

Petrophysics: Practices and Pitfalls

Aims

Petrophysics is fundamental to understanding the properties of oil and gas fields. It lies at the centre of all subsurface activities: whether in the context of open-hole operations on new-drill wells, cased-hole operations on producing wells, or in an integrated team - building reservoir models for asset evaluation, field development or reservoir management. However, lack of awareness of petrophysical pitfalls can lead to wrong, costly and often embarrassing decisions. How can we ensure that the petrophysical data input does not compromise the subsurface models?

In this course, emphasis will be placed on the integration of all available subsurface data, understanding the context in which the data are acquired and the analyses used to refine the data. The objective is to identify common pitfalls often encountered during the interpretation process and realise the effects they can have on ultimate outcomes. Interpretation exercises are an important element of the course.

Benefits

You will learn about:

- 🕒 logging tool measurement principles and the logging environment
- 🕒 data quality assurance and the integration of all subsurface data
- 🕒 quick-look interpretation and deterministic petrophysical interpretation in both clean and shaly formations
- 🕒 the pitfalls of petrophysics
- 🕒 uncertainty in petrophysical interpretations
- 🕒 practicalities of database building
- 🕒 reporting and delivery to other disciplines

Who should attend?

Reservoir engineers, geoscientists, petrophysicists and others involved in the subsurface management life cycle, having some experience of formation evaluation and who wish to broaden their practical knowledge and understanding of petrophysical



data acquisition, quality control, integrated interpretation and the potential petrophysical pitfalls.

Duration

🕒 3 days

Course Instructors

This course will be presented by Graham Webber or Andrew Buffin.

Graham Webber is a Principal Petrophysicist in Senergy's Edinburgh office with over 25 years' experience gained in both operating companies (including BP and Shell) and consultancies. Graham has participated in multi-disciplinary teams engaged in exploration, field development drilling, equity re-determination and reservoir management in mature fields.

Andrew Buffin is a Principal Petrophysicist with Senergy in Perth, Australia and has over 25 years' experience in both geology and petrophysics working for operating companies in Australia (including Santos and Woodside Energy) and the UK (Shell), and a consultancy in Norway.

Both Graham and Andrew have managed petrophysical projects, supervised operational log and core data acquisition, and carried out technical assurance for a range of field developments and for sandstone and carbonate reservoir types.

Course Description and Modules

The course will be conducted using a combination of lectures and paper/calculator-based exercises.

Introduction to formation evaluation

- petrophysics definition and contribution
- primary petrophysical parameters: porosity, permeability, water saturation and capillarity
- petrophysical interpretation process overview

Logging tools and the well environment

- the drilling environment and data acquisition process
- planning the formation evaluation programme
- methods of data acquisition and depth measurement
- logging tools, evolution, physical principles, applications, responses and resolution
- additional data types
 - mud-logging data
 - core data
 - routine (RCA)
 - special (SCAL)
 - formation testers

Quality assurance

- depth control and tie-in
- log response QC
- lithology
- fluid types and contacts
- reporting

Quick look and deterministic formation evaluation methods

- data preparation
- shale volume and lithology
- porosity
- water saturation – clean sands
- water saturation in shaly sands
 - when to use a shaly sand model
 - Indonesian equation
 - Waxman-Smits equation
- permeability
- net and pay determination
- reporting and deliverables
- estimation of uncertainty

Integration and application of subsurface data

- database build and quality assurance
- porosity calibration
- porosity-permeability relationships
- net cut-offs
- RCA and SCAL
- fluid contacts
- formation pressure data
- capillarity

To book this course, please contact **Sarah McPhee** - Training Co-ordinator

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