

PETROPHYSICS FOR DRILLING ENGINEERS

DRL045

COURSE OVERVIEW

Petrophysics is fundamental to all aspects of the petroleum business. Principles, applications, and integration of petrophysical information for reservoir description will be discussed in depth. At the end of this course the participants will learn how to conduct competent quick-look evaluations. Using data from open hole logs, logging-while-drilling, and core data you will evaluate porosity, permeability, and saturation in a variety of reservoirs. Knowing how to integrate petrophysical information with other data sources will improve participants' ability to assess technical risk when examining hydrocarbon opportunities.

COURSE OBJECTIVES

By the end of this course, participant will be able to:

- Understand and apply at a basic level the theory and operation of major petrophysical tools
- Calibrate porosity and permeability values from core and log sources for improved saturation calculations
- Apply basic open hole logging, borehole seismic, image, and LWD/MWD
- Analyze and integrate log, core, geoscience, and engineering well data for well and field development projects
- Select petrophysical tool combinations for specific applications
- Assess the impact of petrophysical analyses on technical uncertainty estimates of reservoirs

WHO SHOULD ATTEND

- Drilling engineers.
- Directional drillers.
- Geo-scientists associated with drilling.

COURSE DURATION

5 Working Days

arctic

COURSE OUTLINES

Day 1

- Pre course evaluation
- Fundamental concepts of petrophysics
- Depositional systems and petrophysical rock parameters
- Nature of porosity and permeability
- 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 Coring
- Overview of Conventional Core Analysis

Day 2

- Basics of Logging
- Overview of 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

Day 3

- 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 (R_{xo})
- Resistivity measurements in the uninvaded zone using Induction and Laterolog
- The concept and applications of array resistivity measurements

Day 4

- Measurement While Drilling (MWD) and Logging While Drilling (LWD)
- Data acquisition of porosity, lithology, Pulsed Neutron Sigma and resistivities
- Wireline Formation Testing
- Formation Pressure

- Geosteering basics
- Acoustic
- Cement evaluation

Day 5

- Well Site - Quick Look Log Evaluation for Lithology, Porosity and Fluid Type
- 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 identify fluid type and hydrocarbons
- Salinity estimations of formation water and filtrate water,
- Estimation of porosity, lithology and water saturations in clean and in shaly-sands
- Capillary Pressure Analysis and Pore Geometry
- Post course evaluation.

arctic