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jh

This may also be of interest

Simulation of Enhanced  
Oil Recovery Methods

Oil Recovery Methods

Water Alternate Gas  
EOR

EOR

Water Shut off and  
Conformance

Conformance

## Description

This course is designed to cover all the aspects required for a successful design, implementation, and operation of a water flooding project, including theoretical and operational practices, it describes the parameters that influence the waterflooding performance, starting from the reservoir, the rocks, the fluids, the wells, the production, and the treatment facilities. It will include the description of analytical and numerical prediction methods and practices, surveillance methods, and monitoring techniques to prevent, detect, and correct common operational problems in waterflooding projects.

The overall waterflooding process in the system reservoir-wells-facilities is described including the well pattern selection, wells injectivity calculations, design's procedures for the production and injection system, produced water analysis, chemical treatments and methods to identify potential problems and solutions. Various actual field cases applications are explained with in-class exercises.

This training will feature an actual field case application selecting a candidate reservoir for a water flooding operation, applying the design criteria for the components of the water plant, the calculation of water flooding injectivity, predicting the production performance, applying diagnostics and surveillance practices and implementing corrective actions.

This course utilizes a variety of proven learning techniques to ensure maximum understanding, comprehension and retention of the information presented. The course is designed as a blended environment of presentation, class exercises, field application, analysis and several industry videos showing all processes.

## Objectives

- Learn and apply surface and subsurface water flooding principles and fundamentals
- Understand and apply analytical and numerical prediction methods for waterflooding projects
- Learn fundamentals to choose suitable candidate reservoirs for water flooding operations
- Identify the various components and function of a water flooding plant
- Identify water flood problems and how to solve them.
- Learn waterflooding and surveillance and monitoring practices

## Audience

- Operation engineers
- Production Engineers
- Reservoir Engineers
- Facilities Engineers & other discipline
- Geologists & Petrophysicists
- Engineers who are new to the profession
- Other individuals and professionals involved with water flooding.
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## Content

### Day 1

#### Reservoir Properties and Design Factors of Water Flooding

- Definition and history of water flooding
- Water flood performance measurements
- Water sources of sweep water, good water, and bad water
- Factors to consider in water flooding design
- Types of water flood patterns and selection of a flood pattern
- Rock/fluid properties for reservoir engineering calculation

### Day 2

#### Frontal Displacement Theory and Water Flooding Injectivity

- Analytical models: Buckley-Leverett and Welge methods
- Calculation of time to breakthrough and cumulative water injected
- Calculation of water flood injectivity and stages of water flooding
- Prediction methods: Stiles, Craig-Geffen-Morse, and Dykstra-Parsons
- Calculation of areal and vertical sweep efficiencies
- Main reservoir problems of water flooding project

### Day 3

#### Problems/Solutions of Water Flooding

- Phenomena of water fingering and tonguing
- Casing, tubing or packer leaks and channel flow behind casing
- Moving oil-water contact and watered-out layer without crossflow
- Fractures or faults between injector and producer wells
- Calculation of critical rate for water coning
- Using reservoir simulation for water flood optimization.

### Day 4

#### Diagnostics, Monitoring, and Surveillance of Water Flooding

- Monitoring water flood techniques and used tools
- Diagnostics, indicators, and surveillance of water flooding
- Well Diagnostics for water control using different ways
- Recovery plot, production history plot, and decline-curve analysis
- WOR diagnostic plot plus shut-in and choke-back analysis
- Special diagnostics for Vertical Communication.

### Day 5

#### Water Control Solutions

- Mechanical solutions for water-control problems
- Chemical solutions and squeeze cement treatments
- Rigid gels for near wellbore shutoff of excess water
- Injector problems and risk assessments
- Field-wide considerations for water flooding
- An integrated approach for cost saving operations
- Wrap Up and Conclusions

End of Training