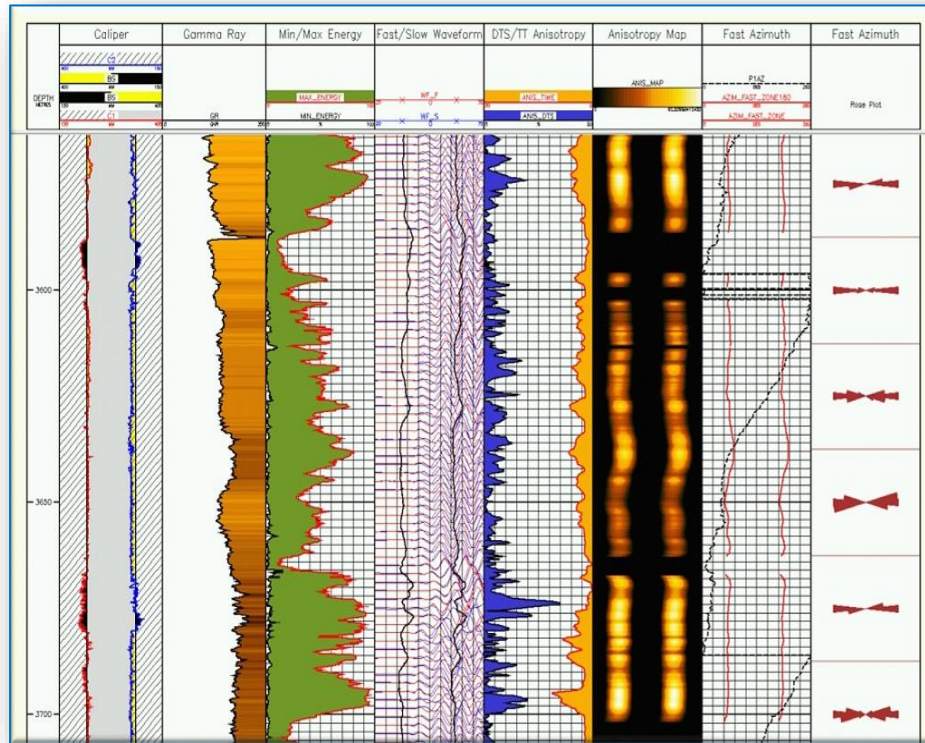




DE159

Advanced Well Log Interpretation & Formation Evaluation Techniques

Course Introduction:

Well logs are detailed record of the geologic formations by a borehole. These are comprehensive and important data gathered in any phase of a well's history to identify petrophysical properties which in turn defines the economic value of a reservoir. The techniques in analysis and interpretation of well logs are therefore essential in identification of hydrocarbon recovery.

In the E&P business, integrated petroleum engineering studies and field development plans are management tools which are used to maximize economic recovery of hydrocarbons. Petrophysical engineers fulfill a key role in analyzing and interpreting subsurface reservoir data, which form the basis for reservoir models. E&P technical staff and team leaders involved in integrated studies require more than general skills in petrophysical and interpretation techniques to produce quality input to development plans.

The ICTD expert trainer will provide understanding of practical and new techniques and tools in well logging with the support of case studies. At the end of the course, participants will be able to quantitatively identify the reservoir quality, measure the storage capacity of the reservoir through integrating the reservoir and petrophysical data and to improve oil recovery.

WHY TO ATTEND THIS COURSE?

Analysis and interpretation of well logs are critical and essential to any oil & gas exploration. This course is customized specially to learn how to apply measurements and physics of well logging tools to methods for interpretation of these parameters. The understanding of techniques in analysis and interpretation as well as practice of integration of core analysis and open-hole logs will provide extensive knowledge of the topic to participants. The trainer will also provide the interpretation of cased-hole logs and recent tools for reservoir performance, production and to solve diagnostic problems. The trainer will provide information for optimum use of well logs to maximize and improved oil recovery

Course Objectives:

Upon successful completion of this course, the delegates will be able to:

- ✓ Drive a consistent and effective Petrophysics inputs to improve oil recovery
- ✓ Understand rock properties and pore geometry
- ✓ Capitalize on integration reservoir and petrophysical data to maximize economic recovery of hydrocarbons
- ✓ Attain the knowledge and practical use of total and effective porosity calculation

- ✓ Determine and understand new techniques and tools in well logging including imaging logging tools
- ✓ Acquire knowledge on permeability and rock quality interpretation Learn and practice integration of core analysis and open-hole logs
- ✓ Knowledge on hydrocarbon typing and saturation estimation
- ✓ Understand formation pressure selection, interpretation and pressure correlation
- ✓ Learn from practical experiences and case studies scenarios

Who Should Attend?

