

Course Code

PE01

Course Title

Pressure Transient Testing: Theory, Interpretation and Analysis

Instructor

Dr. Mustafa Onur



Professional Career

Dr. Onur is a professor and head of the Dept. of Petroleum and Natural gas engineering at Istanbul Technical U., Turkey. He has taught at various academic institutions in different countries; Istanbul Technical University, Istanbul, Turkey; King Saud University, Riyadh, Saudi Arabia; Tulsa University, Tulsa, Oklahoma, USA and involved in various industrial projects for private companies and public companies since 1989. His expertise and interest are in well testing, pressure-transient analysis, formation wireline testing, reservoir simulation, reservoir performance predictions (automatic history matching and prediction) methods, geothermal reservoir engineering, and nonlinear regression analysis for parameter estimation. He holds a BS degree from the Middle East Technical U. in Turkey and MS and PhD degrees from the U. of Tulsa, all in petroleum engineering. He has served on the editorial committees of Turkish Journal of Oil and Gas, SPE Reservoir Evaluation and Engineering, SPE Journal, CT&F (Ciencia, Tecnologia y Futuro, ecoPETROL) as both technical and associate editor and conducted various short courses related to reservoir engineering, well testing, pressure transient testing, reservoir simulation and history matching, reservoir performance predictions, and geothermal reservoir engineering for industry for many years. He was the recipient of the Society of Petroleum Engineer's Outstanding Technical Editor Awards in 2004, 2005, 2007, and 2008. Further, He has over 35 refereed journal publications, over 60 papers presented and/or published in conferences and proceedings, and over 10 funded research projects. A further detailed CV is upon request.

Course Objective and Description

The course provides a fundamental concepts, definitions and methods used in pressure transient testing, interpretation and analysis. The basic theory and practice of pressure transient testing including both conventional well tests and wireline formation tests (DSTs, mini DSTs, interval pressure transient testing) are covered. The course will also cover a review of fluid and rock properties that are essential for pressure transient testing. During the 5-day course, several example applications and problem solving will be given to help the audience to better understand the concepts and application of the methods. Homework will be assigned to the attendees during the course, and a final exam will be given at the end of the course to evaluate each attendee's learning outcomes.

Who Should Attend

Reservoir and production engineers, petrophysicists, geologists, as well as personnel involved with the design

Prerequisite

Interpretation of well tests and wireline formations tests

Learning Level

Intermediate

Duration

5 days

Course Material

A file of Power Point presentation and handouts

Course Outline

Day One

- Introduction: basic reservoir performance concepts, the need for pressure transient testing
- Global flow regimes for reservoir/well performance (Transient, steady state, pseudo- steady State)
- Review of rock and fluid properties needed in pressure transient testing
 - Fundamentals of pressure transient testing
 - Primary purpose of pressure transient testing
 - Methodology of pressure transient testing (Forward/Inverse problem concepts)
 - Test types (Drawdown, buildup, injection, falloff, Interference, Multi-well and vertical interference tests, wireline formation tests)
- Example applications and class exercises

Day Two

- Flow regimes that may be observed in a pressure transient testing
- Models used for interpretation and analysis
 - Wellbore storage and skin effects (phase redistribution, damage and geometric skin)
 - Well completion effects (limited entry, vertical, slanted and horizontal wellbores)
 - Infinite acting flow behavior
 - Reservoir homogeneity and heterogeneity (layered, fractured, composite systems)
 - Boundary effects (sealing and leaky faults, pinch-outs, channels, depletion effects, etc.)
- Methods to analyze pressure transient test data
 - Type-curve matching
 - Straight line methods
 - Diagnostic and derivative analysis
 - Estimating recovery for gas reservoirs
- Example applications and class exercises

Day Three

- Analysis of pressure transients from naturally fractured reservoirs
- Analysis of pressure transients from fractured wells
- Analysis of pressure transients from horizontal wells
- Analysis of multi-well interference test data (Superposition in space)
- Example applications and class exercises

Day Four

- Tests with variable rates
 - Convolution
 - Deconvolution
- Gas well testing
 - Phase redistribution
 - Fluid properties, theory and new term such as pseudo pressure and pseudo time
- Multi-phase flow testing
 - Solution gas drive reservoirs
 - Gas condensate reservoirs
- Example applications and class exercises

Day Five

- Wireline formation testing
 - o DST
 - o Wireline formation testers (single probe, multi-probe, dual-packer w/wo probe configurations) for permeability and permeability anisotropy estimation.
 - o Spherical flow
- Test design
- Uncertainties in rock/fluid used for analysis and their propagation into parameter estimates
- Example applications and class exercises

Antalya, Turkey
 3-7 May
 US\$ 2,950

Istanbul, Turkey
 25-29 Oct
 US\$ 2,950