JUPITER PRIME
Consulting • Training • Advisory
جوبيتر برايم للاستشارات والتدريب

COURSE BROCHURE

Advanced Well Log Interpretation for Shaly Sands Training Course

30 May – 10 June 2027
Muscat

Advanced Well Log Interpretation for Shaly Sands Training Course

Ref: 1346_50429 **Date:** 30 May – 10 June 2027 **Location:** Muscat **Fees:** 11700 GBP

Well log interpretation for shaly sands is a 2-week advanced training course for petrophysicists, geologists and reservoir engineers who must turn gamma ray, resistivity, density, neutron, NMR and image logs into reliable net pay, and it ends with a shaly sand formation evaluation report for a real well. Thin-bedded and clay-rich sandstones now hold much of the remaining hydrocarbon in mature basins, where simple Archie answers mislead. Jupiter Prime Training offers this course for interpreters facing those reservoirs.

Why Well Log Interpretation for Shaly Sands Matters Now

Three forces drive demand for sharper log interpretation in clastic reservoirs: infill drilling in mature fields that targets low-resistivity and laminated pay, reserves auditors who expect saturation and cut-off choices to be defended, and new logging tools that produce more data than many teams can integrate. An organisation that interprets shaly sands well books pay that others miss and avoids completing wet zones; one that does not risks bypassed reserves and failed perforations. The course connects log results to the Petroleum Resources Management System PRMS of the Society of Petroleum Engineers SPE, so interpreted volumes support classification decisions.

Who Gains Most from Well Log Interpretation for Shaly Sands

- Petrophysicists who compute clay volume, porosity and water saturation for field studies
- Development geologists who tie log facies and image log features to depositional models
- Reservoir engineers who take net pay, saturation-height and permeability into simulation models
- Operations geologists who choose logging suites and perforation intervals at the wellsite
- Reserves specialists who defend petrophysical cut-offs during audits

Subsurface asset groups gain most when a petrophysicist, a geologist and a reservoir engineer working on the same field attend together and agree one interpretation workflow.

Well Log Interpretation for Shaly Sands Capabilities

Participants move from single-model answers to defended interpretations that reconcile logs, core and test results across laminated and dispersed clay settings.

- Calculate clay volume from gamma ray, neutron-density and spectral logs — net reservoir definition
- Apply Simandoux, Indonesia, Waxman-Smits and dual-water models — water saturation for reserves
- Test NMR porosity partitions against core for bound and free fluid — permeability prediction
- Assess thin beds from image logs and high-resolution curves — perforation interval selection
- Specify cased-hole saturation monitoring runs — production and waterflood surveillance teams
- Communicate cut-offs and uncertainty ranges — reserves classification and audit panels

Key Well Log Interpretation for Shaly Sands Terms

- Shaly sand — a sandstone containing enough clay minerals to raise conductivity and distort porosity and saturation computed from simple models.
- Clay volume — the fraction of rock occupied by clay minerals, derived from gamma ray, neutron-density or spectral logs.
- Cation exchange capacity — the ability of clay surfaces to hold exchangeable ions, which adds conductivity to formation water.
- Low-resistivity pay — hydrocarbon-bearing rock whose resistivity is suppressed by clay or laminations, so it appears wet on logs.
- NMR T2 cut-off — the relaxation time separating bound fluid from free fluid in a nuclear magnetic resonance distribution.
- Saturation-height function — an equation linking water saturation to height above free water level for building reservoir models.

Well Log Interpretation for Shaly Sands Day by Day

Day 1: Clastic Reservoirs and Interpretation Pressures

- Depositional Settings of Shaly Sandstones — Laminated, Dispersed and Structural Clay
- Logging Suite Selection — Matching Tools to Reservoir Questions
- Data Quality Control — Depth Matching, Borehole Effects and Splicing
- Core-to-Log Integration Plans — Calibrating Interpretation from the Start
- Petroleum Resources Management System Links — Why Log Results Feed Reserves

Day 2: Open-Hole Log Physics

- Gamma Ray and Spectral Gamma Ray — Separating Clay from Radioactive Sands
- Laterolog and Induction Resistivity — Invasion Profiles and True Resistivity
- Density and Photoelectric Logs — Lithology and Total Porosity
- Neutron Response — Hydrogen Index and Gas Effects
- Sonic Logs — Porosity, Compaction and Mechanical Properties

Day 3: Clay Volume and Lithology

- Single and Double Clay Indicators — Choosing the Least Biased Estimate
- Neutron-Density Crossplots — Clay Points and Matrix Lines
- Thomas-Stieber Diagrams — Distinguishing Laminated from Dispersed Clay
- Mineral Solvers — Multi-Mineral Models from Elemental Logs
- Clay Typing from Spectral Data — Kaolinite, Illite and Smectite Effects

