

Quantitative Well Log Analysis

5 days
Overview

LOGADV-EN-P

LEVEL

Skilled

PURPOSE

This course provides participants with some experience in qualitative log interpretation.

LEARNING OBJECTIVES

Upon completion of the course, participants will be able to:

perform sound quality-control and environmental correction of logs, determine R_t , R_{xo} , D_i ,

evaluate shale content of reservoirs, apply shale and hydrocarbon corrections,

perform quantitative log interpretation in case of water and oil based mud, determine porosity, permeability, net sand, net reservoir and net pay characteristics.

WAYS AND MEANS

Hand computations followed by petrophysical software sessions.

Software used during workshops: with courtesy of Senenergy.

LEARNING ASSESSMENT

Knowledge assessment with multiple choice questions.

PREREQUISITES

Degree in G&G.

Participants should know the principles and applications of common wireline logging tools and should know how to perform a quick look (lithology, porosity, R_w , S_w).

Agenda

PREPARATION FOR QUANTITATIVE LOG ANALYSIS

1 d

Petrophysical concepts and relationships.

Quality control of the data.

Determination of geological formations and reservoirs - Zonations.

Environmental corrections of logs. Determination of R_t , R_{xo} , D_i .

Case studies (water and oil based muds).

INTERPRETATION OF CLEAN FORMATIONS

1 d

Determination of fluid contacts (WOC, GOC).

Determination of matrix and fluid parameters, R_w (SP, Ratio, R_{wa}).

Determination of lithology, porosity, fluid type, water and hydrocarbon saturations.

Cross plots techniques: N-D-S, Pe-RHOB, K-Th, etc.

Case studies.

QUANTITATIVE LOG INTERPRETATION OF SHALY FORMATIONS (DETERMINISTIC APPROACH)

2.5 d

Influence of shale on logging tool response. Introduction to complex lithology - D-N cross-plot.
Determination of shale parameters, shale content V_{sh} and effective porosity.
Hydrocarbon effects on logs and hydrocarbon correction.
Determination of water and hydrocarbon saturations (various equations).
Comparison of porosity and permeability results to core data (PHI-K relationship and SCAL).
Determination of net sand, net reservoir and net pay thicknesses and associated characteristics (V_{sh} , H , $Phie$, S_o).
Case studies: integration & interpretation of pressure tests and NMR data, if available.
Cross-section between wells and comparison of interpretation results.

OTHER INTERPRETATION METHODS

0.5 d

Introduction to the multi-mineral model and general optimization method.
Case study.