
Pre-Pearsall Geology and Exploration Plays in South Texas

Thomas E. Ewing

Frontera Exploration Consultants, 19240 Redland Rd., San Antonio, Texas 78259

ABSTRACT

The pre-Pearsall Mesozoic strata in South Texas form a 10,000 mi² (26,000 km²) prospective province with few penetrations (29 reaching Jurassic strata) and limited production.

South Texas “basement” consists of deformed and metamorphosed Paleozoic (Ouachita) sandstone, shale, and chert, overlain by two redbed successions; the “Blum Unit” of Permian (?) age, and the fill of the “Chittim Rift” of early Mesozoic (?) age. Other structures relating to the opening of the Gulf of Mexico are proposed but not yet well imaged. Louann Salt was deposited in the southeastern portion of the area.

The “Louark” cycle of deposition (Oxfordian-Kimmeridgian) includes Smackover carbonates and overlying evaporites (Buckner) that transition downdip into Haynesville limestone and shale. A northwest-trending carbonate shelf margin was established, resting everywhere on salt; halokinesis during deposition profoundly affected reservoir and source-rock distribution.

The Cotton Valley cycle of deposition (Tithonian-Berriasian) includes abundant sandstone updip, but passes into marine shale before reaching the Louark shelf margin. Bossier-like deep-water fans are possible.

The Coahuilan cycle of deposition (Valanginian [?]-Aptian) began with a significant basal Hosston lowstand, depositing sands seaward to the Louark margin. Regional transgression deposited mud, followed by a varied clastic-carbonate succession. Finally, clastic input ceased; carbonates blanketed the area behind the Sligo/Cupido reef. This platform was then transgressed, forming shoals and finally ending in deposition of Pearsall marine muds.

Eight plays occur: two confirmed, three indicated and three speculative. The confirmed plays are the overpressured Sligo shelf margin gas play (80 BCFG [billion cubic ft of gas] produced), and upper Sligo platform shoals (3.5 BCFG produced). Shows occur in Louark shelf-margin carbonates, in lowstand sandstones of the basal Hosston, and in lower Sligo dolostones. Speculative plays include the Chittim Rift environs, the Cotton Valley clastics, and “Poza Rica” carbonate debris wedges seaward of the Sligo reef. Depth, temperature and gas properties have led to limited sub-Pearsall exploration.