Cretaceous Stratigraphy, Depositional Systems, and Reservoir Facies of the Northern Gulf of Mexico

Robert W. Scott[1,2]

[1]Precision Stratigraphy Associates, 149 West Ridge Rd,, Cleveland, Oklahoma 74020-5037

[2]Department of Geosciences, University of Tulsa, 800 S. Tucker Dr., Tulsa, Oklahoma 74104-3189

ABSTRACT

The Cretaceous southern passive margin of North America was an extensive shelf to the proto-Gulf of Mexico. Shoreline extended west from the Florida Peninsular Arch to north Texas. Westward its position fluctuated as sea level changed.

Regional unconformities divide the Cretaceous section into three very long-term depositional cycles: the Coahuila Series encompasses strata from the base of the Cretaceous to the intra-Aptian unconformity; the Comanchean Series includes strata above the intra-Aptian unconformity and below the intra-Cenomanian unconformity; and the Gulfian Series spans the interval up to the Cretaceous/Tertiary boundary. Biostratigraphic zones of ammonites, foraminifera, calcareous nannofossils, and dinoflagellates correlate the Gulf strata with European zones and stages.

Cretaceous seas flooded much of North America during Late Albian through Maastrichtian. Thick siliciclastic sequences filled the northern part of the Gulf of Mexico and were interrupted by widespread carbonate shelves developed during seven major transgressive events.

New data and reservoir models stimulate exploration of Cretaceous rocks: fluvial sandstone and gas-prone shale reservoirs in the Hosston and Travis Peak formations, prograding carbonate ramp and carbonate mounds in the upper part of the Cotton Valley Group and Aptian James Formation, and Albian shelf-margin carbonates.

Exploitation of Woodbine Formation sandstone lithosomes is rejuvenated by new depositional models: meander-belt facies in the shale, channels incised into shale, or slope turbidites. Major hydrocarbon production is from (1) Woodbine sands in stratigraphic pinchout and truncation traps, (2) Tuscaloosa and Eagle Ford sands and shales in fault-controlled fluvial-deltaic, shelf, slope deposits, or in fractured shale, and (3) Austin Chalk fractured reservoirs.

Scott, R. W., 2010, Cretaceous stratigraphy, depositional systems, and reservoir facies of the northern Gulf of Mexico: Gulf Coast Association of Geological Societies Transactions, v. 60, p. 597-609.