

BASIC DRILLING TECHNOLOGY

DRL001

COURSE DESCRIPTION

This course addresses a thorough overview of current drilling equipment, technology and practices being used worldwide in various drilling environments. Participants will learn the general methodology for planning, designing, and executing a drilling project, as well as the basic tools involved. Besides a review of onshore and offshore drilling units and systems, topics include AFE preparation, key elements of well plans, wellbore pressure dynamics, well control, downhole equipment, drilling fluids, and casing and cementing operations. Additionally, a basic introduction to unconventional drilling practices such as Underbalanced and Managed Pressure drilling is included.

COURSE GOAL

To enhance participants' knowledge, skills, and abilities necessary to be equipped with basic knowledge of the theoretical and practical aspects of drilling operations

COURSE OBJECTIVES

By the end of this course, participant will be able to:

- Understand hydrocarbon formation.
- Describe key characteristics of hydrocarbon reservoir (rock, source, trap, seal).
- Be familiar with upstream and downstream petroleum industry.
- Identify different rig types.
- Be familiar with different components of drilling rig and understand their basic functions.
- Have basic understanding of downhole wellbore pressures and the means to control them.
- Learn the principles of drilling, cementing, casing processes.
- Learn the principles of well control and blowout prevention.
- Understand basic functions of drilling fluids and cement.
- Identify onshore and offshore drilling processes.
- Describe the basic principles of logging and MWD/LWD.
- Describe the methods of drilling deviated and horizontal wells.
- Understand the components and functions of well completion (valves, artificial lift, sand control).

WHO SHOULD ATTEND

- Personnel requiring a comprehensive introduction to drilling equipment and operations.
- Delegates may be new employees or existing drilling personnel who are being promoted and will require a greater depth of knowledge for their new position.

- Shore-based operational staff that require being conversant with all aspects of drilling equipment and practices.

COURSE DURATION

5 Working Days

COURSE OUTLINES

1. Introduction, Terminology, Drilling Context

- Introductions
- A bit of oil history - Terminology of Petroleum and of Drilling
- Drilling planning: An overview
- Oil prices and drilling
- Major drilling accomplishments and challenges

2. Essentials of Geology

- Hydrocarbon formation
- Key elements of economic reservoir, rocks, traps, seals
- Geological and geophysical information

3. Origins of Petroleum

4. Preparation for Drilling Operations

- Oil Companies Drilling Contractors, Service
- Companies and Government Bodies

5. Basic Petroleum Geology Drilling Rigs and Drilling Systems

- Onshore - Offshore rigs characteristics
- Drilling challenges
- Rig components - Well classification
- Power - Hoisting system
- Circulation system / pumps
- Control system / BOPs
- Monitoring system

6. Drilling Costs

- Drilling cost estimation - Types of costs
- Acquisition for expenditure (AFE)



7. Drilling Fluids and Drilling hydraulics

- Drilling fluid types - Uses
- Fluid properties - additives
- Rheology of drilling fluids
- Static / dynamic conditions / circulation
- Rheological models, pressure losses
- Bit hydraulics
- Cuttings transport issues

8. Abnormal Pressures, Kicks and Kick Control

- Sedimentary rocks - Overpressure generation
- Pore pressure / Fracture pressure estimation
- Kick definition / Kick sequence
- Control methods, BOPs (video)
- Kick detection

9. Casing Design

- Purpose of casing design
- Casing / hole diameter selection
- Burst / Collapse pressure calculations
- Casing depth estimation
- Mud weight estimation

10. Cementing and Cement Job Design

- Cementing process
- Cements and types of cements, additives
- Cement placement / Cementing problems
- Cement job evaluation

11. The Drill String

- Drill string components
- Drilling bits
- Bit wear / Bit selection
- Drill collars, characteristics and selection
- Drill pipe characteristics
- Bottom Hole Assembly

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12. Directional and Horizontal Drilling

- Purpose, history and types of deviated wells
- Inclination and azimuth
- MWD
- Horizontal / ERD wells
- Multilaterals
- Coil-Tubing-Drilling

13. Well Logging and Completions

- Logging
- Mud Log
- Open hole logs
- RFT, Drill stem testing
- Basic components and function of completions
- Stimulation

14. Drilling Problems and Advanced Techniques

- Types of drilling problems, severity
- Lost circulation - Stuck pipe - Junk in hole
- Surface / downhole measurements / problem prevention

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