Advanced Enhanced Oil Recovery Techniques and Applications Training Course



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Sharm El-Sheikh

4100 € (Per Person)

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Course Introduction / Overview:

Enhanced Oil Recovery (EOR) represents the frontier of petroleum engineering, unlocking significant hydrocarbon reserves from mature and challenging reservoirs that are beyond the reach of primary and secondary recovery methods. This comprehensive course is meticulously designed to provide a deep dive into the advanced techniques and practical applications of EOR. It moves beyond theoretical principles to equip participants with the skills needed to screen, design, implement, and manage successful EOR projects. We will explore the three main pillars of EOR: chemical, thermal, and gas injection methods, drawing on foundational knowledge from seminal works like "Enhanced Oil Recovery" by Don W. Green and G. Paul Willhite. Participants will learn to navigate the complexities of reservoir characterization, fluid-rock interactions, and process optimization. BIG BEN Training Center has structured this program to bridge the gap between academic knowledge and field application, focusing on real-world case studies and economic evaluation. This course is essential for professionals seeking to maximize asset value, improve recovery factors, and stay ahead in an industry that increasingly relies on sophisticated technology to meet global energy demands while considering environmental sustainability, such as in CO2-EOR projects.

Target Audience / This training course is suitable for:

- Reservoir Engineers.
- Production Engineers.
- Petroleum Engineers.
- Geologists and Geophysicists.
- Petrophysicists.
- Field Development Managers.
- Asset Managers.
- EOR Project Team Members.
- Research and Development Professionals in the energy sector.
- Technical Supervisors and Team Leaders.

Target Sectors and Industries:

- Upstream Oil and Gas Sector.
- National Oil Companies (NOCs).
- International Oil Companies (IOCs).
- Independent Oil and Gas Exploration and Production Companies.
- Oilfield Service Companies.
- Energy Consulting Firms.
- Governmental bodies and regulatory agencies overseeing natural resources.
- Research and Technology Institutions.

Target Organizations Departments:

- Reservoir Management and Engineering.
- Production and Operations.
- Field Development Planning.
- Exploration and Production (E&P).
- Subsurface and Geoscience Teams.
- Research and Development (R&D).
- Asset Management.
- Strategic Planning and Economics.
- New Technology Deployment.

Course Offerings:

By the end of this course, the participants will have able to:

- Analyze reservoir characteristics to determine suitability for EOR applications.
- Apply systematic screening criteria to select the most effective EOR method for a given field.
- Understand the mechanisms of chemical EOR, including polymer, surfactant, and ASP flooding.
- Evaluate the principles and applications of thermal recovery methods like steam injection and in-situ combustion.
- Design and assess gas injection projects, including miscible and immiscible CO2 flooding.
- Conduct preliminary economic analysis and risk assessment for EOR projects.
- Develop strategies for monitoring and surveillance of EOR performance.
- Identify challenges and solutions for EOR implementation in unconventional and heavy oil reservoirs.
- Integrate EOR planning into long-term reservoir management strategies.

Course Methodology:

The training methodology at BIG BEN Training Center is designed to be highly interactive, practical, and engaging, ensuring that participants can translate theoretical knowledge into actionable skills. This course utilizes a blended learning approach that combines expert-led presentations with intensive, hands-on exercises. A cornerstone of our method is the extensive use of real-world case studies from various geological settings, allowing participants to analyze the successes and failures of actual EOR projects. Interactive sessions, group discussions, and brainstorming workshops encourage collaborative problem-solving and the sharing of diverse experiences. Participants will work in teams on practical problems, such as screening potential EOR candidates and outlining a basic project design. The instructor will provide continuous feedback and facilitate discussions to deepen understanding of complex concepts like mobility control and sweep efficiency. The learning environment is supportive and dynamic, fostering critical thinking and ensuring that every participant leaves with the confidence to apply advanced EOR techniques in their respective roles.

Course Agenda (Course Units):

Unit One: Fundamentals of EOR and Reservoir Characterization

- Introduction to primary, secondary, and tertiary recovery mechanisms.
- Classification and overview of major EOR methods.
- Key reservoir properties influencing EOR success.
- Rock and fluid characterization for EOR screening.
- Phase behavior and its impact on recovery processes.
- Systematic EOR screening methodologies and criteria.
- Data requirements for a comprehensive EOR study.

Unit Two: Gas-Based Enhanced Oil Recovery

- Principles of miscible and immiscible gas injection.
- CO2 flooding for EOR and its mechanisms.
- Nitrogen and flue gas injection techniques.
- Water-Alternating-Gas (WAG) and its variations for mobility control.
- Design considerations for gas injection facilities.
- Case studies of successful CO2-EOR projects.
- Challenges and solutions in gas injection operations.

Unit Three: Chemical Enhanced Oil Recovery

- Polymer flooding for improving macroscopic sweep efficiency.
- Surfactant flooding for reducing interfacial tension.
- Alkaline-Surfactant-Polymer (ASP) flooding for synergistic recovery.
- Design and selection of chemicals for specific reservoir conditions.
- Laboratory analysis and core flooding experiments for chemical EOR.
- Modeling and simulation of chemical flooding processes.
- Field implementation and operational challenges of chemical EOR.

Unit Four: Thermal Enhanced Oil Recovery

- Principles of heat transfer in the reservoir.
- Steam injection methods: Cyclic Steam Stimulation (CSS) and steam flooding.
- Steam-Assisted Gravity Drainage (SAGD) for heavy oil and bitumen.
- In-Situ Combustion (ISC) principles and applications.
- Well design and completion for thermal recovery projects.
- Monitoring and managing thermal EOR operations.
- Case studies from heavy oil fields in Canada and Venezuela.

Unit Five: EOR Project Management, Economics, and Future Trends

- EOR project lifecycle from screening to abandonment.
- Developing a robust surveillance and monitoring plan.
- Economic evaluation, risk analysis, and decision-making for EOR investments.
- Introduction to Microbial EOR (MEOR) and other novel techniques.
- EOR applications in unconventional reservoirs like shale and tight sands.
- The role of CO2-EOR in Carbon Capture, Utilization, and Storage (CCUS).
- Future outlook and emerging technologies in enhanced oil recovery.

FAQ:

Qualifications required for registering to this course?

There are no requirements.

How long is each daily session, and what is the total number of training hours for the course?

This training course spans five days, with daily sessions ranging between 4 to 5 hours, including breaks and interactive activities, bringing the total duration to 20 - 25 training hours.

Something to think about:

Considering the global push for carbon neutrality, how can CO2-EOR be optimized not just for oil recovery but as a viable, large-scale carbon capture, utilization, and storage (CCUS) solution?

What unique qualities does this course offer compared to other courses?

This course distinguishes itself by offering a holistic and pragmatic perspective on Enhanced Oil Recovery, moving far beyond standard theoretical instruction. Its primary strength lies in its emphasis on the complete project lifecycle, from initial reservoir screening and method selection to detailed economic evaluation and risk analysis. Unlike programs that focus on a single EOR category, this training provides a comparative analysis of chemical, thermal, and gas injection methods, empowering participants to make informed decisions based on specific field conditions and economic drivers. The curriculum is built around an extensive library of real-world case studies, providing invaluable insights into the practical challenges and successful strategies employed in major oilfields globally. Furthermore, the course directly addresses the contemporary challenges and opportunities in the industry, including the application of EOR in unconventional reservoirs and the critical role of CO2-EOR in CCUS initiatives. It is designed not just to teach techniques, but to cultivate a strategic mindset for maximizing recovery factors and asset value in an evolving energy landscape.