

OUTCROP-TO-SUBSURFACE CORRELATION AND SHELF-TO-BASIN MODELLING OF THE CUTOFF FORMATION AND THE AVALON IN THE DELAWARE BASIN, WEST TEXAS AND NEW MEXICO

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Abstract

The Avalon represents a tight-oil and condensate play in the Delaware Basin composed of organic-rich shales, fine-grained carbonates, and sandstones. Previous studies attempting to link stratigraphic units of the Avalon in the subsurface to outcrops in the Guadalupe Mountains have been impeded by an anomalous thickening and diversification of facies in the basinward direction. A newly proposed stratigraphic framework for the Cutoff Formation in the Guadalupe Mountains by Hurd (2014) reveals a similar record of basin-restricted units, which may be equivalent to subsurface strata of the Avalon. This study uses hand-held gamma ray profiles and a robust database of well logs in order to extend the new Cutoff Framework into the subsurface. Hand-held gamma ray profiles collected along the outcrop during a previous field effort will be used to create a log-based stratigraphic framework for the Cutoff Formation that can be correlated to nearby wells. Core and thin section descriptions for the Avalon from previous studies (e.g Stolz, 2009) will be calibrated with log-response to guide this correlation. Cross sections and isopach maps will be generated in Petra (IHS) to illustrate variations in stratigraphic geometries, architectural elements, and facies distributions. Cross-sections and maps will then be integrated with sequence stratigraphic models by Hurd (2014) in order to illustrate how temporal variations in processes occurring along the slope influenced the architecture of Avalon deposits on the basin floor, targeting key organic rich intervals.

AAPG Search and Discovery Article #90249 © 2016 AAPG Foundation 2015 Grants-in-Aid Projects