JUPITER PRIME
Consulting • Training • Advisory
جوبيتر برايم للاستشارات والتدريب

COURSE BROCHURE

# Advanced Well Test Design and Pressure Transient Analysis Training Course

9 – 20 August 2027
Singapore

# Advanced Well Test Design and Pressure Transient Analysis Training Course

**Ref:** 1355_50744 **Date:** 9 – 20 August 2027 **Location:** Singapore **Fees:** 12000 GBP

Well test design and pressure transient analysis is a 2-week advanced training course for reservoir and production engineers who plan drawdown and build-up tests and must turn gauge data into permeability, skin, boundaries and connected volume, and it ends with a well test design and interpretation report for a field well. Deferred production during shut-ins and tighter reserves scrutiny make every test hour count. Jupiter Prime Training runs this course for engineers who own those decisions.

## Why Well Test Design and Pressure Transient Analysis Matters Now

Three pressures shape well testing today: operators who resist long shut-ins because of deferred production, permanent downhole gauges that stream more pressure data than engineers can interpret, and reserves reviewers who want connected volume and boundary evidence before approving development. A company that designs tests carefully obtains clear radial flow and boundary signals at minimum cost; one that does not gets ambiguous derivatives, repeated tests and weak development decisions. The course links test results to the Petroleum Resources Management System PRMS of the Society of Petroleum Engineers SPE, so interpreted volumes and productivity support resource classification.

## Who Gains Most from Well Test Design and Pressure Transient Analysis

- Reservoir engineers who estimate permeability, boundaries and connected volume for field models
- Production engineers who track skin, damage and stimulation results on producing wells
- Well test supervisors who choose gauges, flow periods and surface equipment
- Exploration and appraisal engineers who plan drill stem and extended well tests
- Reserves engineers who use test evidence to support resource categories

Subsurface and well operations groups gain most when the engineers who design tests and those who interpret them attend together and agree one test specification.

## Well Test Design and Pressure Transient Analysis Capabilities

Participants learn to read the log-log derivative as a diagnostic map, then design tests that reach the flow regimes each decision needs.

- Design flow and shut-in sequences that reach radial flow and expected boundaries — test approval and cost
- Calculate permeability-thickness, skin and average pressure from build-up data — stimulation decisions
- Diagnose wellbore storage, fractures, dual porosity and boundaries on derivative plots — reservoir model selection
- Apply pseudo-pressure and rate-dependent skin to gas well tests — deliverability forecasts
- Test interpretation models against geology and production history — field development planners
- Communicate uncertainty in connected volume — reserves and appraisal review panels

## Key Well Test Design and Pressure Transient Analysis Terms

- Pressure derivative — the rate of change of pressure with the logarithm of time, used to identify flow regimes on a log-log plot.
- Skin factor — a dimensionless value describing extra pressure drop near the wellbore from damage, stimulation or partial penetration.
- Wellbore storage — the early-time effect where fluid compressibility in the wellbore masks the formation response after a rate change.
- Radial flow — the flow regime with a flat derivative, from which formation permeability-thickness is calculated.
- Dual porosity — a reservoir model where fractures carry flow while the rock matrix stores fluid and feeds the fractures.
- Radius of investigation — the approximate distance the pressure disturbance has travelled into the reservoir during a test.

## Well Test Design and Pressure Transient Analysis Day by Day

### Day 1: Why Tests Are Run

- Test Objectives Matrix — Linking Permeability, Skin and Volume to Decisions
- Test Types Overview — Drawdown, Build-Up, Interference and Injection Tests
- Drill Stem and Extended Well Tests — Appraisal Choices and Costs
- Deferred Production Trade-Offs — Shut-In Length Against Information Value
- Resource Classification Links — How Test Evidence Supports PRMS Categories

### Day 2: Flow Equations and Reservoir Response

- Diffusivity Equation — Assumptions Behind Every Interpretation Model
- Dimensionless Variables — Scaling Pressure, Time and Distance
- Superposition in Time — Handling Variable Rate Histories
- Radius of Investigation Estimates — Planning What a Test Can See
- Fluid and Rock Properties — Compressibility and Viscosity Inputs

## Day 3: Drawdown and Build-Up Analysis

- Semi-Log Analysis — Horner and MDH Plots for Permeability
- Skin Calculation — Separating Damage from Completion Effects
- Average Reservoir Pressure — MBH and Extrapolation Methods
- Producing Time Corrections — Equivalent Time and Rate Normalisation
- Data Quality Checks — Gauge Drift, Tidal Effects and Phase Segregation

