

E-545

▲ Who should attend?

Production engineers and any person interested in the fundamentals of Reservoir Engineering, for a better understanding of their interactions with **day to day field operation activities**.

▲ Duration

5 days

▲ Sessions in English

February 01-05, 2010
Rueil-Malmaison (Paris)

September 06-10, 2010
Rueil-Malmaison (Paris)

French sessions: F-545

▲ Registration

Fees: € 2,120

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▲ Course Coordinator

Dawn BANNER

Ref. **PROD / REGB**

At request, this course may be organized for a single company, and tailored to its specific requirements.

RESERVOIR ENGINEERING FOR PRODUCTION ENGINEERS

OBJECTIVES

To provide the fundamentals of geosciences and reservoir engineering for Oil & Gas industry.

Upon completion of the course, participants know the:

- fundamentals of petroleum geology processes (basin geometry and petroleum system),
- principle of the main techniques (seismic, well logging, well testing) used in exploration and reservoir studies,
- main drainage mechanisms and the principle of reservoir simulation,
- main **reservoir constraints**, and understand their **consequences on field operations**.

COURSE CONTENT

PETROLEUM GEOLOGY

0.75 day

Basin tectonics: extension basins, compressive zones, etc.

Basin infill: clastic and carbonate rocks

Sedimentology and stratigraphy

Petroleum system: source rock, reservoir and cap rocks, hydrocarbons types and main characteristics

Reservoir characterization and modeling

Volumetric reserve estimation and calculation

PETROLEUM GEOPHYSICS

0.25 day

Wave propagation and seismic principles

3D Seismic: acquisition and interpretation

Reservoir geophysics

RESERVOIR FLUIDS

0.50 day

Basic properties of reservoir fluids – Definition for oil & gas

Correlations of physical properties

Empirical relationship between main oil properties: bubble point pressure, formation volume factor, density, compressibility, viscosity...

Empirical relationship of gas properties: compressibility factor, formation volume factor, viscosity, density.

Sampling: bottom hole and surface sampling, representativity of sampling

Water properties

PETROPHYSICS

0.50 day

Conventional core analysis (single phase flow): porosity (definition and measurement), absolute or intrinsic permeability (Darcy's law), inertial effects, Klinkenberg effect, resistivity measurements (Archie's law)

Introduction to Special Core Analysis (SCAL): basics flow properties in porous media (Two-Phase flow, capillary effects, transport equations), wettability and effect on recovery on core, saturation (Water – Oil – Gas), capillary pressure measurements, relative permeability measurements

WELL LOG INTERPRETATION

1 day

Well site logging operations

Environment of measurement (borehole, invasion profile)

Fundamental equations for log interpretation in clean formations

The main log measurements

Qualitative and semi-quantitative interpretation using the quicklook overlay technique :

- identification of fluid contacts

- determination of R_w , resistivity (R_t , R_{xo}), lithology, porosity and saturation

Production well logging

WELL TESTING

0.50 day

Purpose of well testing

Well and reservoir performance and the need for testing

Practical well test operations: types of tests, well testing equipment,

Definitions & typical regimes: Darcy's law, the diffusivity equation, wellbore storage, radial flow regime, skin effect, fractured well, well in partial penetration

Productivity index, radius of investigation

Well test interpretation: pressure curves analysis - pressure derivative

RESERVOIR ENGINEERING AND SIMULATION

1.50 days

Drainage mechanisms

Primary drainage: undersaturated oil reservoir, dissolved gas drive, gas cap drive, oil reservoir with natural water influx, gas field

Secondary recovery: waterflood, gas injection

Introduction to Enhanced Oil Recovery (EOR)

Basics of reservoir simulation:

from geology to dynamic reservoir modeling

petrophysic data used (capillary pressure & relative permeabilities) in simulator

black oil PVT set data

production and well data

reservoir simulation methodology