

## FUNDAMENTALS OF GEOLOGICAL WELL PLACEMENT

### General:

Discipline: Drilling/Petrophysics

Level: Basic

Duration: 5 days (3h a day)

Instructor(s): Hazboun, Nidal Khalil

### Purpose:

The purpose of this course will be to introduce the concept of geosteering which consists in placing a horizontal or high angle well geologically and successfully. It will provide processes tools and techniques that can be used to perform the proposed task. This includes integrating geological and petrophysical data in real-time during drilling for the decision process. The main three methods to geologically position a well will be discussed alongside the technologies involved. This multidisciplinary task comprising: directional drilling, drilling dynamics, geology, wire line petrophysical measurements, and formation evaluation while drilling (LWD) will be reviewed.

The objective of high angle and horizontal wells is to largely maximize reservoir contact impacting positively on the well productivity. This task, in a practical sense, requires a real-time collaboration team of geologists (with formation evaluation understanding), drillers (who understands the well trajectory is only a draft to be modified within the limits he must set), and petrophysicists (the formation evaluation specialists acting during the drilling process in order to optimize well contact with the target formation).

### Designed for:

Beginner geoscientist, geologist, geophysicist, petrophysics, and drilling engineers engaged or planning to make decisions on the benefits of horizontal or high angle wells placed geologically.

### You Will Learn:

How to:

- Identify potential benefits from horizontal drilling in your location
  - Structural
  - Geological / Petrophysical
  - Hydrocarbon
  - Drilling/Logging equipment
  - Transmission
  - Cost x Benefit
- Be aware of the different drilling tools and the correct selection for the project
- Have an awareness on the directional drilling process
- Understand how LWD tools work and their differences with original WL tools
- Have an awareness on selecting LWD fit for porous sets based on project objectives

- Understand the components for a real time well placement project
- The steps to generate a correlation model for real time update
- Steer the well based on images
- Evaluate the conditions for the use of remote boundary detection

### Course Content:

- Geology and geological well placement introduction
- The three basic methods of geological well placement used in the process
- Essential conditions of reservoir geology
- Structural setup conditions
- Directional drilling basics
- Measurement While Drilling defining wellbore location and drilling data
- Logging While Drilling essential tools
- Basic Formation Evaluation with LWD
- Practical examples
- Effects of high angle on LWD data
- LWD Image acquisition fundamentals and applications
- Image derived formation dips as an input for well placement
- Model-compare-update method
- Incorporation of LWD images
- Remote boundary detection

### Software applications:

- To be defined depending on requirement for dedicated well placement software.

### Text and consulting books:

- "Fundamentals of Well Placement ", Roger Griffith 2009
- "Log Interpretation Principles / Applications", Schlumberger 1989
- "Log Interpretation Charts", Schlumberger, 1998
- "Fundamentals of Well Logs Interpretation 1,2", O. Serra Elsevier, Amsterdam 1984.
- "Logging While Drilling", Schlumberger, 1993

