

# PETROLEUM EXPLORATION OVERVIEW

**EXP001**

## COURSE DESCRIPTION

The course concentrates on the methods and technologies employed in the exploration phase of the petroleum project life cycle. Starting with plate tectonics and sedimentary basins, it moves on to describe how a petroleum accumulation is formed, from source rock to trap. Surface mapping, geophysical surveys and drilling wells are then explained before moving on to the concepts of petroleum system and petroleum play, followed by a treatment of leads, prospects, volumetric and the concepts of risk and uncertainty.

## COURSE GOALS

To enhance participants' knowledge, skills, and abilities necessary to understand the sedimentary basins and examine the potential of the basin to generate and accumulate petroleum and necessary to understand how to analyze the geological information where petroleum accumulations are possible and discuss tools to locate these areas.

## COURSE OBJECTIVES

By the end of this course, participant will be able to:

- Understand the processes that combine to form a petroleum accumulation.
- Understand how we explore for petroleum, particularly seismic surveying and drilling wells.
- Understand how exploration data are used to build the concepts of the petroleum play and the petroleum system.
- Understand how a petroleum prospect is built and how the risks and uncertainties are assessed.
- Understand how the decision to drill or not to drill is made, and how exploration drilling locations are chosen.

## WHO SHOULD ATTEND

- Reservoir and production engineers and technicians.
- Entry level petroleum geologists, geophysicists, petro physicists and engineers.
- Management personnel in support roles - purchasing, economics, contracting, drafting, database personnel, exploration secretaries, training, human resources, personnel, environmentalists and drilling.

## COURSE DURATION

5 Working Days

## COURSE OUTLINES

### 1. Overview

- Definition of petroleum
- The petroleum project life cycle

### 2. The Geological Setting of a Petroleum Accumulation

- Plate tectonics
- Sedimentary rocks and sedimentary basins

### 3. The Components of a Petroleum Accumulation

- Source rocks:
  - Richness
  - Maturity
  - Proneness
- Migration
- Reservoir
- Seal and trap
- Timing

### 4. Petroleum Exploration - Operations

- Surface geological mapping
- Surveys:
  - Gravimetric
  - Magnetometric
  - Full tensor gravity gradiometry
- Drilling a well:
  - Well construction
  - Mud logging
  - Petrophysical logging
  - Coring
  - Testing

### 5. Petroleum Exploration - Concepts

- The geological model
- Petroleum plays:
  - Common risk segment maps
  - Play fairways

- Petroleum systems:
  - Source kitchen
  - Migration pathways
  - Reservoirs
  - The relative commercial attractiveness of the different types of petroleum
- Leads and prospects

## 6. Exploration Volumetrics and Decision Making

- Volumetrics - resource and reserves
- Uncertainty, probability and risk
- Monte Carlo simulation
- Economic indicators
- Selecting the exploration well location

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