WATER QUALITY PARAMETERS FOR RESERVOIR MANAGEMENT

RSE020

COURSE DESCRIPTION

One of the critical challenges facing oil companies to maximize recovery is from existing water-floods. Besides water availability and quality, the subsurface displacement process is of key importance to understand field performance and maximizing water-flood reserves.

This course addresses the basic Reservoir Engineering concepts of water-flooding. It will assume that the participants have basic knowledge of the Darcy equation and will build on it to explain the key aspects of oil or water flow inside a reservoir.

Attention will be given to the impact of wettability and complex geological structures. Especially the impact of well architecture and pattern effects will be explained. Various options for production optimization will be discussed. Finally, key elements of water-flood screening tools and project management will be explained.

COURSE GOAL

To enhance the participant's knowledge, skills and abilities necessary to understand the key analytical techniques that a reservoir engineer can apply to understand and manage their water-floods optimally, stability criteria and stream line analysis.

COURSE OBJECTIVES

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

- Understand principles of water flooding.
- Understand key Reservoir Engineering techniques to design and analyze water-floods.
- Monitor Water Operating Condition (Quality, Quantity, Pressure & Temperature).
- Adjust water flow rate at transit lines & wellheads.
- Appreciate the strengths and weaknesses of each technique.
- Discuss water-flood operations in a multi-disciplinary team.
- Understand how to optimize subsurface water-flood designs, considering the full life cycle.
- Have an insight into water-flood screening and project management aspects.

WHO SHOULD ATTEND

- Petroleum and Reservoir Engineers who are involved in water-flooding studies and operations
- Supervisors who want a better understanding of current Reservoir Engineering techniques, to be able to discuss these with their experienced staff and make more informed decisions.
- Field Operator

COURSE DURATION

5 Working Days

COURSE OUTLINES

1. **Reservoir Data Gathering and Analysis**

   - Introduction: Causes of excess water production.
   - Data collection for problem identification.
   - Integration of data collected.
   - Collect samples, readings , and operate valves.
   - 14 different types of water production (based on subsurface source and water flow paths).
   - Problem well diagnosis (methods and field examples).
   - Wellbore and near wellbore water shutoff technologies.

2. **Conformance Control and Water Shutoff**

   - Gels for water shutoff.
   - Polymer flooding.
   - Down-hole sink technology.
   - Selection of water control treatment.

3. **Analysis and Treatment of Oilfield Water**

   - Analysis and treatment of produced water.
   - Scale, bacteria and corrosion problems.
   - Water flooding ,reservoir souring and water breakthrough.

4. **Water Injection Wells: Water Quality / Injection Well Testing**

   - Water quality requirements for re-injection and surface disposal.
   - Water quality requirements for surface discharge.
   - Water quality requirements for offshore discharge to the sea.
   - Models for injectivity decline in injection wells with matrix injection.
   - Performance prediction for injection wells.
   - Selecting water treatment equipment based on water quality specifications, water volumes, temperature and pressure.
   - Down-hole vs surface separation and re-injection.
   - Sub-sea vs platform water handling.

5. Field case studies:

- Fractured injection wells.
- Fractured Injectors
- Injection into unconsolidated sands (with sand control).
- Impact of water re-injection on reservoir performance.
- Economics and post-treatment analysis.