

Real time XRF Chemostratigraphy Provides Geological Certainty in Picking a 3–Way Structural Trap against a Fault in the Deepwater Gulf of Mexico

Simon Hughes¹, A. Liborius¹, and D. J. Tonner¹

¹Diversified Well Logging

Abstract

Seismic depth uncertainty and the nature of sediment sequences in deepwater Gulf of Mexico can provide a challenge for stratigraphic positioning. This case study includes the analysis of a discovery well which was drilled with real time XRF measurements on drill cuttings. Chemostratigraphic units and packages were established as the reference or correlation well. Although biostratigraphy has been well-established as a real time tool for absolute dating and thus understanding stratigraphic position in a sequence, it is not unusual to have “shadow zones” within a sequence. These shadow zones represent an absence of micro fossils for dating purposes. Chemical stratigraphy or chemostratigraphy is available on each cuttings sample collected.

An appraisal well was drilled targeting a structural three-way closure trap. LWD measurements, chemostratigraphy, and biostratigraphy were used to identify the crossing of the fault, the displacement of the fault, missing sections and degree of stratigraphic expansion. A combination of measurements provides a more precise indication of stratigraphic position contributing to successful wellbore construction.