



## Lithofacies and Diagenetic Features of Strawn Carbonates and Tannehill Siliciclastics in King County, Texas: Implications for Reservoir Quality

Qilong Fu and William Ambrose

Bureau of Economic Geology, Jackson School of Geosciences

### ABSTRACT

The Pennsylvanian Strawn Group and Tannehill Sandstone in King County are significant hydrocarbon-producing intervals in the Eastern Shelf of the Permian Basin. Three principal end types of lithofacies are distinguished: grain-dominated carbonates (mainly bioclast packstone), mud-dominated carbonates (bioclast wackestone and minor mudstone), and sandstones.

Bioclast packstone is dominated by echinoderms with minor brachiopods, bryozoans, foraminifera, algae, ostracods, peloids and intraclasts, which is tentatively interpreted as density-flow (debris-flow) deposits. Grains of bioclast wackestone and mudstone include sponge spicules, bryozoans, echinoderms, and microbial clots. Low-angle planar laminations and wavy bedding are present, suggesting reworking by traction currents. Bioclast wackestone and mudstone might represent deep-water deposits in outer ramp or slope setting. Cementation and compaction were the major diagenetic processes that significantly reduced porosity. Dissolution created considerable vugs and molds. Residual intergranular and intercrystalline pores may be common. Intragranular pores are locally abundant. Hydrocarbon reservoirs mainly occur in grain-dominated carbonate lithofacies.

Tannehill siliciclastic rocks comprise very fine to fine sandstones with minor medium sandstones, and may show ripple-stratification and carbonate coatings of sands (oolitic coatings). Quartz is the dominant grain type, with other minor grains including rock fragments, feldspar, and bioclasts. These sandstones might have been deposited in shallow-marine environments and overprinted by subaerial diagenesis, based on the presence of double mud-draped ripples overlying soil zones with root mottling. Mechanical compaction is evident, and calcite cements are common in some samples. Dissolution features are moderately present. Residual intergranular and vuggy pores are abundant. Intragranular micropores may occur in

rock fragments and feldspar. Generally, sandstone samples are more porous than those in the carbonate rocks.