

# CHARACTERIZATION, EVALUATION AND ENHANCED OIL RECOVERY IN NATURALLY FRACTURED RESERVOIRS

## RSE026

### COURSE OVERVIEW

In this course, oil recovery mechanisms in fractured reservoirs will be reviewed and discussed. Most attention will be devoted to experimental studies on fluid flow in fractured reservoirs and imaging techniques to visualize fluid flow in-situ. Special focus will be on complementary imaging in the laboratory, where important processes in fractured reservoirs are studied at different length scales. A solid understanding of the flow functions governing fluid flow in fractured reservoirs provides the necessary foundation for upscaling laboratory results to the field scale using numerical simulators.

### COURSE OBJECTIVES

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

- Review and understand the different types of naturally fractured reservoirs (Type I, Type II, Type III, Type IV, and Type V).
- Explore and discuss the recovery mechanisms in fractured reservoirs, including scaling laws, shape factor, and the influence of wettability.
- Familiarize participants with complementary imaging techniques at micro, core, and block scales to visualize fluid flow in fractured reservoirs.
- Examine the effects of wettability on fluid flow in core plugs and block samples in fractured reservoirs.
- Gain knowledge about enhanced oil recovery (EOR) methods specifically designed for fractured reservoirs at micro, core plug, and block scales.
- Focus on foam injection as an EOR technique in fractured reservoirs.
- Understand the behavior and characteristics of naturally fractured reservoirs composed of different rock types (carbonates, shales, sandstone).
- Investigate the influence of wettability on production in naturally fractured reservoirs.
- Explore experiments conducted by scholars in the field of fractured reservoirs.
- Study thermal EOR methods applicable to fractured reservoirs, including cyclic steam stimulation, continuous steam injection, in-situ combustion, steam-assisted gravity drainage, and vapor extraction (VAPEX).

### WHO SHOULD ATTEND

Reservoir engineers, Petroleum engineers, production technologists, geologist, geophysicists, petrologists and all technical individuals and managers dealing with naturally fractured reservoirs and enhanced oil recovery processes.

## COURSE DURATION

5 Working Days

## COURSE OUTLINES

### Day 1

- Pre course evaluation.
- Types of Naturally fractured reservoirs
  - Type I, type II, Type III, Type IV and Type V
- Recovery Mechanisms in fractured reservoirs
  - Scaling laws
  - Shape factor
  - The influence of wettability

### Day 2

- Complementary imaging techniques
  - The micro scale
  - The core scale
  - The block scale
- Complementary imaging in fractured reservoirs
  - Wettability effects in core plugs
  - Wettability effects in block samples
    - Strong water wet
    - Weak water wet
    - Weak oil wet

### Day 3

- Enhanced oil recovery in fractured reservoirs
  - EOR in micro scale
  - EOR at the core plug scale
  - EOR at the block scale
- EOR by foam injection in fractured reservoirs

### Day 4

- Natural fractured reservoirs
  - Fractured carbonates
  - Fractured shales

- Fractured sandstone
- Behavior of naturally fractured reservoirs
- Hydraulically fractured wells
- Influence of wettability on production
- Experiments conducted by scholars

#### **Day 5**

- Thermal EOR in fractured reservoirs
  - Cyclic steam stimulation in NFR
  - Continuous steam injection in NFR
  - In-situ combustion in NFR
  - Steam Assisted Gravity Drainage in NFR
  - Vapor Extraction (VAPEX) in NRF
- Post course evaluation.

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