
N642: Introduction to Onshore Drilling

Instructor(s): Richard Heenan

Format and Duration

Classroom - 2 Days

Summary

This two-day course provides a non-technical overview of the phases, operations, and terminology used in the drilling and completion of an onshore oil or gas well. It is intended for non-drilling personnel who work with drilling professionals (e.g. accounting, administrative, and support staff, environmentalists, landmen, stock analysts, etc). No prior experience or knowledge of drilling operations is required. The course will provide participants with a better understanding of the issues faced in all aspects of onshore drilling operations.

Learning Outcomes

Participants will learn to

1. Understand basic geology and petroleum concepts.
2. Outline the stages of planning and drilling a well and list the tools required for each stage.
3. Understand the components of a drilling rig and their purposes.
4. Identify the three basic types of drilling contracts and their methodologies.
5. Name the different personnel on the rig and their roles.
6. Recognize the various types of drill bits in common use.
7. Identify the types of drilling fluids, their properties and components.
8. Understand “making a connection”, “tripping” and related drilling operations.
9. Explain the need for casing and cementing a well, and the methods for doing so.
10. Discuss formation evaluation from cuttings, cores and logs.
11. Understand the difference between directional and horizontal drilling, and the purpose of each along with the tools used.
12. Appreciate the purpose and limitations of relief wells.
13. Understand the concepts of Underbalanced Drilling and related techniques.
14. Be familiar with basic well completions.
15. Understand the types of downhole pumps used in oil production.
16. Identify the components in a service or workover rig.
17. Appreciate the techniques of acidizing and hydraulic fracturing to improve well production.
18. Understand the basic concepts in producing unconventional (shale) reservoirs including multistage hydraulic fracturing).

Training Method

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

Who Should Attend

The course is intended for non-drilling personnel who work with drilling professionals (e.g. accounting, administrative, and support staff, environmentalists, landmen, stock analysts, etc).

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Course Content

Course Agenda

Day One

Introduces the concepts related to drilling and the major components of a drilling rig. Basic drilling operations are then introduced in chronological order by following the drilling of a simple well “from top to bottom”.

1. Petroleum Introduction
 - a. Basic Petroleum Geology
 - b. Porosity & Permeability
 - c. How Petroleum is Formed
 - d. Petroleum Traps (Reservoirs)
2. . Well Design & Construction
 - a. Concepts and Considerations in Designing a Well
3. Drilling Rig – Components & Functions
(a description of the four basic systems common to all rotary drilling operations)
 - a. Hoist & Rotary
 - b. Mud System
 - c. Drillstring
 - d. Blowout Preventer System
4. Personnel & Contracts
5. Drilling an Example Well from Top to Bottom
(this introduces the various activities as they are encountered during the drilling of the well)
 - a. Lease Preparation
 - b. Move-in & Rig Up
 - c. Cellar & Conductor
 - d. Drill Bits
 - e. Drilling Fluids
 - f. Drillstring Operations (Making a Connection & Tripping)
 - g. Casing & Cementing
 - h. Formation Evaluation (including Drilling Recorder, Drill Cuttings, Mud Logging, Coring, Drillstem Testing, Electric Wireline Logging)

Day Two

The second day builds on the concepts of the first, by introducing more complex alternate drilling activities, completions operations, and unconventional (shale) resources

Note: the division of time between the two days is flexible to allow for class questions and discussions,

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focusing on the items that are most relevant to the participants

1. Directional & Horizontal Drilling Concepts and Methods
2. Relief Wells
3. Underbalanced, Controlled & Managed Pressure Drilling
4. Completions
 - a. Tubing Conveyed Perforation
 - b. Typical Gas Well Completion
 - c. Typical Oil Well Completion
 - d. Service Rigs
 - e. Coiled Tubing
 - f. Permeability Improvement in Completions
 - Acidizing
 - Hydraulic Fracturing
5. Unconventional Resources(Shale oil/Gas)
 - a. Changes From Conventional Oil & Gas Operations
 - b. Multi-stage hydraulic Fracturing

Auxiliary Material

These subjects are added if time permits (depending questions and discussions in previous two days)

1. Fishing
2. Well Control