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This may also be of interest

Simulation of Enhanced Oil Recovery Methods

OIL RECOVERY METHODS

Water Alternate Gas EOR

EOB

Waterflooding from A to Z

## The Instructor

Julio Herbas Petroleum Engineer with extensive experience in design and operation of Enhanced Oil Recovery projects in light and heavy oil fields; leading the design, implementation and operation of thermal, waterflooding, gas flooding, solvents, and chemical flooding projects in Latin America, Europe, Africa, and Asia, he has worked for operators as Lagoven s.a. affiliated of PDVSA, Shell International, BP, Total, Statoil, Maersk and Tullow Oil, with research institutes as Intevep and universities in Venezuela, United Kingdom, Germany, China and USA. Among his main EOR projects are Steam floods and Huff & Puff Steam injection in Cerro Negro and Jobo fields, Low Salinity Waterflooding and Miscible Gas Injection in the Furrial field the largest oil reservoir in Venezuela, Polymer, and low salinity waterflooding Uganda, and other studies in Asia, Africa and North Sea.

## Description

This course is designed to provide a solid knowledge of the Fundamentals of the Enhanced Oil Recovery Process being applied worldwide to increase the oil recovery. The lectures include theoretical and practical components describing the Thermal, Chemical, Miscible, Immiscible and Hybrid methods to enhance the oil recovery and screening techniques to select an EOR Method. The participants will be exposed to practical application experiences and field examples and will have the opportunity to discuss their own cases.

## Objectives

- To provide an up-to-date overview of the concepts and theory of Enhanced Oil Recovery
- Review the latest advances in Enhanced Oil Recovery
- Learn how to identify potential candidate fields to implement Enhanced Oil Recovery projects
- Learn how to execute EOR screenings and how to define preliminary project value
- Understand how to plan and how to implement Enhanced Oil Recovery studies and projects
- How to plan and implement Enhanced Oil Recovery studies
- Review principles and applications of Thermal, Chemical, Gas Injection Miscible, Immiscible and Hybrid methods
- Selection criteria's, recovery targets, design considerations
- Learn how to create cost estimations and economic evaluations
- Review and discuss technical challenges, environmental constraints and study cases

## Audience

- Reservoir Engineers
- Reservoir Managers
- Production
- Engineers
- Geologists
- Geophysicists
- Technical field personnel from oil companies or service companies that need to gain or increase their understanding of reservoir performance under Enhanced Oil Recovery projects

This training can be delivered in house, based on workshop sessions for groups of delegates with interest in understanding the principles of Enhanced Oil Recovery methods; it can be tailored to specific company needs.



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## Content

### Day 1

#### Concepts Review

- Enhanced Oil Recovery concepts and objectives review
- Production mechanisms & reservoir types
- Characteristics influencing the Enhanced Oil Recovery project implementation
- Predominant driving mechanisms in primary, secondary, and tertiary production stages
- Properties affecting the recovery factor and ultimate recovery: Bubble Point, Viscosity, Mobility's, Mobility ratio, Capillary pressures, Wettability, Relative Permeability's
- Incremental Recovery factor methods, correlations, and use of analogues. Review of basic concepts: Definition of Secondary Recovery and Enhanced Oil Recovery (SPE)
- Capillary Pressures, Wettability, Interfacial Tension, Relative Permeability Curves and Mobility Ratio

### Day 2

#### EOR Methods and Screening

- Thermal, Chemical and Solvent Methods: Steam Stimulation, Steam flood, SAGD, Combustion In Situ, Alkali, Surfactant and Polymer (ASP) and Polymer Applications
- Screening methods and criteria for application
- Identification of analogue field cases, step by step road map to EOR design and implementation.
- Laboratory requirements and procedures, cost consideration, cost estimations, facilities modifications, personnel training requirement.
- Examples of screening field cases: technical challenges and complexities of enhanced oil recovery

### Day 3

#### Thermal Methods

- Fundamentals of Thermal Recovery, Steam Stimulations, Cyclic steam injection, Continuous Steam Flood
- Water Source and Treatment Requirements, SAGD, In Situ Combustion overview
- Field requirements for thermal projects implementation, well design, thermal isolation, well head and casing protection, thermal cements
- Water characterization and water treatment
- Field Implantation Strategies

### Day 4

#### Chemical and Solvent Methods

- Aqueous solution methods:
- Alkalis, Surfactants and Polymers (ASP),
- Polymer Injection, CO<sub>2</sub> Injection,
- Low Salinity Water injection,
- Gas Injection Miscible
- Microbial methods application in Enhanced Oil Recovery.
- Economic considerations, economic evaluations, economic incentives, framing decision before implementation.



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### Day 5 Emerging Technologies

- EOR Offshore
- EOR in Horizontal Wells
- CO2 & Exhaust Gas Injection=
- Critical Review of Emerging Technologies
- Future R&D directions
- Discussions and Case Studies
- Wrap Up

### End of the training

