

INTRODUCTION TO SEISMIC STRATIGRAPHY

GEP006

COURSE DESCRIPTION

One of the most revolutionary, most effective, yet most under-utilized tools introduced into exploration this century is that of seismic stratigraphy. It is not a tool exclusive to geophysicists, nor is it a tool only for geologists. Seismic stratigraphic techniques are based upon an integration of firm, well-established geological and geophysical fundamentals. When properly applied, seismic stratigraphy provides a powerful foundation for geohistory analysis, helping describe a basin's evolution and the resulting effects upon its spatial and temporal variation in hydrocarbon potential. Seismic stratigraphy chronostratigraphically constrains both the sedimentological and fault-mechanical stratigraphy of a basin. Furthermore, it can provide a predictive model extrapolated beyond the borehole as to aspects of the quality of potential reservoirs and seals, their sedimentary environments of deposition, and in some cases, even their paragenesis.

COURSE GOAL

To enhance the participants' knowledge, skills and abilities necessary to apply the seismic stratigraphic method to optimizing their exploration efforts.

COURSE OBJECTIVES

By the end of this course, participant will be able to:

- Apply geophysical fundamentals to uncovering the geological information embedded within seismic.
- Understand the premises behind the Vail seismic sequence paradigm.
- Construct and interpret chronostratigraphic charts, sea level curves, and seismic facies maps.
- Interpret clastic and carbonate depositional system responses to allocyclic and autocyclic processes and the effects upon reservoir architecture and seal potential.
- Systematically reconstruct a basin's geohistory which provides the critical foundation for its petroleum system analysis and effective exploration.

WHO SHOULD ATTEND

Geologists, geophysicists, biostratigraphers and engineers (with some knowledge of geology).

COURSE DURATION

5 Working Days

COURSE OUTLINES

1. Introduction: philosophy and history

- Overview of seismic stratigraphy's significance in exploration.
- Key milestones in the development of seismic stratigraphy.

2. Geophysical fundamentals

- Understanding seismic data acquisition, processing, and interpretation.
- Integration of well data with seismic data.

3. Breaking out operational sequences

- Identifying and defining sequence boundaries.
- Analyzing stratigraphic variations within sequences.

4. Introduction to fault interpretation

- Identifying and evaluating fault geometries.
- Integrating fault interpretation with seismic stratigraphy.

5. Chronostratigraphy construction and interpretation

- Techniques for constructing chronostratigraphic charts.
- Interpreting temporal variations and correlating events.

6. Sea level curves, accommodation space, and cycle orders

- Analyzing the relationship between sea level changes and sedimentation.
- Identifying and interpreting cycle orders within sequences.

7. Vail sequence theory and sequence hierarchy

- Application of the Vail sequence paradigm in seismic stratigraphy.
- Understanding sequence hierarchy and depositional environments.

8. Carbonate sequences

- Analyzing seismic expression and facies variations in carbonates.
- Interpreting diagenetic processes and reservoir potential.

9. Siliciclastic sequences

- Interpreting seismic characteristics and facies variations in siliciclastics.
- Assessing reservoir quality and potential seals.

10. Seismic facies

- Identifying and characterizing seismic facies based on reflection patterns.
- Correlating facies with depositional environments.

11. Paleo-environmental analysis

- Using seismic data to infer paleoenvironmental conditions.
- Interpreting sedimentary features indicative of past environments.

12. Geohistory reconstruction

- Analyzing seismic stratigraphy to reconstruct basin geohistory.
- Integrating stratigraphic, structural, and paleoenvironmental information.

13. Optimizing exploration

- Using seismic stratigraphy in prospect evaluation and risk assessment.
- Integrating seismic and well data for reservoir characterization.

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