N274: Unconventional Resource Engineering for Geoscientists

Format and Duration
Classroom - 3 Days

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Summary

This course introduces geoscientists to the terminology and practices of the drilling, completion, and reservoir engineers with whom they interact on multi-disciplinary unconventional resource evaluation teams. It also discusses future directions in unconventional resource engineering. This course will help you improve business performance by developing a solid understanding of unconventional resource engineering concepts and terminology, as well as improving your technical communication with the engineers in your team.

Learning Outcomes

Participants will learn to:

1. Illustrate the drilling, completion, and stimulation technologies applied to unconventional projects.
2. Explain the sampling procedures adopted by reservoir engineers.
3. Demonstrate how resource estimates, production forecasts, and economic evaluations are generated for these plays.
4. Analyze the water demand and disposal issues associated with stimulation of unconventional reservoirs.
5. Examine the impact of unconventional projects on air quality.
6. Illustrate future trends in development of unconventional plays.
7. Understand and predict the hydrocarbon phase change in reservoirs.

Training Method

This is a three-day classroom course comprising lectures and exercises.

Who Should Attend

The course is intended for non-engineering technical professionals and managers assigned to unconventional resource projects who want to understand the role of the engineer in these projects.

Course Content

- Introduction
  - Overview of unconventional resources
  - Geological and geochemical considerations for resource shales
- Drilling, completion, and stimulation technologies
  - Horizontal well drilling
  - Multi-stage hydraulic fracturing
  - Micro-seismic monitorin
- Sampling and laboratory measurements for shale
  - Sampling techniques and field measurements of fluid content
  - Porosity and pore size measurements

    - Permeability measurements
    - Storage and flow characteristics of resource shales
    - Pore size considerations for hydrocarbon storage and transport
    - Multi-phase flow in tight formations
- Reservoir engineering
    - The five reservoir fluids
    - Pressure transient regimes in hydraulically-fractured horizontal wells
    - Hydrocarbon recovery from kerogen pores
    - Volumetric calculations for natural gas reservoiurs
    - Material balance for natural gas reservoirs
    - Fracture Net Present Value (NPV) and Discounted Return on Investment (DROI) calculations
    - Decline curve analysis using Arp's equation
    - Estimated ultimate recovery of production well
- Future directions in unconventional resource engineering
    - New trends in drilling and completion technologies
    - Enhanced hydrocarbon recovery technologies for shale
    - Environment