

WIRELINING AND LWD PRINCIPLES AND INTERPRETATION

General:

Discipline: Petrophysics

Level: Intermediate

Duration: 5 days

Instructor(s): Jesus Sotomayor, Nidal Hazboun

Purpose:

The most universal, comprehensive, and concise descriptive documents on oil and gas wells are logs. Familiarity with the purpose and optimum applications of well logs is, therefore, essential for people forging their careers in the oil business. The instructor uses an approach to help participants develop a good grounding in understanding and applying well logging tools. Participants develop an appreciation for the constraints and limitations of operating in the borehole environment. A number of actual log examples are related to basic principles in the description of reservoir properties such as porosity, mineralogy, formation factor, saturation, and hydrocarbon type for essentially clean reservoirs. This course offers a realistic experience by working in team on a comprehensive log interpretation exercise.

Designed for:

Petrophysicist, geologist, geophysicist, engineers, technicians, or anyone interested in a solid understanding of the principles of borehole petrophysics.

You Will Learn:

How to:

- Understand how WL tools work
- Understand how LWD tools work and their differences with original WL tools
- Identify reservoirs
- Determine mineralogy, porosity, and saturation in various lithologies
- Recognize the importance of electrical properties of earth materials
- Highlight oil mobility
- Interpret pressure profiles
- Develop optimum tools and logging programs
- Apply quick-look methods of formation evaluation
- Apply cut-offs for reservoir evaluation and reserves determination
- Acknowledge unconventional reservoirs

Course Content:

- Fundamental concepts of petrophysics
- Logging objectives
- Basic rock properties
- Mudlogging use in petrophysics
- Core analysis, acquisition, interpretation, and quality checks
- Invasion profile
- Depth measurements and control

- Passive electrical properties of earth materials, Archie equation
- Understand different WL tools
 - Resistive measuring tools, normal, induction, laterolog
 - Reservoir/non-reservoir discrimination
 - Borehole calipers
 - Matrix sensitivity logs: GR, SGR, Pe
 - Porosity-minerology logs, density, neutron, sonic
 - Nuclear magnetic resonance
 - Elemental capture spectroscopy
- Understand Logging While Drilling tools
- Porosity-resistivity cross-plots
- Water salinity determination
- Water saturation equations
- Permeability relationships
- Assessment of rock quality using core and logs
- Basic Formation Evaluation with LWD
- Borehole image analysis
- Use of pressure measurements
- Sidewall coring
- Challenge of borehole geophysics
- Petrophysical impact and uncertainty, and tool selection
- Introduction to unconventional reservoirs

Software applications:

- Microsoft Office

Text and consulting books:

- "Log Interpretation Principles / Applications", Schlumberger 1989
- "Log Interpretation Charts", Schlumberger, 1998
- "Fundamentals of Well Logs Interpretation 1,2", O. Serra Elsevier, Amsterdam 1984.
- "Logging While Drilling", Schlumberger, 1993
- "Advance interpretation of wireline logs", Schlumberger, O. Serra, 1986