Day 4: Porosity in Clay-Bearing Rock

- Total and Effective Porosity Definitions — Consistency with Saturation Models
- Shale Corrections for Density and Neutron — Avoiding Double Counting
- Gas-Corrected Porosity — Handling Light Hydrocarbon Effects
- Core Porosity Calibration — Overburden and Clay-Bound Water Adjustments
- Porosity Uncertainty Ranges — Feeding Volumetric Estimates

Day 5: Water Saturation Models

- Archie Parameters a, m and n — Laboratory Derivation and Limits
- Simandoux and Indonesia Equations — Shale Conductivity Corrections
- Waxman-Smits and Dual-Water Models — Cation Exchange Capacity Approaches
- Formation Water Resistivity — Pickett Plots and Produced Water Data
- Model Comparison Exercises — Selecting Saturation for Booking

Day 6: Nuclear Magnetic Resonance Logs

- NMR Measurement Principles — T1, T2 and Echo Trains
- T2 Cut-Offs and Bin Distributions — Bound Versus Free Fluid
- Timur-Coates and SDR Permeability — Calibrating to Core
- Hydrocarbon Typing with Diffusion — Identifying Gas and Light Oil
- NMR in Low-Resistivity Pay — Confirming Movable Hydrocarbon

Day 7: Borehole Image Logs and Thin Beds

- Resistivity and Acoustic Image Tools — Resolution and Borehole Conditions
- Bedding, Cross-Bedding and Fracture Picking — Structural Dip Analysis
- Sand Count from Images — Quantifying Laminated Net Pay
- High-Resolution Resistivity Processing — Thin-Bed Saturation
- Image Facies for Fluvial and Deltaic Sands — Supporting Geological Models

Day 8: Cased-Hole Logging

- Cement Bond and Variable Density Logs — Zonal Isolation Before Perforating
- Pulsed Neutron Capture Logs — Saturation Behind Casing
- Carbon-Oxygen Measurements — Saturation in Fresh or Unknown Water
- Time-Lapse Saturation Monitoring — Waterflood and Gas Cap Movement
- Production Logging Integration — Linking Inflow to Petrophysical Zones

Day 9: Cut-Offs, Rock Typing and Uncertainty

- Clay Volume, Porosity and Saturation Cut-Offs — Defining Net Pay
- Rock Typing and Flow Zone Indicators — Grouping for Simulation
- Saturation-Height Functions — Capillary Pressure to Model Initialisation
- Monte Carlo Petrophysics — Ranges for Pay and Pore Volume
- Comparison Cases from Gas and Oil Fields — Lessons from Bypassed Pay

Day 10: Practising the Shaly Sand Formation Evaluation Report

- Log Conditioning and Clay Volume for a Field Well — Applying Days 2 and 3
- Porosity and Saturation Model Choice — Applying Days 4 and 5
- NMR and Image Log Integration — Applying Days 6 and 7
- Net Pay and Uncertainty Summary — Applying Day 9 Cut-Offs
- Shaly Sand Formation Evaluation Report — Results, Assumptions and Recommendations

Applying Well Log Interpretation for Shaly Sands After the Course

- Re-interpret one previously bypassed interval with the Thomas-Stieber and dual-water methods, and present the revised saturation to the asset group.
- Agree a field-wide cut-off and saturation-height workflow with reservoir engineers so the next model update uses one consistent petrophysical basis.

Well Log Interpretation for Shaly Sands Questions FAQ

What is well log interpretation for shaly sands and why does it matter now?

Well log interpretation for shaly sands is the evaluation of clay-bearing sandstones from logs and core to find porosity, saturation and net pay. It matters now because infill wells in mature fields target low-resistivity pay that simple models miss.

Which roles gain most from well log interpretation for shaly sands training?

Petrophysicists, development geologists and reservoir engineers gain most. Operations geologists and reserves specialists also benefit, because they choose logging suites, perforation intervals and the cut-offs that support booked volumes.

How does well log interpretation for shaly sands differ from a carbonate formation evaluation course?

Well log interpretation for shaly sands centres on clay effects in sandstones. It covers clay volume, Thomas-Stieber analysis and shaly sand saturation models, whereas carbonate courses focus on pore types, vugs and fractures in limestone and dolomite.

What do you bring back from well log interpretation for shaly sands training?

You bring back a shaly sand formation evaluation report for a field well. It documents conditioned logs, clay, porosity and saturation choices, NMR and image results, cut-offs and uncertainty ranges ready for the asset model.

Well Log Interpretation for Shaly Sands: The Way Forward

The shaly sand formation evaluation report first informs which intervals to perforate or test in the next well. Petrophysicists, geologists and reservoir engineers use it to update models and reserves estimates. After its first use, revisit the saturation model and cut-offs against production results, because flowing wells reveal whether the interpretation over- or under-counted pay.