N943: Well Test Interpretation in Practice

Instructor(s): Alain Gringarten

4 Days

Competence Level:
Skilled

Classroom Course

Summary

This course provides participants with the advanced skills and understanding required to analyse complex pressure transient tests. The methodology followed has become the industry standard, systematic way of interpreting well tests in homogeneous and heterogeneous reservoirs, including fissured and multilayered systems. Recommendations for designing tests in such formations are also addressed for oil, gas and multi-phase flow wells.

Learning Outcomes

Participats will learn to:

1. Evaluate, select and apply the appropriate diagnostic methods for analysing presssure transient data.
2. Apply the appropriate well and reservoir models for analysis.
3. Assemble the well and reservoir data needed to design a well test.
4. Formulate and recommend well test objectives.
5. Design a well test to achieve the desired objectives.
6. Perform quality controls on test data.

Duration and Training Method

This is a four day classroom based course, with problem solving sessions for practical experience and immediate application.

Who Should Attend

The course is designed for mid to senior level Petroleum Engineers looking to further their knowledge in conventional reservoirs.

Prerequisites and Linking Courses

A basic understanding of transient well testing nomenclature and familiarity with basic petrophysical and reservoir engineering principles is assumed assumed through work or having attended and introductory class. Class that best follow on from this with conventional reservoirs include N940 (Modern Completion and Production Enhancement Techniques) and N955 (Cased-hole Well Log Interpretation).

Course Content

The course aims to address a number of key topics in this area, but there is some flexibility in the formal itinerary depending on the groups preferences. The key topics that are covered include:

Objectives of well testing:

- Engineering of well performance
- Engineering of reservoir performance
- Reservoir characterisation

Information obtained from well tests:

- Well testing as a signal analysis problem
- Concept of interpretation models and their components (near wellbore, reservoir, boundary effects)
- Interpretation versus reservoir models
- Identification and verification of interpretation models

Interpretation methods:

- Straight line analysis
- Log-log analysis
- Pressure derivative analysis
- Deconvolution

Interpretation models:

- Observation wells in interference tests
- Wellbore storage and skin
- Changing wellbore storage and different types of skin
- Hydraulically fractured wells
- Wells with, limited entry
- Horizontal and slanted wells
- Homogeneous reservoirs
- Double porosity and double permeability reservoirs
- Composite and multilayered reservoirs
- Fault, channel, wedge and baffle boundary effects

Gas wells:

- Dry gas
- Gas condensate
- Mulitphase flow

Test design and practical test considerations:

- Data quality control
- Uncertainty in model choice
- Effects of uncertainty in input data