Inorganic Elemental Rock Compositions Provide Detailed Subsurface Characterization to Reduce Geological and Stratigraphic Uncertainty: Near Real Time Wellsite Data were used to Aid in Well Placement and Geosteering

Aaron Salin[1], Alfonzo Zaza[1], Simon Hughes[2], and David Tonner[2]

[1]Equinor

[2]Diversified Well Logging

ABSTRACT

The typical modus operandi for geological acquisition programs on most unconventional wells in the Lower 48 of the United States is to provide gamma ray from MWD and a mudlogging service. In some instances where formations encountered have relatively little gamma ray character it becomes very difficult to provide definitive stratigraphic wellbore positioning and thus geosteering guidance.

Field deployable and portable XRF instruments were deployed at the wellsite and utilized to measure elemental compositions of drill cuttings in near real time. The elemental compositions and ratios provided detailed chemostratigraphic position of the wellbore.

In this case study from multiple Eagle Ford and Austin Chalk wells in South Texas, seismic and offset well data suggested that the planned wellbore trajectories may encounter significant faulting. Given the potential for substantial stratigraphic displacement across the fault, it was required to establish if it was economic to geosteer back down into the target or TD the well early and save drilling and completion costs while drilling out of the target. Formations with similar gamma ray character to the Austin Chalk and Eagle Ford exist above the targets. An independent correlation tool was sought to reduce the uncertainty of using gamma ray only correlation. The paper will describe the process and discuss the results obtained.

Salin, A., A. Zaza, S. Hughes, and D. Tonner, 2019, Inorganic elemental rock compositions provide detailed subsurface characterization to reduce geological and stratigraphic uncertainty: Near real time wellsite data were used to aid in well placement and geosteering: GeoGulf Transactions, v. 69, p. 617.