

Polymer Flooding

Basic Course for Engineers and Managers

This course provides a comprehensive introduction to the most widely used chemical EOR method: polymer flooding. Different classes of polymers used for EOR will be introduced. Participants will learn the methods of polymer flooding, including reservoir screening, laboratory tests, pilot phase, and field implementation. The use of polymer in polymer/gel conformance will also be discussed. Several field examples of polymer and polymer/gel will be reviewed.

Target Audience

Any staff member with interest in polymer flooding and basic knowledge of reservoir engineering.

Skills Learned in Course

Participants in the course will learn to:

- Evaluate benefits and limitations of polymer flooding over other EOR processes
- Select laboratory tests for polymer flooding
- Discuss critical parameters such as injectivity, permeability reduction factor, and retention on both lab and field scales
- Screen particular fields for application of polymer flooding
- Simulation models and parameters for polymer flooding; discuss the critical parameters for history matching (optional)
- Conformance control methods using polymer/gel
- Set expectations on incremental oil recoveries and the economics
- Determine impact of polymer flooding on production facilities and personnel training

Course Description

Polymer flooding is the most widely used chemical EOR method. It uses polymer as a mobility control agent to improve sweep and displacement efficiencies for both. This course reviews fundamentals for reservoir engineering and also polymer flooding. The current status of polymer flooding technology is discussed. Guidelines are provided for initial screening of polymer flooding corresponding to particular reservoir conditions. Laboratory and field examples are presented. Physical models of polymer flooding are reviewed.

Course Content

- Overview of polymer flooding techniques
- EOR Mechanisms of polymer flooding
 - Vertical and Volumetric sweep efficiencies
 - Displacement efficiencies and fractional flow theory
- Polymers and their properties
 - Synthetic polymers vs. biopolymers
- Laboratory screening
 - Thermal stability
 - Rheology
 - Sensitivity to hardness and salinity
 - Permeability reduction
 - Retention
 - Inaccessible Pore Volume
- Heavy oil and unstable polymer floods
- Field design and facilities
- Field case review
- Reservoir simulators for polymer flooding
- Polymer/gel conformance control methods