Best Technology Solutions (BTS)

Reservoir Engineering
Basics & Overview

BTS
Training & Consultancy

1st floor, Incubator Building, Masdar City, Abu Dhabi, UAE

00971-2-6452630

00971-50-6652671

info@btsconsultant.com

www.btsconsultant.com

Table of Contents:

- Introduction
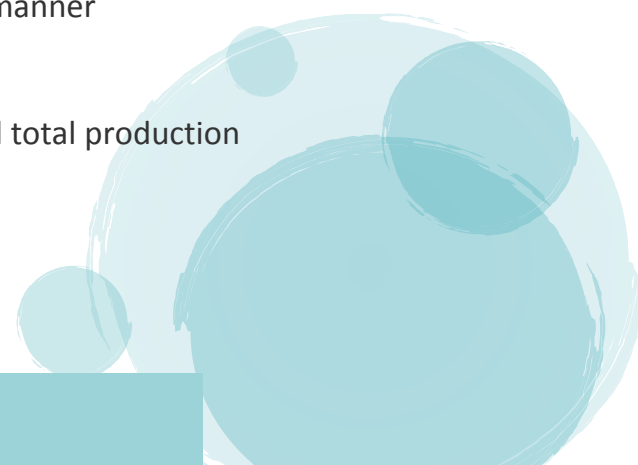- Objectives
- Who should attend?
- Course Outline

Introduction:

This course provides a basic introduction and overview of the subject. It is particularly aimed at entry level engineers who are to become involved in the technical aspects of hydrocarbon exploration and reservoir production.

The aim of Basic Reservoir Engineering is development of a more complete understanding of the characteristics of oil and gas reservoirs, from fluid and rock characteristics through reservoir definition, classification, development plan, and production. The objective of reservoir engineering is to optimize hydrocarbon recovery. This course will introduce basic reservoir engineering concepts and methods to know how much oil & gas is there (accumulation), How much can be recovered (reserves) and how fast can it be recovered.

Objectives:

By the end of this BTS training course, participants will be able to:

- Gain a working knowledge of how the complex subject of petroleum reservoir engineering can be applied in the field in a practical manner
- Construct well bore history schematics
- Import production data and calculate cumulative and total production
- Import pressure test data
- Determine reservoir and well bore properties

- Generate decline curves and extrapolate production and economic cut-offs
- Produce bubble plot maps of production

Who should attend?

Geologists, Geophysicists, Petro physicists working in exploration and exploitation, production engineers and technologists, anyone who are relatively new to the industry, but who have some background in reservoir geology and the production of hydrocarbons.

Course Outline:

Introduction to Basic Concepts of Oil & Gas Accumulations

- Migration of Hydrocarbons
- Key geologic and reservoir definitions
- Traps and their classification
- Reservoir engineering units and dimensional analysis
- Oil and gas recovery process

Characterization of Oil and Gas Reservoirs

- Types of oil and gas reservoirs
- Clay content, heterogeneity and anisotropy
- Natural drive mechanisms

- Elements of reliable geological models
- Naturally-fractured reservoirs

Reservoir Rock and Fluid Properties

- Porosity, permeability, density and compressibility
- Rock wettability and hysteretic phenomena
- PVT characteristics of oil, water and gas
- Phase behavior of hydrocarbon systems

- Capillary pressure
- Consistency and reliability of PVT data
- Relative permeability for two and three-phase flow

Fundamentals of Reservoir Fluid Flow

- Types of fluid
- Flow regimes
- Reservoir geometry number of flowing fluids in the reservoir
- Fluid flow equations
- Darcy€™s Law
- Inflow performance relationship

Volumetric and Material Balance Methods

- Principle of volumetric methods
- Evaluation and recovery of oil and gas reserves
- Classification of reserves, recovery factors, volumetric of oil and gas reservoirs
- Estimation of original oil and gas in place
- Material balance calculations

- Material balance concept, drive index, water influx models
- Material balance concepts
- Limitations of material balance methods

Well Productivity and Recovery Factors

- Productivity index for oil and gas wells
- Recovery factors for primary methods
- Effects of capillary pressure, gravity and mobility ratio
- Productivity improvement in stimulated wells
- Recovery factors in displacement processes

Reservoir Calculations and Performance Predictions

- Multi-phase fluid flow (steady-state and transient)
- Water influx calculations from various aquifers
- Statistical methods for predicting recovery
- Displacement and volumetric sweep efficiencies
- Analysis of common well tests

- Decline curve analysis
- Frontal advance theory and fractional flow
- Applications to water flood and gas flood and EOR methods

Introduction to Reservoir Simulation Methods

- Basic simulation equations for black-oil systems
- Element of simulation studies
- Finite difference concepts
- Input data sources
- History matching