

Applied Geopressure and Risk Assessments for E & P (Three days)

Course Description

This three day course teaches the tools of predicting geopressure, compartmentalization, prospects appraisal, and their impact on exploration, exploitation, and drilling for oil and gas resources.

Sealing integrity and hydrocarbon retention capacity of a prospective structural closure are the consequence of the subsurface geopressure partitions. Moreover, successful drilling to the targeted formation relies on accurate prediction of pore – fracture pressure within the drilling tolerance window.

“The applied geopressure course that you taught to the members of the HGS will provide wide-range of benefits to the future of our industry “.

HGS and the Continuing Education Committee,2005

In this 3-day, we will discuss the essentials of geopressure compartmentalization in relation to pore pressure development with depth. The basic geological building blocks are used as the foundation for pore pressure predictions. The course discusses concepts, models, measurements, predictions and their implication to different geological settings. Moreover, it covers the process of QC input – output data, calibrating pore and fracture pressures and establishing of prediction models before and during, drilling. Before drilling risk assessment and post drilling appraisal methods will be clarified. The distribution of geological basins world wide and their impact on geopressure profiles and hydrocarbon entrapment are discussed in case history forms.

Who should attend?

Geologists, geophysicists, drilling and reservoir engineers, well log analysts, managers, and support staff involved in exploration, development and drilling.

Learning outcomes

1. Understand the causes, concepts and graphic representations of the geopressed and hydrodynamic systems
2. QC and qualify data for pore pressure prediction and measurements. A thorough emphasis on the disparity between measured and predicted pore pressure
3. Overview of methods to predict / calibrate pore pressure and their pitfalls
4. The impact of the geological setting on geopressure compartmentalization , hydrocarbon entrapments and pre – post drilling assessments
5. The effect of world wide basin distribution on geopressure profiles and risk appraisals.

Course outline

- ✓ New approach to geopressure definitions, causes and concepts
- ✓ Graphical representations (PSI and PPG MWE) including some of their pitfalls
- ✓ Method used to predict pore pressure before drilling, with emphasis on Effective Stress
- ✓ Calibration and analysis during drilling
- ✓ Compartmentalization, seal effectiveness and retention capacity
- ✓ Supra and Sub salt geopressure models and their applications
- ✓ Faults and their rock mechanics as sealers vs. leakers
- ✓ AVG (Amplitude versus Geopressure) seismic response
- ✓ Strat-Geopressure Fairways and their mapping methods
- ✓ Rock mechanics of borehole stability and their application for casing, and mud programs and anticipated drilling challenges
- ✓ Post drilling assessment of success or failure to find hydrocarbons
- ✓ Global case histories and their implications: Gulf of Mexico, North America, North Sea, Mediterranean and Far East

Course info

- New approach to definitions, causes and concepts
- Geopressure vs. Hydrodynamics
- Graphical representations (PSI and PPG MWE) including some of their pitfalls
- PP-FP direct and pertinent measurements
- Method used to predict pore pressure with emphasis on Effective Stress
- Calibration of prediction model

• *Data qualifications and technique used for PP – FP prediction*

- ✓ *Before drilling (Modeling)*
 - Regional and empirical records
 - Seismic velocity
- ✓ *During Drilling (Calibration)*
 - Drilling events and mud outputs (cutting, fluids, kicks, etc.)
 - Resistivity, conductivity
 - Sonic, check-shot and VSP
 - Density and porosity
- ✓ *Post Drilling (Appraisal)*
 - Assessment of success or failure

• *Application overview and their impact on prospect evaluations*

- ✓ Transgression and regression
- ✓ Compartmentalization, seal effectiveness and retention capacity
- ✓ Supra and sub salt geopressure models
- ✓ Faults and their rock mechanics as sealers vs. leakers
- ✓ AVG (Amplitude versus Geopressure) seismic response
- ✓ Strat-Geopressure Fairways and their mapping methods

- ✓ Reserve and reservoir management
- ✓ Rock mechanics of borehole stability and their application for casing, and mud programs
- ✓ Anticipated drilling challenges

- **Global case histories and their implications:**
 - ✓ Gulf of Mexico/Trinidad
 - ✓ Continental North America
 - ✓ Mediterranean Basin and North Sea
 - ✓ Australia and Far East

“ I enjoyed the class on geopressure and found it to be most helpful and I came away with new ideas on working with service companies on geopressure “
John Rogers, Senior Geological Advisor, Petrobras America Inc.,2007

A 5 day course (expanded version of the 3 day course) is available “Geopressure: Prediction, Analysis, and Risk Assessment for E&P” focuses on **know how, in depth exercises and analyses** (Microsoft Excel is used for the 5 day course. No pore pressure prediction software is required).