TETRA TECH RPS ENERGY | TRAINING

N330: Image and Dip Log Analysis and Interpretation

Instructor(s): Nicholas Harvey

Format and Duration
Classroom - 3 Days
Virtual - 5 Sessions

Summary

This course equips participants with essential skills for interpreting formation image log data. It covers key concepts in selecting logging tools, optimizing data acquisition, and performing processing and quality checks. Participants will explore borehole shape analysis, structural and fracture interpretation, and in-situ stress analysis.

The course also includes applications for both carbonate and clastic reservoirs, emphasizing volumetric computation, porosity, permeability, and sedimentary analysis. Additionally, participants will learn to integrate borehole images with core and open-hole logs, leveraging neural networks for advanced rock typing and facies analysis.

Business Impact: Effective image and dip log analysis improves subsurface understanding, optimizing drilling, reservoir management, and production. This training reduces drilling risks, enhances reservoir models, and supports informed decisions, leading to better resource management, lower costs, and higher returns.

Learning Outcomes

Participants will learn to

1. Explain the basic principles of formation image log data interpretation, including the purpose and benefits of using different formation image logging tools.
2. Compare the various current formation image logging tools by discussing their theory, applications, advantages, and limitations, as well as strategies for optimizing data acquisition.
3. Describe the process of data loading, quality control, and corrections for formation image logs, including graphical presentation techniques.
4. Identify key features related to borehole shape analysis, including breakouts, tensile fractures, and stress indicators, and classify these features based on their characteristics.
5. Apply structural dip and fracture analysis techniques to interpret subsurface geological features and assess in-situ stress conditions using image logs.
6. Illustrate the application of formation image logs in carbonate reservoirs, focusing on volumetrics computation, heterogeneity quantification, and high-resolution porosity and permeability analysis.
7. Summarize the integration of borehole images with core and open-hole logs for flow unit identification, rock typing, and facies analysis, including the use of neural network techniques.

Training Method

This course is offered as a 3-day classroom or virtual program, featuring a blend of lectures, discussions, case studies, and practical exercises.

For a customized experience, the course can be extended to 5 days, incorporating additional examples, exercises, and familiarization with LogScope software.

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Who Should Attend

This course is relevant to petrophysicists, sedimentologists, geologists, and formation image interpreters, as well as technical staff involved in data loading and editing.

Course Content

Session 1:

- Introduction to the Principles of Formation Image Log Data Interpretation
- Review of current formation image logging tools;
  - Theory, application, pros and cons of different tools and optimization of acquisition programs.
- Data loading and LQC
  - Processing
  - Image corrections
  - Graphical Presentations

Session 2:

- Borehole Shape Analysis
  - Breakout Analysis
  - Tensile Fractures
  - Stress Determination
- Structural and Fracture Interpretation
  - Structural Dip Analysis
  - Fracture and Fault Analysis
  - In-situ Stress Analysis
  - Statistics and Attributes Analysis

Session 3:

- Carbonate Applications
  - Volumetrics Computation
  - Heterogeneity Quantification
  - High Resolution Azimuthal Porosity
  - High Resolution Permeability
  - High Resolution RT Computation

Session 4:

- Clastics Applications
  - Sedimentary & Paleocurrent Analysis
  - Grain Size & Sorting Index

- Volumetrics Computation

Session 5:

- BH Images-Core-OH Logs Integration
  - Flow Units-Rock Typing and Facies
  - Neural Network Applications
- Exercises: Participants will engage in practical exercises during the workshop session, utilizing the Log Scope software package.