CONCEPT

Enhanced Oil Recovery (EOR): Screening, Mechanisms and Pilot Design

19 – 23 September 2027
Riyadh - KAFD district five-star



Enhanced Oil Recovery (EOR): Screening, Mechanisms and Pilot Design

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Introduction:

Enhanced oil recovery EOR decisions on mature fields are often taken on screening tables alone, before miscibility, chemical phase behaviour or heat losses are tested, so pilots fail or incremental oil never pays for the injectant. This Core Concept course works through recovery stages and residual oil targets, then miscible and immiscible gas injection, polymer, surfactant and ASP flooding, steam methods, low-salinity water, coreflood programmes, pilot layout, surveillance and project economics including the CO2-EOR link to storage. Participants build an EOR Screening and Pilot Proposal for a candidate reservoir.

Course Objectives:

- Quantify the remaining and residual oil target of a mature reservoir and break recovery into microscopic displacement and volumetric sweep components
- Screen gas, chemical, thermal and low-salinity EOR methods against oil, rock and reservoir conditions and rank the candidates
- Specify miscibility tests, WAG parameters and injectant selection for a CO2, hydrocarbon or nitrogen gas injection scheme
- Evaluate polymer, surfactant, alkaline and ASP formulations and steam processes from laboratory and field performance data
- Design a coreflood programme, pilot pattern and surveillance plan with measurable success criteria
- Build incremental oil forecasts and project economics for an EOR scheme, including CO2 purchase, recycling and retained volumes

Target Audience:

- Engineers who forecast recovery and select improved recovery options for mature oil fields
- Engineers who design gas, water-alternating-gas and chemical injection schemes and their injectant supply
- Specialists who plan and interpret EOR laboratory programmes such as slim-tube tests, phase behaviour scans and corefloods
- Engineers who run pilot and field surveillance, including tracers, injection profiles and produced fluid sampling
- Engineers and analysts who prepare incremental oil cases and economics for EOR investment reviews

Course Outline:

Day 1: Recovery Stages, Residual Oil Targets and EOR Screening

- Primary, Secondary and Tertiary Recovery Stages and the Remaining Oil Target
- Residual Oil Saturation and the Capillary Number Desaturation Curve
- Microscopic Displacement and Volumetric Sweep Efficiency Breakdown
- Mobility Control, Viscous Fingering and Gravity Override in EOR Processes
- EOR Screening Criteria Tables by Oil Gravity, Viscosity, Depth, Permeability and Temperature

Day 2: Gas Injection EOR: Miscible CO2, Hydrocarbon and Nitrogen

- Minimum Miscibility Pressure from Slim-Tube and Rising-Bubble Tests
- First-Contact and Multi-Contact Miscibility: Vaporising and Condensing Gas Drives
- CO2 Oil Swelling, Viscosity Reduction and Immiscible CO2 Displacement
- Hydrocarbon Gas and Nitrogen Injectant Selection Matrix
- Water-Alternating-Gas WAG Ratio, Slug Size and Cycle Design

Day 3: Chemical and Thermal EOR Mechanisms

- Polymer Flooding: Solution Viscosity, Adsorption, Retention and Shear Degradation
- Surfactant Flooding: Ultra-Low Interfacial Tension and Salinity Phase Behaviour Scans
- Alkaline and Alkaline-Surfactant-Polymer ASP Flooding with In-Situ Soap Generation
- Cyclic Steam Stimulation and Steamflooding Heat Losses and Steam-Oil Ratio
- Steam Assisted Gravity Drainage SAGD and In-Situ Combustion at Overview

Day 4: Emerging Methods, Laboratory Programmes, Pilots and Surveillance

- Low-Salinity Water Injection, Wettability Alteration and Microbial EOR at Overview
- Tertiary Coreflood Programme Design and Incremental Recovery Measurement
- EOR Pilot Layout: Pattern Choice, Observation Wells and Success Criteria
- Interwell Tracers, Injection Profile Logs and Time-Lapse Monitoring of EOR Fronts
- EOR Problem Cases: Early Gas Breakthrough, Polymer Injectivity Loss, Emulsions and Scale

Day 5: EOR Economics, CO2-EOR and Storage, and Pilot Proposal Case Study

- EOR Project Economics: Incremental Oil Forecast, Injectant Cost per Barrel and Utilisation Factor
- CO2-EOR Purchase, Recycling and Net CO2 Retained Underground for Storage
- Case Study: Screening a Mature Field Data Pack Against Candidate EOR Methods
- Pilot Proposal Build: Laboratory Plan, Pattern, Surveillance and Decision Gates
- EOR Screening and Pilot Proposal Presentation and Technical Challenge Panel

Skills You Will Gain:

- Residual Oil Target Assessment
- EOR Method Screening
- Miscibility Evaluation
- Chemical Flood Formulation Review
- Thermal Recovery Evaluation
- Coreflood Programme Design
- Pilot Surveillance Planning
- EOR Project Economics

Why Attend This Course:

- Return with an EOR Screening and Pilot Proposal that names the preferred method, laboratory tests, pilot pattern and decision gates for a candidate reservoir
- Reject unsuitable EOR methods early by testing screening results against miscibility, phase behaviour and heat-loss evidence
- Spot the signs of early gas breakthrough, polymer injectivity loss or emulsion problems before a pilot is judged a failure
- Compare gas, chemical and thermal recovery experience with engineers from different reservoirs, operators and consultancies

Conclusion:

Enhanced oil recovery adds value only when the method matches the reservoir, the laboratory work proves the mechanism and the pilot is designed to answer clear questions. The course moves from residual oil targets and screening to gas injection, chemical and thermal processes, low-salinity water, coreflood programmes, pilot surveillance and economics, including how CO2-EOR retains carbon dioxide underground. Participants leave with an EOR Screening and Pilot Proposal ready for technical review.