

N157: An Introduction to Drilling and Wellsite Geology

Instructor(s): Martin Saunders

Format and Duration

Classroom - 5 Days

Virtual - 10 Sessions

Summary

Through a blend of lectures and practical exercises, this course provides an introduction to drilling technology, wellsite operations, and wellsite formation evaluation techniques for those personnel either new to the industry or transferring to more operational roles. As such, participants on this course will be empowered to immediately add value to their subsurface teams through exploration to appraisal and development. Highlighted and discussed topics additionally cover drill bit types and selection, wellsite geology roles and responsibilities, and wellsite services.

Learning Outcomes

Participants will learn to:

1. Compare drilling operations, both onshore and offshore and understand the differences between the various types of rigs and platforms.
2. Distinguish the various components of the drill string: hoisting and rotating systems and pipe handling equipment, bit types and their design and application; the mud circulation process and system; the variety of drilling fluids and well hydraulics; casing and cementing procedures; directional drilling processes and techniques; borehole surveying.
3. Appraise mudlogging services including: the collection and analysis of ditch cuttings and lag time estimation; depth and bit parameter measurements; the collection, analysis and integration of gas readings; the wider role of mudlogging in safety monitoring and drilling engineering support.
4. Analyse how ditch cuttings are sampled, described, reported, logged and evaluated for lithological evaluation and hydrocarbon potential.
5. Compare conventional coring and sidewall coring processes, procedures and evaluation techniques.
6. Distinguish the acquisition, processing and basic interpretation of wireline from LWD logs, and their integration with other wellsite derived geological data.

Training Method

This is a classroom or virtual classroom course comprising lectures, discussion, and practical exercises.

Who Should Attend

This course is suitable for geoscientists, petrophysicists, and petroleum engineers who are new to drilling and wellsite operations.

Course Content

Participants will learn:

- About well planning and rig selection
- About the drillstring, bits, drilling fluids, casing and cementing, well control and directional drilling
- How wellsite geologists and mudloggers collect and interpret geological and drilling data

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- About coring, wireline logs and MWD Services
- How to evaluate and describe drill cuttings and oil shows from practical work

The following shows the planned order of content:

1. Drilling Rigs

- Land Rigs
- Offshore Rigs
- Platforms

2. Drilling Technologies

- Bit Technology
 - Design: Roller cone; PDC
 - Applications
- BHA Design, Drill Pipe
- Hoisting, Rotating, Motion Compensation
- Well Control Equipment
- Drilling Fluids
 - Properties and Specifications
 - Fluid Systems
 - Oil and Water Based Mud
 - Polymer Fluids
 - Synthetic Systems
- Fluid Circulation Systems
- Hydraulics Calculations
- Casing and Cementing
- Directional Drilling
 - Applications
 - Steering Systems
 - Formation Evaluation
 - Survey Processes/calculations

3. Drill Returns Logging

- Mud Logging Services
- Cuttings Recovery
- Lag Time Calculations
- Depth and ROP Recording
- Hydrocarbon Gas Evaluation
 - Total Gas
 - Chromatographic Analysis
 - Interpretation of Gas Shows

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4. Wellsite Geology

- Cuttings Sampling and Preparation
- Cuttings Description
 - Clastics
 - Carbonates
 - Evaporites
- Reporting Procedures
- Lithology Logs
- Oil and Gas Show Evaluation
 - UV Light and Solvent Tests

5. Coring Operations

- Conventional Coring
- Sidewall Cores

6. Formation Evaluation

- Wireline Logging Operations
- MWD Operations