PEA
PETROLEUM ENGINEERS ASSOCIATION

ACCREDITED

3 Days Short Online Training On

WATERFLOOD PERFORMANCE ANALYSIS USING MS-EXCEL

MR. BISWAJIT CHOUDHURY

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About This Course

This course in waterflood is aimed at introducing the participants to basic waterflood concepts using Excel based numerical problems. Several key concepts that will be discussed are components of recovery efficiency in waterflood, impact of Dykstra Parson coefficient, key design considerations in a waterflood project, distinction between matrix and fracture injection and their applications, evaluation of injection well performance and evaluation of performance of producers in a large waterflood project and water production mechanism in wells by means of diagnostic plots.

A number of numerical problems using Microsoft Excel will be used in the class to illustrate the various concepts.

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Day-1 :

Topics

- Stock tank oil Initially in Place (STOIIP) and Floodable Oil Volume
- Components of Recovery Factor from waterflood
- Microscopic Displacement Efficiency, Areal Sweep Efficiency and Vertical Sweep Efficiency

Exercises

- How to Identify Floodable Oil Volume
- Finding out Components of Recovery Efficiencies
- Understanding the Impact of Dykstra Parson Coefficient on Vertical Heterogeneity

Learning Outcomes

- You will understand why the recovery from waterflood is not that high
- You will be able to breakdown total recovery efficiency into individual components
- You will understand what factors impact the various recovery efficiencies

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Day-2 :

Topics

- Design Considerations in a Waterflood Project
- Different Phases of a Waterflood
- Concept of Voidage Replacement
- Matrix and Fracture Injection
- Step Rate Test and its Importance
- Monitoring of Injection Well Performance – Hall Plot

Exercises

- How to calculate voidage replacement
- How to Interpret a step rate test
- How to construct Hall's Plot and draw conclusions on Injection Performance

Learning Outcomes

- You will understand the design considerations in a waterflood project
- You will be able to calculate voidage replacement requirement in a waterflood
- You will be able to distinguish between matrix injection and fracture injection and understand their applications.
- You will be able to interpret a step rate test and construct Hall's plot to evaluate injection performance.

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Day-3 :

Topics

- Analysis of Well Performance in Waterflood project.
- Produced Water Diagnostics and Management
- Pattern Balancing

Exercises

- To construct Heterogeneity Index (HI) Plot
- Information from ABC (After-Before-Compare) Plot
- To prepare Chan's plot from production data and identify mechanism of water production in wells

Learning Outcomes

- You will be able to identify the good performing and bad performing wells in a waterflood project.
- You will be able to identify wells that have shown response to waterflood
- You will be able to prepare and interpret Chan's plot identify mechanism of water production in wells
- You will be able to understand how pattern balancing enhances the performance of a waterflood project

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Who should Attend

Any subsurface personnel (Reservoir Engineer, Production Geologist, Petrophysicist or Production Technologist) at just about any experience level, from no waterflood experience to several years of waterflood experience.

The course will be delivered in a manner so that both beginners and experienced personnel will find the material very useful. The course content and real-life numerical problems have been selected to illustrate the fundamental concepts.

Benefits from Attending the Training

By the end of the training the participant will feel confident in his understanding of

- How in-place oil volume is different from floodable oil volume
- How to estimate oil recovery by waterflooding
- How to estimate the individual components of recovery efficiency by waterflooding
- How to monitor, analyse and optimise current waterflood projects

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