N569: Core Analysis for Reservoir Models

Instructor(s): Dr. Adam Moss

Format and Duration

Classroom - 5 Days
Virtual - 10 Sessions

Summary

Participants on this course will learn to measure and integrate conventional and special core analysis (SCAL) data into static and dynamic reservoir models. The expert instructor has over 25 years' experience working in core analysis laboratories and an operating company. The course is structured to demonstrate the complete workflow from core acquisition to reservoir model consruction.

Learning Outcomes

Participants will learn to:

1. Design a core analysis programme to supply all data required for reservoir modelling.
2. Perform quality checking of core analysis data.
3. Build a saturation height function for use within the reservoir model.
4. Measure and quality check relative permeability data, and integrate these data into the reservoir model.

Training Method

This classroom or virtual classroom course will comprise short lectures and discussions followed by practical exercises to embed understanding.

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. Clients are encouraged to provide examples of their own core analysis data, so these can be included in the practical workshops.

This course is also available in a shortened 4-day classroom or 8-half-day virtual classroom format.

Who Should Attend

This course is designed for reservoir engineers, geologists, and petrophysicists.

Course Content

Part 1

- Data Requirements for Reservoir Characterisation and Reservoir Simulation
- Overview of Coring & Core Recovery
- The Effect of Core Handling and Core Quality on Core Analysis Data
- The Impact of Heterogeneity on Core Analysis Data
- Selecting a Laboratory for Successful Core Analysis and SCAL
- Designing a Conventional Core Analysis and SCAL Programme

Part 2

- Core Plug Sampling Strategies
- Core Porosity – Understanding Different Measurements and Factors Effecting Data Quality
- Permeability – Controlling Factors, Measurement Choices and Quality Control
- Pore Volume Compressibility and its Effects on Porosity and Permeability
- Water Saturation from Core – Dean-Stark Measurements; Theory, Best Practice and Integration with Log and Other Core Data
- Rock Types (Inc. Flow Zone Index) – Core and Log Data Integration; Comparison with Geological Facies.

Part 3

- Wettability – Impact on Fluid Distribution and Flow; Factors Effecting Wettability and Laboratory Measurement of Wettability
- Capillary Pressure - Theory and Understanding the Controls on Fluid Distribution
- Capillary Pressure – Laboratory Measurements
- Capillary Pressure – Conversion to Reservoir Conditions
- Using Core, Log and Pressure Data to Define Contacts – Including the Difference Between Free Water Levels and Contacts

Part 4

- Integration of Capillary Pressure into Saturation Height Function Models
- Critical Review of the Common Saturation Height Function Models
- Integration of Saturation Height Functions with Log Data and Reservoir Models
- Global Case Studies – Different Saturation Height Function Models Used in a Range of Reservoirs

Part 5

- Relative Permeability – Theory and Controls on Two Phase Fluid Flow
- Relative Permeability – Laboratory Measurement
- Quality Checking Relative Permeability Data
- Integration of Relative Permeability Data into Reservoir Models
- Upscaling and Averaging Core Analysis and Petrophysical Data
- Integration of Reservoir Geology and Core Analysis Data
- Integrating all Data and QCing Legacy Data & Reports - Including What to do with Limited Data
- Course Conclusion and Review