

N967: Introduction to Reservoir Engineering

Instructor(s): Rob Lavoie

Format and Duration

Classroom - 5 Days

Summary

This course provides a practical understanding of how hydrocarbon reservoirs are described (rock and fluid properties), what the primary mechanisms of oil and gas production are, and how recovery can be enhanced with secondary recovery methods. It is intended for engineers and geologists who are involved with making reserve estimates and production forecasts for primary and secondary recovery.

Learning Outcomes

Participants will learn to:

1. Examine the role of the reservoir engineer.
2. Differentiate basic geologic processes.
3. Compare reservoir trapping mechanisms.
4. Interpret various types of geologic maps.
5. Calculate rock volumes.
6. Contrast rock types and their properties that are of interest to a reservoir engineer.
7. Determine and apply principles of phase behaviour for multi-component hydrocarbon mixtures.
8. Manipulate and apply the Material Balance Equation.
9. Interpret and apply the Real Gas Law.
10. Examine the diffusivity equation and the implications of various boundary conditions.
11. Apply and interpret traditional decline curve models; distinguish weaknesses and strengths of decline curve analysis.
12. Differentiate between the various oil recovery drive mechanisms.
13. Apply basic waterflood screening criteria.
14. Be conversant with reservoir simulation engineers.

Training Method

A five-day classroom course comprising lectures with case studies; exercises and solutions throughout the course will give students a hands-on experience.

Who Should Attend

The course is geared toward recently graduated petroleum engineers, engineers from other disciplines who are entering the petroleum industry and geoscientists with some background in reservoir geology and/or production.

Course Content

Day 1

- Reservoir geological description.
- Hydrocarbon phase behavior including example PVT Studies.

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Day 2

- Reservoir rock properties including porosity, permeability, capillary pressures and relative permeability.
- Volumetric reserve estimates including examples, reserve classifications, probabilistic reserve estimates.

Day 3

- Well test planning including typical DST's.
- Pressure transient analysis methods including build-up curve examples.
- Gas well testing and AOF analysis.

Day 4

- Reservoir drive mechanisms.
- Material balance methods for gas reservoirs including p/z example.
- Recovery from oil reservoirs under solution gas drive and natural water influx.

Day 5

- Waterflood displacement mechanisms and analytical techniques for estimating recovery including example calculations.
- Introduction to numerical simulation methods.