides a measure of rock properties independent of other techniques.
An independent realisation of rock properties, for comparison with conventional sources, either validates results or shows where discrepancies occur. In both cases, NMR provides a tool for recognising and/or reducing uncertainty. Clearly, NMR data completes the formation evaluation story; without the independent benchmark the story is too often incomplete.
NMR also bridges disciplines because it provides the geometrical configuration of the pore system to link with sedimentological, petrophysical and engineering information. Consequently, NMR provides answers for an independent, single-well interpretation, and a foundation for predicting rock properties into the geological model.

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Nuclear Magnetic Resonance Petrophysics (NMRP)

The course is designed for

- Geoscientists
- Reservoir Engineers

This 5-day NMR Petrophysics course will provide geoscientists and engineers with a basic to intermediate skill-level for using NMR data in reservoir characterisation workflows. Course design is a balance between information transfer, discussion, training and practical exercise. The expectation is that participants will return to their jobs with the skill-set:
- When to use NMR, and when not to use it
- Plan logging jobs with contractor and/or colleagues
- Plan NMR core analysis jobs
- Assemble NMR core data and interrogate the results
  - Understand how to use core data for calibration
- Understand the composition of contractor's deliverable
- Review NMR log quality
- Understand the procedure for processing raw NMR log data
- Know how to use the contractor's deliverable

Course Module Overview

I.   Introduction - How, why and when NMR works
II.   Pore Geometry
III.   NMR Core Analysis
IV.   Rock Typing
V.   Introduction to NMR Logs (Focus on wireline tools)
VI.   Job Planning
VII.   Preparing for Log Interpretation: LQC
VIII. Special Applications: Wettability, Gas, Heavy Oil and Fluid Typing

Training Exercises

- NMR signature from oil- and water-based muds
- Designing an NMR core analysis job
- Working with raw NMR core data (Time-domain)
- Working with processed NMR core data (T2-domain)
- Core-to-log calibration
- NMR rock typing
- Learning log-curve mnemonics
- Planning an NMR logging program (logging on paper)
- LQC
- Working with log data

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