



N623: Petroleum Engineering for Non-Engineers (2 Day)

Tutor(s): Saad Ibrahim

2 Days

Competence Level:
Awareness



Classroom Course

Summary

This course is designed to provide non-engineering petroleum industry technical professionals with a thorough overview of most key aspects of petroleum engineering technology and its applications. The course addresses engineering issues ranging from initial involvement with explorationists, reserves evaluation and field development, production optimization, and all the aspects of well drilling. The sessions will focus on relevant and practical issues; including real case studies.

Learning Outcomes

Participants will learn to

1. Learn about an overview of the industry and how the roles of different professional disciplines are integrated to generate development plans.
2. Understand subsurface geology to learn how economic oil/gas fields are formed and discovered
3. Basic review of rock and fluid properties
4. How wells are drilled. The function of the drilling rig various equipment,
5. Learn about completion techniques for vertical and horizontal wells to allow for safe operation and to control production.
6. How engineers/geologists determine oil/gas reserves, which define the value of E&P companies.
7. How to diagnose production problem and perform remedial action.
8. The application of different Enhanced Oil Recovery EOR schemes and benefits.
9. How economic analysis is performed to confirm that proposed projects will economic benefits

Duration and Training Method

Two classroom days providing 1.6 CEU (Continuing Education Credits) or 16 PDH (Professional Development Hours)

Who Should Attend

This course is aimed at non-engineering professionals involved in the oil industry and also for junior exploitation engineers/technologists, and geologists.

Course Content

Course Agenda

Day One

Morning

1. Overview

- a. Oil and gas reserves breakdown
- b. The main components of oil/gas field development plans briefing the role of each discipline

2. Reservoir Geology

- a. Types of reservoir rocks
- b. Main elements of petroleum reservoirs
- c. Geological maps

3. Rock properties

- a. Types of rock porosity and measurements



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- b. Definitions of formation permeability and measurements
- c. Capillary pressure

Afternoon

1. Fluid properties
 - a. Hydrocarbon classifications and fluid sampling
 - b. Phase envelopes description of oil and gas field
 - c. Physical properties of oil and gas fields
2. Well drilling and completion methods
 - a. Background history
3. Rotary drilling
 - a. Description of rotary systems
 - b. Hoisting system
 - c. Rotary system
 - d. Pipe connection, BOP, tubing and casing hangers
 - e. Top drive method
4. Underbalanced drilling and coiled tubing drilling
5. Well completion techniques
 - a. Open hole, cased hole, and gravel pack
 - b. Well perforation

Day Two

Morning

6. Reservoir drives and reserves determination
7. Reservoir drives
 - a. Primary and secondary recoveries
 - b. Types of reservoir drives and impact on performance
8. Reserves determination
 - a. Reserves classification and definitions
 - b. Volumetric and material balance methods
 - c. Decline analysis
9. Reservoir delineation & development
 - a. Field development considerations
 - b. Design aspects related to the well and the field
10. Types and applications of artificial lift
 - a. Impact on field performance
 - b. Different techniques (advantages and disadvantages)
11. Horizontal well applications
 - a. Benefits of horizontal wells
 - b. Geological, completion, and drilling risks

Afternoon

12. Production operations and optimization
 - a. Methods estimating well performance
 - b. Operational problems (diagnostic and remedy methods)
13. Well testing
 - a. Types of well tests



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- b. Flow/buildup test and analysis
- c. Drawdown testing and reservoir limit testing (RLT)
- d. Case study
- 14. Well stimulation methods (acidizing and fracing)
- 15. Enhanced Recovery Mechanism
 - a. Oil recovery mechanisms
 - b. Types of EOR and screening
 - c. Monitoring of waterflood project
- 16. Review chemical and CO2 floods
- 17. Unconventional Oil and Gas
 - a. Oil sands and thermal
 - b. Shale gas and oil shale and the applications of horizontal wells with multi fracing
- 18. Economics
 - a. Input data to economic evaluation
 - b. Various economic profitability indices
 - c. Example of running economics of well drilling
- 19. Closing comments