Petrophysical Properties: Core, Log & Test Data Integration for Reservoir Modeling

Overview

LEVEL
Skilled

PURPOSE
This course provides a deep understanding of the methods used to measure reservoir petrophysical properties from cores, logs and well tests data and, ultimately, correlate and integrate results for reservoir characterization and modeling.

LEARNING OBJECTIVES
Upon completion of the course, participants will be able to:
- deduce reservoir properties from log interpretation and compare results to core measurements,
- define rock-types, determine electro-facies and derive K-Phi relationship,
- integrate cores, logs and well tests data for reservoir modeling.

WAYS AND MEANS
Real case study with cores, logs and well tests data.

LEARNING ASSESSMENT
Knowledge assessment with multiple-choice questions.

PREREQUISITES
Degree in geology, geophysics or reservoir engineering, or equivalent experience.

Agenda

RESERVOIR PROPERTIES FROM CONVENTIONAL & SPECIAL CORE ANALYSIS
Core studies.
Structure and properties of porous materials: porosity, permeability, grain density.
Saturation, wettability, relative permeability and capillary pressure.
Electrical properties (m and n exponents).
Real case study: petrophysical synthesis.

RESERVOIR PROPERTIES FROM LOG EVALUATION
Seals, reservoirs and fluid characteristics.
Wireline logging operations and logs.
Open hole log interpretation methodology.
Determination of reservoir properties from log interpretation: lithology, porosity and water saturation (case study).
Quantitative log analysis.
Core - Log correlation and comparison of petrophysical results to core data.
Permeability estimation from logs and core data.
Real case study.
ROCK-TYPING
Introduction to rock-typing and bases of electro-facies analysis.
Electrofacies identification techniques: non-supervised and supervised approach.
Connection with both geological and reservoir models building process.
Real case study: correlate, combine and integrate consistent information from logs, core description and petrophysics.

WELL TESTING
Well test introduction and generalities.
Well test interpretation methods.
Examples and type curves.
Real case study: well test interpretation and integration with petrophysics.

DATA INTEGRATION FOR RESERVOIR MODELING
Introduction to integration for reservoir modeling.
Geological model review: structural model, stratigraphic model and petrophysical model.
Reservoir, geological and petrophysical synthesis.
Gridding and upscaling.