

# Stratigraphic Relationships of the Red Fork and Atoka in the Western Anadarko Basin – A New Look at the Clinton Lake

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Anadarko Basin regional stratigraphic well log correlations integrated with 3-D seismic interpretation reveal several inconsistencies in long held correlations of Lower Des Moinesian (Cherokee) Red Fork and Atoka strata. Most notable are the correlations that subdivide the Upper, Middle and Lower Red Fork parasequences and the Clinton Lake. Although the Clinton Lake is often considered to be Atokan in age, this study indicates that it should be assigned to the Lower Des Moines (below the Inola and above the Novi limestone, possibly equivalent to the Bartlesville). By extension of these correlations and interpretation, the stratigraphic section above the Clinton Lake, which is currently identified as Atoka, is actually Middle and Lower Red Fork.

The Clinton Lake is an elongate asymmetrical marine basin that lies just north of the Ancestral Wichita Mountain Front and underlies portions of Beckham, Washita, Roger Mills, and Custer counties. Clinton Lake sediments were deposited as one of a series of clastic wedges that were derived from the uplifted Lower Paleozoic carbonates and sandstones, and the granitic basement and shed northward into the subsiding adjacent Anadarko Basin. Generally, the Clinton Lake interval is over 500' thick along its southern extension in the study area and thins northward to a near pinch out in northern Custer and Roger Mills counties. Although the southern limit is the mountain front, the Clinton Lake nearly pinches out locally against the northern flank of the Elk City Anticline which was either an existing or active paleo high throughout most of Clinton Lake time.

Clinton Lake sediments consist of a variety of lithologies including sandstone, quartz wash, granite wash, and minor amounts of carbonate wash. The sandstones are often poorly to moderately sorted with large angular quartz grains. The granite and quartz washes are present in wells furthest to the south nearer to the Mountain Front whereas wells further north have primarily sandstone with trace to minor amounts of quartz wash; an observation consistent with sediments sourced from the rising paleo high to the south.

Interpretation of log signatures and isopach mapping utilizing the 3-D data set and well control suggests that Clinton Lake rocks were deposited in various sub environments of basin floor fans and turbidity flows including canyon/channel fills, basin plain sheet sands and channel or overbank-levee deposits.