This course is intended for all professionals with background and experience in petrophysics, whose job requires more extensive knowledge of core and log relations. They include petrophysicists, well log analysts, geologists, geophysicists, geoscientists, reservoir engineers, petroleum engineers and other E&P professionals.

Course Outline:

Day 1:

Petrophysics & Rock Properties

- Porosity Types
- Wettability and Connate Water
- Permeability
- Permeability and porosity relationship
- Resistivity
- Fluid Saturations

Open-Hole Logging Tools

Definition, measurements, application, equations of the following tools:

- Lithology Tools: GR, NGT, SP
- Porosity Tools: BHC, FDC, CNL
- Resistivity Tools: DLL, DIL, MSFL
- Other Tools: EPT

Exercises: Calculations of GR, SP, Sonic, etc.

Logging While Drilling (LWD)

- Lithology Tools
- Resistivity Tools
- Porosity Tools

Day 2:

Logging Operations and Quality Control

- Logging Tools Operations
- Log Quality Control

Quick Look Well Log Interpretation

- Lithology interpretation
- Porosity calculations
- R_w determination
- Petrophysical parameters (a , m , n)
- V_{shale} estimation
- Fluid Saturations
- Permeability

Practical Exercises

Cased-Hole Logging Tools

Definition, measurements, application, equations of the following tools:

- Thermal Decay Time (TDT, RST)
- Cement Bond (CBL-VDL)
- Production Logging (PLT)
 - Flowmeters
 - Gradiomanometer
 - Manometer
 - Thermometer
 - Casing Collar, Gamma Ray and Caliper
- Porosity tools in casing (Neutron & Sonic)
- Lithology tools in casing (GR & NGT)

Practical Exercises and Q & A

Day 3:

Recent and Advanced Tools

- Definition, measurements, application, equations of the following tools:
- Geological Tools: Dipmeter, FMS, FMI, ECS
- Sedimentary sequence and depositional environment
- Resistivity Tools: HRLA, ARI, AIT
- Porosity Tools: APS, LDT, DSI
- Hydrocarbon Evaluation Tools: NMR, CMR, MDT, RFT

Formation Evaluation

Rock Physics (from core and log)

- Porosity Types
- Permeability
- Permeability and Porosity Relationships
- Fluid Saturation
- Lithology Interpretation Vsh Calculation
- R_w determination methods
- Petrophysical parameters (a , m , n)
- Archie's Relationship

Core Analysis and Core-Log Relationships

Day 4:

Advanced Formation Evaluation

Reservoir Petrophysical Model Evaluation

- Modern Approaches and Techniques in Petrophysics
 - Multi-Well Bases Study Using:
 - Multi-Well Data-Base
 - Key Well Study
 - Data Normalization
 - Variable Petrophysical Parameter values
 - Standardization of Petrophysical Parameters
- Lithology Determination
 - Lithology Model
 - Lithological Parameters
- Petrophysical Parameters Determination
 - Archie's Parameters
 - Most Problematic Parameters
 - Old Methods (Constant Value)
 - New Methods (Variable Values)

Day 5:

Computer Processed Interpretation (CPI)

- Hydrocarbon Quality
- Fluid Contacts (GOC-GWC-OWC-ODT-WUT-FWL)
- Reservoir Summations
- CPI examples
- CPI Results quality check

Exercise & Case Studies including:

- Cased Hole Logging Tools
- Quick Look Interpretation
- Case Study for International Examples and Unconventional Reservoirs:
 - Carbonate reservoir (Limestone) from Gulf area
 - Clastics reservoir (Sandstone) from Egypt
 - Gas Sandstone reservoir from South Africa

Course Certificate:

International Center for Training & Development (ICTD) will award an internationally recognized certificate(s) for each delegate on completion of training.

Course Methodology:

A variety of methodologies will be used during the course that includes:

- (30%) Based on Case Studies
- (30%) Techniques
- (30%) Role Play
- (10%) Concepts
- Pre-test and Post-test
- Variety of Learning Methods
- Lectures
- Case Studies and Self Questionnaires
- Group Work
- Discussion
- Presentation

Course Fees:

To be advised as per the course location. This rate includes participant's manual, hand-outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Course Timings:

Daily Course Timings:

08:00 - 08:20	Morning Coffee / Tea
08:20 - 10:00	First Session
10:00 - 10:20	Coffee / Tea / Snacks
10:20 - 12:20	Second Session
12:20 - 13:30	Lunch Break & Prayer Break
13:30 - 15:00	Last Session