## Day 4: Derivative Diagnostics

- Log-Log Plot Construction — Bourdet Derivative and Smoothing Choices
- Wellbore Storage Signatures — Unit Slope and Hump Interpretation
- Flow Regime Identification — Radial, Linear, Bilinear and Spherical Flow
- Type Curve Matching — Confirming Model Parameters
- Non-Uniqueness Checks — Testing Alternative Models Against Geology

## Day 5: Reservoir Boundaries

- Single Sealing Fault Responses — Doubling of the Derivative Slope
- Channel and Parallel Fault Systems — Linear Flow Late in Time
- Closed Systems and Pseudo-Steady State — Connected Volume Estimation
- Constant Pressure Boundaries — Aquifer and Gas Cap Support
- Distance-to-Boundary Calculations — Feeding Structural Maps

## Day 6: Fractured and Dual Porosity Wells

- Infinite and Finite Conductivity Fractures — Half-Length and Conductivity
- Post-Frac Test Evaluation — Measuring Stimulation Effectiveness
- Naturally Fractured Reservoir Models — Storativity Ratio and Interporosity Flow
- Horizontal Well Responses — Vertical Radial and Late Linear Flow
- Partial Penetration and Limited Entry — Spherical Flow Interpretation

## Day 7: Gas Well Testing

- Real Gas Pseudo-Pressure — Linearising Gas Flow Equations
- Rate-Dependent Skin — Non-Darcy Flow from Multi-Rate Tests
- Back-Pressure and Isochronal Tests — Absolute Open Flow Potential
- Condensate Banking Signatures — Composite Model Interpretation
- Deliverability Curves — Supporting Gas Sales Nominations

## Day 8: Test Design and Operations

- Test Design Simulation — Predicting Flow Regimes Before the Test
- Gauge Selection and Placement — Resolution, Drift and Redundancy
- Surface Test Equipment — Separators, Chokes and Flaring Limits
- Downhole Shut-In Tools — Minimising Wellbore Storage
- Permanent Gauge Data — Extracting Build-Ups from Routine Shut-Ins

## Day 9: Integration and Uncertainty

- Deconvolution — Recovering Longer Responses from Variable Rate Data
- History Matching Test Results — Numerical Models for Complex Geology
- Rate Transient Analysis Links — Production Data Versus Test Data
- Interference and Pulse Tests — Connectivity Between Wells
- Comparison Cases from Oil and Gas Fields — Lessons from Misread Tests

## Day 10: Practising the Well Test Design and Interpretation Report

- Objectives and Design Simulation for an Appraisal Well — Applying Days 1 and 8
- Build-Up Interpretation with Derivative Diagnostics — Applying Days 3 and 4
- Boundary and Fracture Model Selection — Applying Days 5 and 6
- Uncertainty Ranges and Deconvolution Check — Applying Day 9
- Well Test Design and Interpretation Report — Results, Model and Recommendations

## Applying Well Test Design and Pressure Transient Analysis After the Course

- Re-interpret a recent build-up on a producing well with derivative diagnostics and deconvolution, and present revised skin and boundary distances to the asset group.
- Run a design simulation for the next planned test so shut-in length is set by the flow regimes needed rather than by habit.

## Well Test Design and Pressure Transient Analysis Questions FAQ

### What is well test design and pressure transient analysis and why does it matter now?

Well test design and pressure transient analysis is the planning of flow and shut-in periods and the interpretation of the resulting pressure data. It matters now because shut-ins defer production, so each test must deliver clear permeability, skin and boundary evidence.

### Which roles gain most from well test design and pressure transient analysis training?

Reservoir and production engineers gain most. Well test supervisors, appraisal engineers and reserves engineers also benefit, because they specify test equipment, plan appraisal tests and rely on interpreted connected volumes.

### How does well test design and pressure transient analysis differ from a rate transient or production analysis course?

Well test design and pressure transient analysis focuses on controlled flow and shut-in periods. Rate transient courses analyse routine production data; this course covers designing tests, derivative diagnostics, boundaries and gas well methods, and links them to production data only where useful.

## What do you bring back from well test design and pressure transient analysis training?

You bring back a well test design and interpretation report for a field well. It sets out test objectives, the designed sequence, the interpreted model, permeability, skin, boundaries, uncertainty and recommendations for completion or appraisal.

## Well Test Design and Pressure Transient Analysis: The Way Forward

The well test design and interpretation report first informs whether a well needs stimulation, further appraisal or a change in development spacing. Reservoir engineers, production engineers and well test supervisors use it to approve the next test. After its first use, revisit the chosen model against production history, because sustained flow reveals boundaries a short test could not see.