TETRA TECH RPS ENERGY | TRAINING

N472: Reservoir Surveillance: Field Development and Production Optimization and the Impact on Completion Design

Instructor(s): Dennis Dria

Format and Duration

Classroom - 3 Days
Virtual - 6 Sessions

Summary

This course provides an understanding of monitoring technologies for conventional and unconventional reservoirs and how to apply them to optimize field development and optimally produce the reservoir. The technologies will be explained in sufficient detail to allow informed decisions regarding the most appropriate measurements to be made and how to integrate multiple measurements to best design key development parameters, such as well spacing and stimulation interval, as well as to optimize production operations and maximize asset value. Considerations for developing and operating single-reservoir fields as well as stacked reservoirs with horizontal wells ("cube development") will also be presented.

Learning Outcomes

Participants will learn to:

1. Determine cases where diagnostic and surveillance measurements can provide data to optimize completion and stimulation design and improve hydrocarbon recovery.
2. Compare and contrast specific sensing technologies relative to other diagnostic and surveillance monitoring methods, to allow best technology choice.
3. Apply surveillance techniques to evaluate actual well performance against predicted well production/injection performance, to assess efficacy of specific completion, stimulation, and production designs.
4. Evaluate well completion and reservoir development scenarios using technical and economic analyses and apply simple cost-benefit models for diagnostic and surveillance data acquisition in specific well types and design a high-level field surveillance plan.
5. Build a project plan outline for start-to-finish: data acquisition design, vendor and equipment selection, data management and interpretation.
6. Assess where and when specific sensing technologies can provide appropriate diagnostic and surveillance data for various development scenarios.
7. Select the most appropriate data acquisition systems to provide reservoir development model calibration and validation information, for various well placement and completion scenarios.
8. Design a plan/workflow (high-level) to effectively integrate various different surveillance data and select the sensing system appropriate for well type and surveillance need.
9. Specify completion hardware and data acquisition system components needed to accomplish surveillance and completion/stimulation diagnostic goals and modify completion designs to accommodate permanently installed monitoring systems.
10. Design data acquisition protocols for specific well types and assess permanently installed and intervention-based ("logging") options and recommend/justify when to use which options based on well type and information need.

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Training Method

This is a classroom or virtual classroom course comprising a mixture of lectures, discussion, case studies, and practical exercises.

Who Should Attend

This course is for completion, drilling, production, surveillance, and reservoir engineers. Geoscientists and asset managers involved in field development and production optimization will also find this course informative.

Course Content

Topics covered in this course include:

- Commercial measurement technologies available for specific reservoir types and well designs, with a focus on those most applicable for unconventional reservoirs.
- Well and reservoir diagnostic measurements (completion diagnostics, optimization).
- Well and reservoir surveillance measurements (data acquisition for specific purposes, ongoing monitoring to provide “exception-based” information).
- Integration of multiple technologies for synergy and to fill the information gaps.
- Time-lapse measurements.
- What works and what doesn’t work for specific applications.
- Permanently installed sensors (e.g. optical fiber, P/T gauges, flowmeters)
- Wired and wireless technologies.
- Intervention-based measurements (wireline and slickline logs, “dip-in” fiber optic sensing).
- Seismic methods (including Vsp and microseismic).
- Tracers (liquid-phase and solid-phase tracers, RA & NRA, completion and stimulation diagnostics, production monitoring).
- “Fingerprinting” technologies: geochemical, DNA.