Petrophysics for Drilling Engineers

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Introduction:

Petrophysics is a key discipline in petroleum exploration and production. This course covers wireline logging, MWD-LWD and their specific applications for wellbore stability. This course will be suitable for all drilling engineers, directional drillers and other geoscientists associated with drilling.

The main objectives of this course are to understand:

- The petrophysical properties and corresponding logging methods
- The fundamentals of log interpretation and formation evaluation
- The link between Petrophysics and seismic reservoir characterization tools

Objectives:

By the end of this course delegates will learn about:

- The importance of Petrophysics in the workflow of reservoir evaluation and characterization
- The physical reservoir properties (porosity, saturation, fluids, permeability) required for clastics and carbonate rock evaluation
- The physical background of well logging methods and the response with respect to reservoir characterization
- Understand fundamental techniques of log interpretation, learn a quick-look interpretation

Who should attend?

Drilling Engineers, Senior Drilling Engineers, Drilling Supervisors, Workover Engineers, Petroleum Engineers, Completion Engineers, Tool Pushers, Reservoir and Senior Reservoir Engineers, Geologists, Production Engineers & technologists, Wellsite Engineers, Lifting Personnel, Maintenance Engineers, Foremen, Industry Personnel

Course Outline:

- Reservoir Rock and Life of a well
- Tool Conveyance, Depth Control
- Well bore stability and filtrate diameter of invasion
- The mud log and its applications
- Basics of Logging
- Log Quality Control
- GR Spectroscopy and its application to determine clay type
- The Spontaneous Potential and its applications to estimate water salinity and volume of shale
- Acoustic Log: secondary porosity, rock mechanical properties and wellbore stability

- The density and photoelectric cross section
- The Neutron Log, neutron spectroscopy and sigma neutron capture cross-section
- Density-Neutron applications for lithology, shale volume and effective and total porosities
- Basics of Resistivity and the Archie Equation

- The concept and applications of the Formation Factor (FF) as a variable –m emulator
- Resistivity measurements in the invaded zone (RXO)
- Resistivity measurements in the uninvaded zone using Induction and Laterolog
- The concept and applications of array resistivity measurements
- Wireline Formation Testing
- Measurement While Drilling (MWD) and Logging While Drilling (LWD)
- Data acquisition of porosity, lithology, Pulsed Neutron Sigma and resistivity
- Formation Pressure
- Geosteering basics
- Seismic
- Acoustic

- Shale Volume (Vsh, Vcl) evaluation and clay type- Dispersed or laminated shales
- Estimating the parameters of "m" and "n" in the Archie Equation,
- Quick look techniques to estimate the oil / water, gas/water and oil/gas contacts,

- Salinity estimations of formation water and filtrate water,
- Estimation of porosity, lithology and water saturations in clean and in shaly-sands