RATE TRANSIENT ANALYSIS & DIAGNOSTIC METHODS FOR PERFORMANCE FORECASTING

RSE040

COURSE OVERVIEW

This course covers five sections that include the general introduction to Rate Transient Analysis, Traditional Decline Curve Analysis, Modern Rate Transient Analysis, Unconventional Reservoirs, and Integration of Material Balance.

COURSE OBJECTIVES

By the end of this course, participant will be able to:

- Understand the principles and applications of rate transient analysis.
- Differentiate between traditional pressure transient analysis and rate time analysis.
- Identify the data requirements for rate time analysis.
- Analyze reservoir information under transient and pseudo-steady state conditions.
- Apply dimensionless variables in rate time analysis.
- Evaluate the limitations of rate time analysis.
- Differentiate between exponential, harmonic, and hyperbolic decline curves.
- Assess the impact of well performance parameters on Economic Ultimate Recovery (EUR).
- Extend decline curve analysis to transient state conditions.
- Utilize rate time analysis when bottom hole pressure varies.
- Evaluate oil and gas wells using Blasingame and Agarwal type curves.
- Apply flowing material balance analysis.
- Analyze rate time data for unconventional reservoirs.
- Identify flow regimes in multiple fractured, horizontal wells.
- Determine reservoir parameters from rate time data in unconventional formations.
- Utilize decline curve analysis for unconventional reservoirs.
- Integrate material balance with rate equations to predict rate as a function of time.
- Predict rates for single-phase gas and oil reservoirs using simple cases.

WHO SHOULD ATTEND

Engineers or geoscientists who will occupy the position of reservoir engineer, and any other technically trained individual who desires a more in-depth foundation in reservoir engineering.

COURSE DURATION

5 Working Days

COURSE OUTLINES

Day 1

- Pre course evaluation.
- Define the rate time analysis
- Distinguish between traditional pressure transient analysis and rate time analysis
- Describe the needs of the type of data which are typically used for rate time analysis
- Discuss the application of rate time analysis under transient and pseudo-steady state conditions
- Distinguish between the type of reservoir information we can obtain under transient and pseudo-steady state conditions

Day 2

- Explain the use of dimensionless variables in rate time analysis
- Describe the limitations of the rate time analysis
- Distinguish between exponential, harmonic, and hyperbolic decline curves
- Explain the different parameters which impact the performance of a well
- Describe how the Economic Ultimate Recovery (EUR) is impacted by the assumptions about the type of decline method

Day 3

- Explain how the traditional decline curve analysis can be extended to transient state conditions
- Describe how to extend the rate time analysis when the bottom hole pressure is not constant but a variable
- Compare both Blasingame and Agarwal type curve methods and evaluate both oil and gas wells using both these type curves
- Explain the concept of flowing material balance analysis

Day 4

- Describe the application of rate time analysis for unconventional reservoirs
- Identify different flow regimes which are present for multiple fractured, horizontal wells
- Indicate important flow regimes which are typically observed in horizontal, multi-stage, fractured wells
- Determine the type of reservoir parameters we can obtain from evaluating rate time data for unconventional formations

Day 5

- Indicate how the traditional decline curve analysis can be used for wells producing from unconventional reservoirs
- Describe the relationship between material balance and rate time analysis
- Explain how to combine material balance with rate equations to predict rate as a function of time
- Describe simple cases for single phase gas and oil reservoirs and predict the rates
- Post course evaluation.