

Training - Well performance engineering



WPERFE-EN-P



Face-to-face only



60 days

This course provides in-depth technical knowledge in well performance engineering in order to hold rapidly and very effectively, the position of field engineer, design engineer, or project engineer

Level

Knowledge

Public

Engineers (particularly recently graduated engineers or engineers in conversion) looking to acquire in-depth knowledge and best practices of Oil & Gas production

Objectives

Attendees will be able to implement the following skills:

- Discuss main principles of thermodynamics applied to reservoir engineering studies
- Build a PVT model for reservoir simulation and carry out a well test interpretation
- Identify main flow regimes and define or recommend a well test design
- Explain the natural, secondary and EOR mechanisms of production of Oil & Gas reservoirs and discuss their related performance
- Perform simple material balance calculations for matching reservoir parameters/forecast recovery for a real case and consequently reserve definition
- Estimate the ultimate reservoir recovery by decline curve analysis
- Select the relevant reservoir characteristics and fluid properties related to well performance modeling
- Design artificial lift, select the adequate method and optimize well performance
- Analyze the impact of well completion and equipment on well performance, analyze the operation process

Pedagogical & technical resources

- Highly interactive training with industry specialist lecturers
- Multiple teamwork sessions and industrial case studies
- Numerous simulation exercises using corresponding software (MBAL™, PROSPER™ & GAP™)
- Knowledge assessment on a weekly basis

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsible

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the

Program

M01: PETROLEUM GEOLOGIE & GEOLOGICAL FIELD TRIPS

5 days

Petroleum geology, facies rocks and their physical properties, petroleum systems, presentation & visit to petroleum system Lacq Bassin.

M02: RESERVOIR ENGINEERING FUNDAMENTALS

5 days

Reservoir characterization: rocks, fluids, logging & interpretation.

Well testing & interpretation: Darcy's law, diffusivity equation & typical flow regimes, productivity index & radius of investigation.

Reservoir Simulation: reservoir simulation models - Building the models, reservoir simulators - Black-oil, compositional, thermal, chemical, etc. Reservoir simulation workflow

Reserves definition & classification.

M03: RESERVOIR FLUID PROPERTIES - PVT

5 days

Thermodynamics: hydrocarbon families, compositional presentation of reservoir fluids.

Thermodynamics of petroleum fluids: pure component, binary mixture, multicomponent systems. Phase behavior, hydrocarbon fluids: under saturated oil, saturated oil, dry gas, wet gas, retrograde gas. Phase envelope. Measurements: sampling: bottom hole and surface sampling. Representativity and validity of sampling, analysis, PVT studies: oil-gas condensate, fluid modeling: PVT matching.

PVT matching with a PVT EOS package.

M04: DRIVE MECHANISMS FUNDAMENTALS

5 days

Primary recovery: undersaturated oil expansion, solution gas drive, gas gap drive, natural water drive, analytical aquifer models. Hurst & Van Everdingen model. Carter-Tracy model, gas reservoirs with and without aquifer, material balance.

Secondary recovery: multiphase flow in the reservoir, water/immiscible gas injection. Principles, multiphase flow stability and influence of mobility ratio. Diffusive flow, sweep efficiency, water & gas injection.

Material balance: material balance equations for the various drive mechanisms "Drive Index", Practical exercises.

M05: WELL TESTING & WELL TEST ANALYSIS

5 days

Purpose of well testing, practical well test operations: types of tests, equipment, safety and environmental issues.

Definitions and typical flow regimes: radial flow, fractured reservoirs, limited reservoirs and closed reservoirs. Productivity index, radius of investigation.

Basic equations and methods: Darcy's law and the diffusivity equation, time superposition, multirate testing, space superposition, boundary effect, pressure curves analysis, pressure derivative analysis.

Wellbore conditions, Boundary models, test design. Hands-on session...

M06: WELL COMPLETION EQUIPMENT

5 days

Fundamentals of well design, well construction & casing program

Completion equipment & their functions (X-mas tree, THS, DHSV, Nipples, SSD, Packer...).

Several Case studies, Well Performance vs equipment selection.

M07: WELLBORE TREATMENTS

5 days

Identification the nature and the origin of different types of damage.

Flow efficiency, cause of low productivity, location of problems and possible solutions.

Acidizing application in sandstones & carbonates reservoir: acid job design & evaluation.

Hydraulic fracturing: candidate wells, frac fluids & frac propping, design and evaluation.

Sand control: techniques & implementation.

Water shutoff: origins & remedials.

M08: WELL PERFORMANCE & ARTIFICIAL LIFT

15 days

Well performance design for naturally flowing well: inflow/outflow theory and practice, well completion equipment and design optimization.

Artificial Lift (AL) methods design and practice: AL methods and corresponding equipment and performance, ESP and gas lift design.

Case studies: well performance design using PROSPER.

M09: PRODUCTION OPTIMIZATION: INTEGRATED PRODUCTION MODELING

10 days

Case study using MBAL™, PROSPER™ & GAP™. Reservoir performance and modeling: prediction of production profile.

Global production modeling and optimization: full field optimization and forecasting approach; full field development hands-on exercise: prediction constraints.

Teamwork on an integrated project with deliverables to be presented on the last day (jury).

To French entities : IFP Training is referenced to DataDock ; you may contact your OPCO about potential funding.

Please contact our disabled persons referent to check the accessibility of this training program : referent.handicap@ifptraining.com