TETRA TECH RPS ENERGY | TRAINING

N382: Recognition of Mudstone Depositional Processes and Depositional Settings: Implications for Reservoir Heterogeneity and Play Extent

Format and Duration
Classroom - 4 Days

Instructor(s): Per Kent Pedersen and Juergen Schieber

Summary

This course will describe, illustrate, and interpret the wide range of bedforms and depositional processes within mudstone dominated successions, including flocculation, hypopycnal, hyperpycnal, wave enhanced gravity, and turbidite flows. Several mudstone classification and terminology schemes based on mineralogy and element composition will be introduced and contrasted for their strengths and weaknesses in assessing reservoir properties.

Learning Outcomes

Participants will learn to:

1. Evaluate sedimentary settings and the processes that deposit fine grained sediments.
2. Assess the characteristics of shales and the lithological variables that distinguish different shale plays.
3. Evaluate shale sections in core.
4. Assess common physical sedimentary structures.
5. Assess visible diagenetic features.
6. Assess various bioturbation features.
7. Evaluate and name fine grained rocks on the basis of core and hand specimen derived properties.

Training Method

A classroom course conducted in a core workshop setting and including lectures, exercises and case studies. The course will be conducted at the BEG's core facility in Houston, Texas.

Who Should Attend

The course is intended primarily for geoscientists and petrophysicists exploiting shale and mudstone resource plays, but the learnings are of relevance to reservoir and production engineers as well.

Course Content

Participant will learn to identify different types of bedforms within mudstone dominated deposits so as to interpret depositional processes. This will allow better characterization of reservoir- to accumulation-scale heterogeneity and understanding of varying flow paths due to lateral variability in reservoir properties.

The core workshop will compare and contrast a wide range of mudstone reservoir deposits from organic mudstones deposited in relatively deep marine, slope to and shallow water settings deposits. The study of sedimentary processes and features will be enhanced by results of flume studies at Indiana University,

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including videos of flow experiments and SEM images of flow deposits. Sedimentary processes and their potential relationship to pore systems will be explored.

Case studies of integration of sedimentary processes and facies distribution to build sequence stratigraphic frameworks to map and predict reservoir fairways will be presented.

The course will include demonstration of the Indiana University mudflume, a large racetrack flume facility dedicated to the experimental study of mudstone depositional processes. Flumes are used to obtain quantitative information about depositional and erosional parameters of clays. This is combined with studies of modern mud accumulating environments to develop a better understanding of mud deposition.