Chemical EOR Simulation Techniques

Technical course for reservoir engineers

Simulation of Chemical EOR in reservoirs involves complex models which require training to accurately 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 feel confident in independent simulation of CEOR. The full course lasts approximately 4 weeks.

Target audience

Technical staff members involved in reservoir engineering simulation of CEOR will benefit most from this course. The models involved in the course are complex, so a background in CEOR is helpful; We suggest having at least one year of CEOR-related experience or taking the 'Introduction to CEOR' course before taking Chemical EOR Simulation Training.

Skills learned in course

- 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
- Simulate field-scale flood
- Recognize and fix common problems in CEOR simulation
- Understand important sensitivities in CEOR
- Discriminate between high and low quality work in CEOR simulation
- 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 core-flood matching of SP and ASP floods; student's simulations will be verified by staff. Based on core-flood 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. Finally, simulation of the full field scale for CEOR will complete the training. Throughout the course participants will use real data from fields and core-floods in executing

their own 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 and role of CEOR

- 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
    - Cost

- Field scale simulation
    - Pattern selection
    - Evaluation of performance
    - Parameter Sensitivity
    - Cost