

SURTEK

Practical Chemical Enhanced Oil Recovery

Training Course

TRAINING COURSE AGENDA

Day 1 : Mechanistics of CEOR

- Introduction
- Oil Recovery Basics
- Capillarity and Wettability
- Alkaline Agents (A)
- Surfactants (S)
- Mobility Ratio
- Polymers (P)
- Total Recovery Efficiency - ASP

Day 2 : Project Design

- Reservoir Screening
- Laboratory Studies
- Numerical Simulation
- Economics
- Pilot Design

Day 3 : Chemical Flood Application

- Chemical Injection Facilities
- QC/QA
- Chemical EOR Potential Issues
- Case Studies
- Closing Remarks

TRAINING COURSE DETAILS

Day 1: Mechanistics of CEOR

Introduction

Surtek: Who we are
Chemical Flooding History and Potential

Oil Recovery Basics

IOR/EOR Techniques
Oil Recovery Equation (Efficiencies)
Chemical Flood Steps

Pore Displacement Efficiency

Capillarity & Wettability
Capillary Number Correlation
Alkaline Agents
Surfactants
IFT + Relative Permeability

Volumetric Sweep Efficiency

Mobility Ratio + Fractional Flow
Polymer Basics
Polymer Characteristics

- Molecular Weight
- Charge
- Water Solubility

Polymer Stability

- Chemical Degradation
- Thermal Degradation
- Mechanical Degradation

Inaccessible pore volume
Adsorption / retention
Polymer Gels

Total Recovery Efficiency

ASP

Day 2: Project Design

Reservoir Screening

Screening Parameters / Reservoir Characteristics

Laboratory Studies

Fluid Analysis
Fluid-Fluid Evaluation

- Interfacial Tension and Phase Behavior
- Produced Water Dilution
- Apparent Viscosity and Screen Factor
- Hydrodynamic Volume

Fluid-Rock Design

- Static Adsorption
- Linear Corefloods
- Oil Recovery Corefloods
- Radial Corefloods

Other Laboratory Considerations

Numerical Simulation

Simulator Options
Reservoir Characterization
Model Calibration (History Matching)
Coreflood Simulation & Calibration
CEOR Predictions & Sensitivities
Effective Pore Volume

Economics

CEOR Costs (Chemicals, Facility, etc.)
Project Economics
Timing

Pilots

Objectives
Pilot Planning
Pilot Pattern Consideration

Day 3: Chemical Flood Application

Facilities

Water Treatment Methods
Water Softening Methods
Chemical Storage and Mixing
Facility Photo Tour

QC/QA & Performance Monitoring

Sampling Points and Method
Filter Ratio and Sample Tests
Trouble Shooting

CEOR Concerns

Scale
Produced Fluid Emulsions
Polymer Degradations and Issues
Corrosion

Case Studies

Failed Projects

Successful Projects

- Rapdan Field
- Marmul Field
- Chateaufrenard Field
- Hitts Lake Field
- Hankenbuettel Field
- North Oregon Basin
- Big Horn Basin
- Thompson Creek
- Cambridge
- Tanner
- Mellott Ranch
- David Project
- Etzikom
- Warner
- Instow Phase I
- Daqing
- Minas

Field applications to watch

Concluding Remarks