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Reexamination of Late Jurassic Reef Building in the East Texas Basin: A Maturing Gas Play

Abstract

In 1993, Marathon Oil Company drilled the MOC Poth #1 near the western margin of the East Texas Basin. The well was completed in an Upper Jurassic reefal buildup approximately 350 feet thick. This outstanding gas well discovery kicked off a new gas play in a basin with a long history of extensive exploration. The depositional model in use at Marathon for its several reef discoveries can now be reexamined using additional information provided by 100 wells during 7 years of exploratory drilling. Workers can now focus on the identification of conditions favoring optimal reef growth and porosity development in Upper Jurassic reefs.

A faulting episode at or near the end of Upper Jurassic Gilmer (Cotton Valley) time dislocated the carbonate ramp and effectively reshaped the shelf margin and basin. The topography created by this faulting event proved advantageous for reef growth and facilitated clastic sediment bypass into adjacent synclinal troughs. Evidence indicates that this faulting episode post-dated deposition of the Gilmer (Cotton Valley) Limestone and predated any significant Bossier deposition. Seismic data shows slide blocks composed of Gilmer Limestone were carried basinward. Deposition of the Lower Bossier shows no evidence of disruption by this décollement faulting but does exhibit draping over fault toes of Gilmer blocks.

Derivative maps of paleogeographic surfaces were generated to identify the trend of the reef tract. They also served to underscore the value of sediment traps that protected coral reefs from the influx of clastic sediment shed from the nearby shelf. The highly developed, thickest, microbially bound, coral dominated, reefal buildups are positioned near the western margin of the East Texas Basin.

In 1998, Clayton Williams Energy, Inc. reinvigorated and expanded the Jurassic Reef play by stepping out 35 miles southwest of Marathon's Riley Trust discovery to drill a successful reef wildcat. The limits of the play have yet to be defined.

Biographical Sketch

EDWARD M. NORWOOD attended Potomac State College and West Virginia University, receiving his bachelor's and master's degrees from WVU in 1956 and 1957. He has worked as a petroleum geologist for 43 years in the employ of several companies including Phillips Petroleum Co., Pennzoil Company, and more recently Marathon Oil Company and Clayton Williams Energy. Ed's range of experience spans several regions, including the Alaskan North Slope, the Appalachians, California, the Gulf Coast and the East Texas basins. □