Chemical EOR Simulation Techniques

Technical Course for Reservoir Engineers

Simulation of Chemical EOR (CEOR) in reservoirs involves complex models which require training to properly apply; this course will guide clients through a comprehensive program to acquire this knowledge. Participants will learn about various simulation products and be trained in them. They will simulate the life cycle of CEOR, from bench-scale tests to field scale. By the end of the training, participants will have solid foundation in independent simulation of CEOR, including polymer, surfactant polymer (SP), alkaline-surfactant polymer (ASP), and more.

Target Audience

This course will benefit any staff member with an interest in simulation of chemical EOR and basic knowledge of reservoir simulation techniques.

Skills Learned in Course

Participants in the course will learn to:

- Understand critical differences in simulators and their various advantages
- Match parameters of CEOR in simulators of interest (UTCHEM, STARS, Eclipse)
- Import/export data and models from various simulators
- Use simulators to match core-floods
- Simulate pilot-scale flood
- Recognize and fix common problems in CEOR simulation
- Understand important sensitivities in CEOR
- Establish realistic performance expectations for all levels of scale

Course Description

The course will begin with a short overview of chemical EOR, which will assume some background knowledge in the field and in reservoir engineering. Afterwards participants will work independently, under the supervision of UEOR staff, to model and simulate various aspects of CEOR. Starting with simple cases and situations, like polymer core-flooding, students will build their understanding of simulation of CEOR step-by-step. Evaluation of the different simulators and the models they use will be emphasized.

After students show command of basic topics, more challenging, complex and complete models will be introduced. This will include coreflood matching of P, SP and ASP floods. Based on coreflood results, students will learn how to design and implement pilot scale simulations using the various products available. Pilot scale sensitivity and performance benchmarking will be included. Throughout the course participants will use real data from fields and corefloods in executing their simulations. The ultimate objective is for students to achieve confidence in simulation of most aspects of CEOR. Course material can be customized to a limited extent to suit client's needs.

Course Content

- Reservoir life cycle
- CEOR Overview
- CEOR in STARS, Eclipse and UTCHEM
  - Displacement modeling in various simulators
  - Current techniques (Polymer, SP, ASP, AP, SF) available in simulators
  - Advantages and limitations of simulation tools
- Laboratory test modeling
  - Various models available
  - Advantages and disadvantages of simulators
  - Evaluate quality of matching lab data
- Core-flood matching
  - Based on real core-floods
  - UTCHEM and commercial simulators
  - Independent simulation with assistance from staff
- Pilot scale simulation
  - Based on prior core-flood match
  - Selecting best simulator / strategy for pilot simulation
  - Importing /Exporting data and models various simulators
  - Selection of pilot area
  - Evaluation of performance
  - Parameter sensitivity
  - Scale up to field scale will be discussed