

## PRACTICAL RESERVOIR MANAGEMENT AND SURVEILLANCE TECHNIQUES FOR STEAM INJECTION THERMAL RECOVERY PROJECTS

### Workshop Description

Primary and secondary production schemes in light oils generally result in recoverable reserves in the range of 10 to 45%. Reservoirs containing heavy oil have much lower recovery efficiencies (typically, 5–10%) using conventional primary and secondary production methods; however, the application of thermal methods to these reservoirs has the potential to (and has been shown to) increase the recovery efficiency of heavy oils to 50% or greater. Meeting the recovery target forecast at the time of project development requires the implementation of a reservoir management plan that includes project surveillance at all levels (well, pattern, producing horizon, area, and field), both surface and subsurface. Reserves additions via new discoveries have been declining steadily in the last decades, and the increase of recovery factors from mature oilfields in known basins will be critical to meeting growing market demand. An increase in recovery factors above the initial forecasts can be achieved through the use of new tools and techniques. Implementation and continued focus on reservoir management and surveillance is even more important in thermal EOR than in conventional operations. This workshop will provide participants the opportunity to review and learn the elements of comprehensive reservoir surveillance for steam injection projects.

In conducting this workshop, the instructors plan to:

- (1) Spend most of the time discussing the practical aspects of project surveillance,
- (2) Discuss the impact of reservoir management and surveillance on the project economics, and
- (3) Provide each course attendee a workbook containing copies of the instructors' PowerPoint presentations

### WORKSHOP CONTENT

Reservoir Management

Surveillance

Philosophy, Methodology, Critical Needs, Desired Accuracy

Necessity of Field Measurements and Options

Critical Aspects to Monitor in Wells and Facilities

Maximizing Utilization of Conventional Methods

Reliability and Frequency of Measurements & Sampling

Data Management & Processing

Ease of Interpretations and Usage

Value of Information and Cost Effective Options

Thermal Project Reservoir Management

Thermal Project Surveillance Planning

Overview

Conventional and Thermal Surveillance in Thermal Projects

Surveillance Tools for Thermal Projects

Reservoir Modeling for Thermal Project Management

Steam Soaks

Management and Surveillance

Injection, Production Surveillance

Steam Drives

Production Well, Injection Well and Pattern Surveillance

Heat Management in Patterns

Surveillance of Surface Production and Injection Facility

Optimizing Steam Injection Projects

Injection Pressure and Down-Hole Steam Quality

Vertical Conformance and Heat Propagation

Surveillance in Steam Augmented Gravity Drainage (SAGD) Projects

Analysis and Optimization of Production and Injection Well

Conformance, Sweep and Bypass in SAGD Projects

## Duration and Scope

This is a five (5) day high-level workshop, which involves discussion of issues related to reservoir surveillance and management techniques. An entire day is devoted to discuss basics of reservoir surveillance including philosophy and methodology of surveillance, and critical aspects of well and facilities monitoring. This is followed by an in-depth presentation of techniques for the surveillance and optimization of steam injection operations. Case histories are included to facilitate the understanding of aspects involved in monitoring these projects. The workshop also includes guidelines for the integration of surveillance data into geological and reservoir models, and discussion about the latest developments in surveillance technology. Several practical classroom problems are included for the attendees to make this a hands-on workshop.

## Who Should Attend

This five (5) day workshop is custom-designed for petroleum engineers, reservoir engineers, production engineers, facilities engineers, managers, and other professionals involved or interested in practical reservoir management and surveillance techniques thermal EOR using steam injection.

## Workshop Requirements

Each workshop attendee (student) should bring their own notebook computer to work on the class problems. Class room should be equipped with power strips, for students to plug in their notebook computers, and a projector for instructors to project their PowerPoint slides.

## Workshop Manual

Each workshop attendee will be provided a workbook containing copies of the instructors' PowerPoint presentations, and solutions to the class problems.

## Workshop Instructors

This custom designed workshop will be conducted by our high-level and seasoned consultants, with extensive knowledge and experience in the subject matter as well as in conducting training programs around the world.

## Language of Instructions

This workshop will be conducted in the English language. However, if desired by the client, one of our bi-lingual consultants can be present throughout the workshop for the benefit of those attendees who are not fluent in the English language. This workshop can be customized further to meet the needs of the client's professionals and managers.