Advanced Certificate

Advanced Well Test Analysis Certification

5 days **WTAADV-EN-P**

Overview

LEVEL

Skilled

PURPOSE

This course provides an extensive and practical knowledge in well test design and analysis aimed at evaluating well productivity and reservoir parameters in the best technical and economical way. It will deal with data acquired from various well completions, homogeneous and heterogeneous reservoirs, gas shale reservoir, as well as testing various production fluids, oil, gas, heavy Oil & Gas condensate.

LEARNING OBJECTIVES

Upon completion of the course, participants will be able to:

describe practical and advanced Well Test Analysis methods and their applications,

discuss application of results derived from Well Test Analysis in geosciences and reservoir engineering, especially integration of Well Test Analysis results within geological and geophysical models,

perform design and analysis of pressure data acquired in wells completed in heterogeneous reservoirs,

perform design and analysis of pressure data acquired in water, polymers or steam injector wells,

discuss benefits and limitations of Well Test Analysis applied to non-conventional reservoirs.

WAYS AND MEANS

Interactive courses and exercises.

Hands-on practice using state-of-the-art software (SAPHIR™).

Workshop using real field case data.

Software used during workshops: with courtesy of Kappa Engineering.

LEARNING ASSESSMENT

Knowledge assessment with multiple choice questions and open explanatory questions.

PREREQUISITES

Basic well test analysis knowledge.

WHY AN IFP TRAINING CERTIFICATION?

- An international recognition of your competencies.
- A Advanced Certificate delivered.
- An expertise confirmed in Advanced Well Test Analysis Certification.
- Ready-to-use skills.

Agenda

OVERVIEW OF WELL TEST ANALYSIS — 1 d

Well testing definition and applications, DST and rig less testing.
Well Test Analysis. Overview of learning methodology.

Diffusivity equation. Homogeneous reservoirs. Analytical and numerical methods.
Types of flow regimes. Radial, pseudo radial, pseudo-steady state and steady state flow.
Pressure derivative.
Wellbore storage and skin effect.
Drawdown and buildup pressure analysis. Superposition principle.
Average reservoir pressure determination. Interference testing.
Deconvolution method.

HETEROGENEOUS RESERVOIRS TESTING — 0.5 d

Two-porosity reservoirs. Pseudo steady state and transient interporosity flow.
Multilayered reservoirs, with and without cross flow.
Radial and linear composite systems.
Reservoir discontinuities. Sealing and conductive fault, intersecting and parallel faults.
Field case examples.

GAS WELLS TESTING — 0.5 d

Solution to the diffusivity equation for gas.
Gas pseudo pressure and rate dependent skin.
Gas well deliverability. AOFP.
Backpressure tests: flow after flow, isochronal and modified isochronal test.
Testing of dry gas, wet gas and gas condensate reservoirs.
Field case examples.

STIMULATED WELL TESTING — 0.5 d

Infinite and finite conductivity fracture models.
Linear and bilinear flow.
Time to reach radial and pseudo steady state flow regimes.
Wellbore storage effect and fracture skin.
Determination of half-fracture length and fracture conductivity.
Horizontal and fractured horizontal well.
Field cases examples.

INJECTION WELL TESTING — 0.5 d

Secondary recovery and EOR processes.
Oil and water banks. Mobility.
Injection and fall off testing. Interpretation models.
Water and steam front determination.
Average Injection Pressure determination.
Field cases examples.

GAS SHALE RESERVOIRS TESTING — 0.5 d

Modeling fluid flow behavior in unconventional reservoirs.
Gas Shale and Coal Bed Methane (CBM) reservoirs.
Mini frac (DFIT) interpretation.
Pressure Transient Analysis applicable to horizontally multi fractured wells.
Stimulated Reservoir Volume (SRV) determination.
Time to reach fractures interference.
Well interference due to frac operations.
Effect of pressure-dependent rock properties on permeability.
Field case examples.

WELL TEST DESIGN — 0.5 d

Test design methodology according to reservoir evaluation objectives.
Common test string configurations. DST and rig less testing.
Elaboration of testing program and contingencies:
Real time vs. memory data acquisition.
Pressure gauges: resolution, specifications and acquired pressure data quality control.
Offshore well testing.
Reservoir and well candidates for test design.
Field case examples.

WORKSHOP — 1 d

Interpretation of real data acquired in fields of interest by using state of the art software:
Both analytical and numerical methods will be applied.

Test design scenarios for both homogeneous and heterogeneous reservoirs including the expected boundary conditions according to the geological model.