CONCEPT

# Seismic Interpretation: Well Ties, Horizon and Fault Mapping, Depth Conversion and DHIs

3 – 7 October 2027
Riyadh - KAFD district five-star



# Seismic Interpretation: Well Ties, Horizon and Fault Mapping, Depth Conversion and DHIs

**Ref:** 277_15463 **Date:** 3 – 7 October 2027 **Location:** Riyadh - KAFD district five-star **Fees:** 20000 SAR

## Introduction:

Seismic interpretation errors, such as a horizon tied to the wrong reflector, a fault missed in a noisy volume or a time map converted with a single velocity, turn directly into dry wells and misplaced development locations. This Core Concept course trains geoscientists to tie wells to seismic with synthetic seismograms, pick horizons and faults in 2D and 3D data, read reflection terminations and seismic facies, convert time to depth and screen amplitudes for hydrocarbon indicators. Participants finish by assembling a Seismic Interpretation and Prospect Map Pack for one structure.

## Course Objectives:

- Assess how acquisition geometry, fold, deconvolution and migration shape the resolution and reliability of the seismic volume being interpreted
- Build a synthetic seismogram from sonic and density logs and tie well tops to the correct seismic reflectors
- Pick horizons and faults consistently across 2D lines and 3D volumes and classify the structural style they describe
- Interpret reflection terminations, sequence boundaries and seismic facies to predict depositional setting and reservoir distribution
- Convert two-way time grids to depth with a velocity model and screen seismic attributes, AVO responses and direct hydrocarbon indicators
- Produce a Seismic Interpretation and Prospect Map Pack with depth maps, closure, spill point and gross rock volume inputs

## Target Audience:

- Geophysicists who pick, grid and map seismic horizons and faults for exploration and appraisal
- Exploration geologists who build play and prospect maps from seismic and well data
- Development geologists who use seismic to place wells and update structural frameworks
- Geoscience technicians who load seismic volumes, digitise interpretations and maintain project databases
- Reservoir modelling staff who take seismic horizons, faults and depth grids into static models

## Course Outline:

### Day 1: Seismic Data Foundations for Interpreters: Acquisition, Processing and Resolution

- Seismic Reflection Principles: Acoustic Impedance, Reflection Coefficient and Two-Way Time
- Land and Marine Acquisition Geometry: Vibroseis, Air-Gun Sources, Geophones and Hydrophones
- Common Midpoint Gathers, Fold and Offset Distribution in 2D and 3D Surveys
- Processing Sequence Review: Deconvolution, Velocity Analysis, CMP Stack and Migration
- Vertical and Lateral Resolution: Tuning Thickness, Fresnel Zone and Data Quality Checklist

### Day 2: Well-to-Seismic Tie, Wavelets and the Interpretation Framework

- Checkshot and Vertical Seismic Profile Time-Depth Relationships
- Synthetic Seismogram Build: Blocked Logs, Reflectivity Series and Wavelet Convolution
- Wavelet Phase, Polarity Convention and Frequency Content Matching
- Well Top to Reflector Correlation and Tie Quality Scoring
- Interpretation Project Setup: Survey Grid, Line Naming, Horizon Colour Scheme and Loop Ties

### Day 3: Horizon and Fault Interpretation and Structural Styles

- Horizon Picking Methods: Seed-Based Autotracking, Manual Picking and Mis-Tie Loop Closure
- Fault Picking on Vertical Sections, Time Slices and Coherence Volumes
- Fault Polygons, Fault Framework Building and Throw Analysis
- Structural Styles on Seismic: Extensional, Compressional, Strike-Slip and Salt-Related Geometries
- Seismic Stratigraphy: Onlap, Downlap, Toplap, Truncation, Sequence Boundaries and Seismic Facies Mapping

### Day 4: Depth Conversion, Seismic Attributes, AVO, DHIs and Interpretation Pitfalls

- Time-to-Depth Conversion: Interval Velocity, Layer-Cake Models and Well Residual Correction
- Attribute Extraction: RMS Amplitude, Instantaneous Phase, Curvature and Spectral Decomposition
- Amplitude Versus Offset Classes and Pre-Stack Gather Screening at Overview
- Direct Hydrocarbon Indicators: Bright Spot, Dim Spot, Flat Spot and Polarity Reversal
- Interpretation Pitfalls: Velocity Pull-Up and Push-Down, Multiples, Migration Artefacts and Side-Swipe

### Day 5: Case Study: Seismic Interpretation and Prospect Map Pack

- Case Data Review: 3D Volume, Well Logs, Checkshots and Tie Validation
- Case Horizon and Fault Framework Interpretation with Loop-Tied Grids
- Case Depth Map Build with Closure, Spill Point and Crest Identification
- Gross Rock Volume Inputs, Amplitude Support and Structural Uncertainty Range
- Seismic Interpretation and Prospect Map Pack Presentation and Peer Challenge

## Skills You Will Gain:

- Seismic Data Quality Assessment
- Synthetic Seismogram Generation
- Horizon Autotracking
- Fault Framework Construction
- Seismic Stratigraphic Analysis
- Velocity Modelling
- Amplitude Anomaly Screening
- Structural Closure Mapping

## Why Attend This Course:

- Return with a Seismic Interpretation and Prospect Map Pack containing tied horizons, a fault framework and depth maps for one structure
- Stop anchoring maps to the wrong reflector by testing every well tie against a synthetic seismogram and a scored match
- Recognise velocity pull-up, multiples and migration artefacts before they become false closures on a prospect map
- Compare interpretation practice with geophysicists and geologists working clastic, carbonate and salt-affected basins

## Conclusion:

Reliable seismic maps depend on knowing how the data were acquired and processed, tying wells to the correct reflectors and picking horizons and faults that close around every loop. The week moves from reflection principles and resolution through synthetics, structural and stratigraphic interpretation, depth conversion, attributes and hydrocarbon indicators. The final day applies each step to one 3D case and produces a Seismic Interpretation and Prospect Map Pack with closure, spill point and volume inputs ready for prospect review.