

CHEMICAL FLOODING

RSE027

COURSE OVERVIEW

This course gives an overview of oil recovery processes that involve the use of polymer, surfactant, alkali, gel, and a combination of them. Furthermore, it reviews reservoir engineering fundamentals and describes the principles for a variety of chemical enhanced oil recovery processes. The current status of these technologies is discussed, and guidelines are presented for initial screening for each process corresponding to particular field conditions. Examples of laboratory and field performances are presented. Simulation exercises are used for each process.

COURSE OBJECTIVES

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

- Understand benefits, limitations, and selection criteria for chemical enhanced oil recovery (EOR) processes.
- Learn laboratory testing and scoping simulation techniques for pilot and field designs.
- Evaluate field-specific screening techniques for chemical EOR methods.
- Assess economic considerations and incremental oil recovery potential.
- Analyze impact on production facilities and personnel training.
- Understand areal and vertical sweep efficiencies and residual oil saturation.
- Gain knowledge of polymer flooding, surfactant/polymer (SP), alkaline/surfactant/polymer (ASP), and conformance control methods.
- Learn properties of polymers, surfactants, alkalis, gels, and microemulsions.
- Apply laboratory screening and field design principles for different chemical EOR methods.
- Gain familiarity with reservoir simulators for chemical EOR modeling.
- Develop skills in simulation exercises for performance evaluation.
- Understand alkali's effect on phase behavior and alkaline solutions in EOR.
- Explore performance control and water shutoff methods (bulk gel, CDG, PPG, Bright Water).
- Learn conformance control method selection and evaluation through laboratory screening and field examples.
- Evaluate economic feasibility and limitations of chemical EOR methods.
- Enhance understanding of concepts, practices, and challenges in chemical EOR.
- Apply knowledge to design, implement, and manage chemical EOR projects.
- Improve skills in numerical simulation, screening, and EOR planning.

WHO SHOULD ATTEND

Engineers, geoscientists, management personnel or other technical personnel with at least a B.S. degree and some experience in reservoir engineering.

The course benefits individuals who are responsible for the design, implementation and management of chemical EOR projects. However, the contents of this course are also beneficial for other technical personnel involved in numerical simulation studies, screening, and planning of EOR applications.

This course may interest new recruits as well as experienced professionals who want to gain a better understanding of the concepts, practices, benefits, and limitations of chemical EOR methods.

COURSE DURATION

5 Working Days

COURSE OUTLINES

Day 1

- Pre course evaluation.
- Evaluate benefits and limitations of different chemical EOR processes
- Select laboratory tests and perform scoping simulations for pilot and field designs
- Screen these techniques for particular fields
- Set expectations on incremental oil recoveries and the economics
- Determine impact of these recovery techniques on production facilities and personnel training

Day 2

- Review of areal and vertical sweep efficiencies
- Heterogeneity and vertical sweep efficiency
- Residual oil saturation
- Enhanced Oil Recovery (EOR) methods
- Chemical EOR methods

Day 3

- Polymer flooding - polymers and their properties
- Laboratory screening
- Polymer flood field design and example field results
- Overview of reservoir simulators for polymer flooding
- Example simulations

- Surfactant/polymer (SP) methods
- Surfactant-brine-oil phase behavior
- Microemulsion properties

Day 4

- Capillary desaturation and oil mobilization
- Laboratory screening
- Field examples and designs
- Reservoir simulators for SP
- Example simulations

Day 5

- Alkaline/Surfactant/Polymer (ASP) methods
- Effect of alkali on phase behavior
- Laboratory screening
- Field examples and designs
- Reservoir simulators for ASP
- Example simulations
- Performance Control/Water Shutoff Methods
- Overview of conformance control options (i.e. bulk gel, CDG, PPG, Bright Water)
- Gel properties
- Laboratory screening
- Field examples and designs
- Reservoir simulators for conformance control methods
- Post course evaluation.

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