

N412: A Critical Guide to Reservoir Appraisal and Development

Instructor(s): Philip Hirst and Pete Smith

Format and Duration

Classroom - 5 Days

Virtual - 10 Sessions

Summary

This course is designed to introduce the decision-based technical workflow that is key to appraisal and development projects. Participants will learn the background theory behind all aspects of reservoirs, from the micro- to seismic-scale, integrating the static and dynamic domains and how to model them. The course covers a range of disciplines and topics, using an integrated subsurface approach with reference to a robust business and commercial framework.

Business Impact: Participants will be empowered to **collaborate between disciplines** and add value in the **appraisal** and **development** of oil & gas assets.

Learning Outcomes

Participants will learn to:

1. Critically evaluate the sources of subsurface data that contribute to the understanding and development of hydrocarbon reservoirs.
2. Evaluate how to combine uncertainties and select key variables in a probabilistic evaluation to manage uncertainty.
3. Assess fluid properties and PVT for reservoir description, material balance, and flow assurance.
4. Understand the controls on the pore scale properties of both clastic and carbonate reservoirs and the principle of flow zones.
5. Evaluate sedimentary reservoir architecture and understand its impact on connectivity and fluid flow.
6. Assess the possible impact of faults and fractures on reservoir productivity.
7. Evaluate the use of both static and dynamic reservoir models as part of the decision-making process.
8. Evaluate how reservoir energy, fluid responses, drive mechanisms, and EOR processes are assessed and managed to maximise planned recovery.
9. Apply the technical aspects of well testing to appraisal and development decisions.
10. Assess the Reserves and resources booking philosophy.

Training Method

This is a classroom or virtual classroom course comprising a mixture of lectures, discussion, case studies, and practical exercises.

Who Should Attend

The course is designed for geoscientists, petrophysicists, and reservoir engineers who are involved in field appraisal and development.

Team leaders and asset managers will also benefit.

Multi-disciplinary asset teams would find particular value in attending as a group.

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Course Content

Introduction

- Business framework

Data and uncertainty

- Data positioning
- Petrophysics and wireline data
- Pressure and contacts

Heuristics, biases, risk and uncertainty

- Range estimation
- Heuristics
- Risk and uncertainty
- Decisions with uncertainty

Reservoirs at a pore-scale

- Clastic reservoirs
- Carbonate reservoirs
- Clays and production issues

Reservoir Architecture

- Reservoir architecture and connectivity
- Faults and naturally fractured reservoirs
- Flow zones
- Waterflood and heterogeneity
- Unconventional reservoirs or analogues*

Fluids and reservoir mechanisms

- Fluids and PVT data
- Multi-phase flow
- Reservoir mechanisms
- Secondary and tertiary recovery
- Gas and aquifers
- Well productivity

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Value of Information, well productivity and testing

- Parametric Combining
- Value of information (appraisal)
- Value of information (intervention)

Static reservoir modelling

- Framing
- Model construction
- Scale and variance
- Facies and property models
- Modelling for comfort
- Upscaling

Probability estimation, dynamic modelling, and resources

- Well productivity
- Well testing
- Reservoir simulation
- Reserves and resources