Enhanced Oil Recovery with Gas Injection - EORG

COURSE

About the Course

On average nearly two-thirds of the original oil in place remains after reservoir abandonment following secondary recovery. The low oil recovery is primarily the result of reservoir heterogeneity, unfavorable fluid and rock properties, poor waterflood management, and cost considerations. This leaves a significant target for enhanced oil methods. Recent focus by many governments to sequester CO2 also provides incentive to initiate new gas floods. One of the most accepted robust, and widely used technologies for enhanced oil recovery (EOR) is gas flooding. Gas flooding is the injection of hydrocarbon or nonhydrocarbon components into oil reservoirs that have typically been waterflooded to residual oil. Injected components are usually gases at atmospheric temperature and pressure and may include mixtures of hydrocarbons from methane to propane, and also carbon dioxide, nitrogen, and even hydrogen sulfide. The key to successful gas flooding is to contact as much of the reservoir with the gas as possible and to recover all of the oil once contacted. Injected gases must be designed to be miscible with the oil so that oil previously trapped by capillary forces is transferred into a more mobile phase that flows easily to the production well. Unfortunately, miscibility is not always possible and reservoir heterogeneities can cause gas to cycle through one or more layers, which results in poor sweep and overall recovery efficiency.

This course gives a comprehensive understanding of immiscible gas and compositionally enhanced recovery processes and the important variables that influence the gas flooding process. The course contains both theoretical and practical material so that an engineer can apply learned knowledge to his/her unique reservoir. The course discusses process optimization to reduce production costs while maximizing oil recovery and income. Compositional simulation using equations-of-state are used to demonstrate how to optimize gas design parameters for water-alternating-gas floods. Published case histories from around the world are reviewed to provide an understanding of what works where, what fails, and why. The course is supplemented with the SPE Fundamentals of Enhanced Oil Recovery textbook and the monograph on Practical Aspects of CO2 Flooding. One personal computer is provided, at additional cost, for each two participants.

"One of the best courses I ever attended." - Geologist, Bahrain

"I liked that we learned the basics of gas flooding at a high level and it got more complicated, and then we applied our knowledge using case studies and performed a simulation." - Verification Coordinator, United Kingdom

Target Audience

Petroleum engineers who want an in-depth knowledge of immiscible and miscible gas flooding techniques. The participant should have some basic knowledge of flow through porous media and should already

understand water flooding fundamentals, including black-oil PVT behavior, Buckley-Leverett flow, and optimization of well placement based on reservoir characterization.

You Will Learn

Participants will learn how to:

- Distinguish rock and fluid characteristics that influence gas flooding recovery
- Understand key factors and process fundamentals that affect volumetric sweep and displacement efficiency
- Estimate key parameters through problem assignments and spreadsheets
- Specify components of a well-designed gas flooding process
- Evaluate each field project based on physical principles and select the proper solvent and injection scheme
- Use compositional simulation to address basic recovery mechanisms and perform process optimization
- Identify problems, key parameters, and trends from field case studies

Course Content

- Reservoir characterization and phase behavior
- Flow regimes and sweep
- Immiscible gas/water flood mechanisms
- First contact miscibility mechanisms
- Multi-contact miscibility mechanisms
- Reservoir simulation, WAG design, and performance forecasting
- Performance and monitoring of field projects

Product Details

Categories: Upstream

Disciplines: Reservoir Engineering

Levels: Specialized

Product Type: Course

Formats Available: In-Classroom

Instructors: PetroSkills Specialist Russell Johns