
N671: Core Analysis for Petroleum and CCS Applications

Instructor(s): Dr Adam K Moss

Format and Duration

Classroom - 3 Days

Virtual - 5 Sessions

Summary

A course designed to help attendees design core analysis & SCAL test programmes for both oil and gas reservoirs and carbon capture storage (CCS) in aquifers and depleted gas and oil reservoirs. The participants will also learn how to quality check and use legacy core analysis and SCAL data. The course builds on 30 years' experience working in core analysis laboratories and an operating company and is structured to demonstrate the complete workflow from core acquisition to petrophysical and reservoir model construction.

Learning Outcomes

Participants will learn to:

1. Design core analysis & SCAL test programmes to supply all data required for petrophysics and reservoir modelling in both conventional reservoirs and CCS.
2. Perform quality checking new and old core analysis & SCAL data.
3. Describe how core and log data are depth matched.
4. Select samples for conventional oil and gas reservoir and CCS analysis.
5. Review core mineralogy data.
6. Stress correct porosity & permeability data to account for initial reservoir stress & depletion.
7. Define the test and data analysis methods to determine capillary pressure versus water saturation curves, capillary entry pressure and seal capacity.
8. Measure and quality check relative permeability data for conventional reservoirs and CCS studies.

Training Method

This classroom course will be a combination of short lectures, practical workshops and plenary discussions to consolidate learning. Sessions will be structured carefully to ensure optimisation of learning expectations verbally and on PowerPoint, followed by practical exercises to embed understanding. Discussions and question and answer sessions are encouraged to ensure understanding. Each session will contain a practical exercise which will be either on paper and in Excel. Attendees should be familiar with basic calculation and charting functions in Excel. Practical exercises use real core analysis and SCAL data.

Participants will have opportunities to share their own experiences, discuss data and explore any issues they may have had relating to core analysis and SCAL data. We encourage the clients to send us examples core analysis data, so these can be included in the practical workshops.

Who Should Attend

Geologists, production engineers, reservoir engineers and petrophysicists.

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Course Content

Coring and Safe Core Handling

- Introduction to Coring
- Coring in 'Problematic' Formations – Fractured, Vuggy and Unconsolidated Formations
- Wellsite Core Handling

Sample Selection, Plugging and Preparation

- Introduction to Scales of Measurement in Core Analysis and Logs
- Core Handling in the Laboratory – Sample Selection, Plugging and Preserving
- Sample Cleaning and Drying Methods
- Using Old/Legacy Core & Core Plugs

Routine Core Analysis

- Core Porosity – Understanding Different Measurements (inc. NMR) and Factors Effecting Data Quality and integration.
- Fluid Distribution from Core – Dean-Stark Measurements – Theory and Best Practice
- Permeability – Controlling Factors, Measurement Choices, and Quality Control
- Mineralogy, Chemical Reactivity and Swelling Tests

Special Core Analysis

- Pore Volume Compressibility, Biot Coefficient and Net Overburden Pressure & Stress corrections
- Capillary pressure – An Introduction to the Theory and Core Measurements.
- Building a Saturation Height Function Model
- Cap Rock Integrity/Seal Capacity & Threshold Pressure
- Relative permeability – Understanding the Different Measurements and the Factors Effecting Data Quality.