

A New Architectural Framework for the Early Cretaceous Sligo/Pettet Formation of East Texas

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Abstract

The Sligo Formation, locally known as the Pettet or Pettit Formation in East Texas, consists of major platform-building carbonates that were deposited during the Early Cretaceous on the Comanche Platform, northern Gulf of Mexico. Growth of a reef margin that persisted for millions of years facilitated development of a rimmed platform architecture with an expansive shelf interior over 200 kilometers wide. Within the shelf interior, reservoirs formed by oolitic-skeletal shoals have been targeted for conventional production for over 50 years. Shoal distribution on the shelf is affected by numerous topographical features such as intrashelf basins and uplifts, as well as influx of siliciclastic sands in nearshore environments. In East Texas, reservoir facies distribution is further complicated by the influence of the East Texas Salt Basin, which contained numerous salt domes and salt withdrawal minibasins at the time of Sligo deposition. Although work in the central Texas region has established a sequence stratigraphic framework for the Sligo Formation, to date no comprehensive work has been done to document cyclicity, architecture, and facies distribution of this formation in East Texas. This study aims to rectify this gap by establishing a core-calibrated stratigraphic framework for the Sligo Formation in the East Texas region. Establishment of a framework allows improved recognition of reservoir facies distribution and continuity, especially in complex areas such as nearshore laterally mixed systems with interfingering carbonates and siliciclastics and in halokinetically influenced systems where observed facies may not match what is predicted. Furthermore, a clearly-defined framework aids in searching for missed opportunities, particularly in the East Texas Basin where the interplay of eustacy and

halokinesis and their effects on facies distribution and transport remains poorly understood.

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