

# WATERFLOODING

## RSE005

### COURSE OVERVIEW

Waterflooding is a vital technique in the field of oil production, enabling the extraction of hydrocarbons beyond primary recovery methods. This intensive and practical course is designed to equip professionals involved in oil production, including reservoir engineers, petroleum engineers, development geologists, and field engineers, with the essential knowledge and skills to implement effective waterflooding strategies for enhanced oil recovery.

Throughout this comprehensive 5-day course, participants will delve into the key elements of reservoir engineering and gain a deep understanding of the intricate processes and factors influencing successful waterflooding operations. From reservoir heterogeneity assessment to pattern selection, from performance prediction to risk assessment and mitigation, this course covers all aspects critical to achieving optimal results in waterflooding.

### COURSE OBJECTIVES

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

- Describe Basic Key Elements of Reservoir Engineering Needed in Waterflooding
- Learn Effect of Reservoir Heterogeneity and How to Quantify it.
- Quantify the Impact of Waterflooding on The Recovery Factor
- List Main Items That Affect the Efficiency of Waterflooding
- Learn Which Pattern is Suitable for Your Reservoir
- Be Able to Use Engineering Methods in Predicting the Performance of Waterflooding
- Explain The Process of Water Treatment and Learn More About Water Properties to Achieve
- Define Check-list for Inspecting a Waterflooding System
- Be Able to Run Risk Assessment for Waterflooding Operations; Defining Hazards and Point out Mitigation Tools
- List & Describe The Main Parameters Needed to Design A Waterflooding Project
- List & Describe Reasons of Waterflooding Failure
- Distinguish rock characteristics and fluid properties that control displacement of oil and thereby influence Waterflooding oil recovery
- Predict incremental oil recovery and develop production profiles
- Specify the components of a well-designed Waterflooding plan
- Estimate injection water requirements
- Monitor Waterflooding performance and optimize oil recovery
- Learn about Smart Water Injection such as Low Salinity (LoSal) Waterflooding

## WHO SHOULD ATTEND

- Reservoir Engineers
- Petroleum Engineers
- Development Geologist
- Field Engineers

## COURSE DURATION

5 Working Days

## COURSE OUTLINES

1. **Pre course evaluation**
2. **Introduction to Waterflooding**
  - HC Recovery (Primary Recovery vs. EOR)
  - Waterflooding Overview
  - Waterflooding Components
  - Waterflooding Economics
  - Reasons of Incomplete Recovery
  - Key Questions in Waterflooding
3. **Fundamentals of Waterflooding**
  - Describing Waterflooding
  - Fundamentals of Immiscible Displacement in Porous Rocks
  - Line Drive Waterflooding Details
  - Pattern Waterflooding Details
  - Effect of Well Pattern
  - Vertical and Areal Sweep Efficiency
  - Industrial Experience in Waterflooding
  - General Remarks
4. **Waterflooding Performance Prediction and Design Aspects**
  - Analogy method
  - Empirical Techniques
  - Analytical Approaches
  - Material Balance Consideration
  - Performance Data Analysis

- Simulation Studies
  - Waterflooding Design Procedure
- 5. Risk Assessment, Uncertainties and Surface Treatment of Waterflooding**
- Water Sources
  - System Design
  - System Inspection
  - Water Quality
  - Sources of Hazards?
  - How to Mitigate?
  - Example of Risk Assessment
- 6. Planning Waterflooding Project, System Optimization and IoSal**
- How to Start Waterflooding Projects?
  - What are Key elements of successful Waterflooding?
  - Why Waterflooding May Fail?
  - System Optimization
  - Low Salinity Waterflooding (IoSal)
- 7. Post course evaluation**

arctic