TETRA TECH RPS ENERGY | TRAINING

N249: Advanced Pore Pressure Prediction Workshop: Concepts, Mechanisms, and Workflows

Format and Duration
Classroom - 4 Days

Instructor(s): Peter Flemings

Summary

This advanced, hands-on workshop gives participants a strong understanding of the processes that generate overpressure in multiple dimensions and experience in predicting pressure and fracture gradient. The course evaluates the approaches to estimate trap integrity and linkages between pore pressure prediction and basin modeling. Participants also develop a greater understanding of pore pressure prediction in different tectonic environments (e.g. unconventional, thrust, and salt settings).

Business Impact: Application of the learnings of this course will provide participants with a strong understanding of the processes associated with overpressure, pressure prediction and fracture gradient. These key concepts that will allow subsurface professionals to increase the likelihood of exploration success and decrease drilling and development costs.

Learning Outcomes

Participants will learn to:

1. Characterize pressure based on limited data.
2. Predict pore pressure in one dimension using multiple approaches.
3. Predict pore pressure in two- and three-dimensions using centroid approaches.
4. Interpret and model fracture gradient.
5. Predict trap integrity by applying pore pressure concepts.
6. Evaluate how basin modeling is used to predict pressure.
7. Predict pressure in thrust belt environments.
8. Predict pressure in unconventional basins.
9. Assess the challenges of pore pressure prediction near salt.

Training Method

This is a four-day classroom course, which intersperses lectures with frequent practical exercises, and the use of web-based software and Excel worksheets to reinforce concepts. Approximately 60% of the course time is spent on lectures and 40% on PC-based exercises.

Who Should Attend

Geologists, geophysicists, petrophysicists, drilling engineers, and other subsurface technical staff who want to develop additional expertise in the latest techniques of predicting pore pressure and fracture gradients at the well scale and the basin scale. Attendees should ideally have a minimum of 2 years' experience in pore pressure prediction.

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Course Content

This advanced workshop covers:

- Characterization of pore pressure, overburden, and fracture gradient
- Petrophysical pore pressure prediction
- Seismic-based pore pressure prediction
- Estimation of trap integrity
  - Mechanical seal
  - Capillary seal
- Compositional and mineralogical controls on shale compaction
- Workflows for predicting pressure in 2- and 3-dimensions
  - Protected trap analysis
  - Centroid-based pressure prediction
  - Techniques for predicting sand and shale pressures
- Basin modeling and pore pressure prediction
  - Principles and assumptions
  - Input requirements
  - Output results
  - Limitations of existing software/data
- Predicting pore pressure and stress in different environments
  - Compressional regimes
  - Unconventional (shale) basins
  - Salt environments
- Well Design
  - Choosing intermediate casing points and mud programs
  - Choosing appropriate mudweights for control of shallow water flow
  - Drilling implications
  - Predicting wellbore under-balance and lost circulation situations
- Limits of current petrophysical and seismic prediction / detection techniques