

Well Architecture & Directional Drilling in Unconventional Wells

5 days

UARCDD-EN-P

Overview

LEVEL

Knowledge

PURPOSE

This certifying training aims to provide the necessary knowledge to plan and carry out a directional drilling (geothermal, water, storage, oil, gas), including the architecture.

LEARNING OBJECTIVES

Upon completion of the course, participants will be able to:

- calculate different casing strings using the Drilling Data Handbook,
- select the right position of casing shoes,
- calculate the stress applied to the casing pipes,
- choose the right wellhead with regards to the casings used,
- know the equipment needed for directional drilling,
- design a directional well,
- calculate the trajectories of a deviated well in 2D,
- design the drill stem adapted to the well's profiles to reach a target,

WAYS AND MEANS

Exercises.
Movies.
Work in groups, teamwork.
Computer use for the design of a personal spreadsheet program.

LEARNING ASSESSMENT

Exercises, quiz, written exam.

PREREQUISITES

Knowledge of the drilling operations.
Blowout prevention and kick control is a plus.

Agenda

DRILLING & CASING PROGRAM

0.5 d

Role of casings.
Parameters to be considered to determine well architecture:
Well type.
Pore and frac pressures.
Completion, lithology.
Different types of casings:
Surface.
Intermediate.

Production.

CHARACTERISTICS OF CASINGS

0.25 d

Geometric, physical and mechanical properties of pipes and connections.
Use of Drilling Data Handbook.

SHOE POSITIONING

0.25 d

Hypotheses to be considered, casing point - Kick tolerance.
Examples and exercises.

CASING STRING CALCULATION

0.25 d

Principles and assumptions to remember for the different strings.
Stress cases study:
Collapse.
Burst.
Tension.
Tri-axial study.
Safety factors.
Casing selection: examples and exercises.

CALCULATION EXAMPLES

1 d

Case studies and writing of a spreadsheet in order to determine the casing point, the kick margin, the pressure max...

DIRECTIONAL DRILLING EQUIPMENT

0.5 d

Specific drilling equipment: downhole motors, rotary steerable system.
Measuring equipment: MWD.

DRILLING ENGINEERING

1 d

Well planning and trajectory calculations.
Limits of use of a drill string: buckling.
Drill string design.
Torque and drag calculation.
Drilling fluids and cementing program.
Hole cleaning.
Logging.
Well control.

HORIZONTAL & ERD

0.25 d

ERD, multilateral and short radius.

CASE STUDIES

0.5 d

Writing of a spreadsheet in order to determine the trajectory of a 2D well according to the needs.

KNOWLEDGE ASSESSMENT

0.5 d