Depostitional Environments, Facies Distribution and Reservoir Description of the Foster Field (Grayburg Formation) Ector County, Texas

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The Grayburg Formation (Permian, Guadalupian) is a shallow marine succession that formed along the marginal shelves surrounding the Midland and Delaware Basins and across the Central Basement Platform of the Permian Basin, Texas and New Mexico. The Grayburg is overlain by the Queen Formation and underlain by the San Andres Formation. This study is based on core and thin section examination of three cored wells from the Foster Field in Ector County, Texas. The total Grayburg cored interval is 391 feet. Most of the core samples from the study area have been completely dolomitized. Intervals of clastic sandstone are also present in the Grayburg cores, they display poor reservoir quality.

The cored Grayburg Formation includes the following lithofacies: oolitic dolograinstone, fusulinid dolowackestone, peloidal dolopackstone, skeletal dolowackestone, dolomudstone and sandstone. In addition to the grains already mentioned, other skeletal grains include bivalves, gastropods and some brachiopods and nonskeletal grains include pellets, intraclasts and pisolites. Sedimentary structures include teepees, stromatolitic algal laminations, mud cracks, cross bedding and rip-up clasts.

The identified depositional facies were mostly tidal flats and evaporitic sabkhas with closely associated shallow water and ooid shoal facies tracts. The observed facies were deposited during easterly progradation across a deeper water open shelf. (Garber, R.A., and P.M. Harris. 1990). These facies can be organized into several shallowing upward cycle types, including shoal capped and tidal flat capped cycles. The shoal capped cycles have ooid/peloidal grain-rich dolopackstones at their

tops and contain the only reservoir quality rocks observed in the cores. The tidal flat capped cycles include teepees, pisolites, fenestral porosity and stromatolitic algal laminations in mud-rich to grain-rich dolopackstones. Although the tidal flat capped cycles can be relatively porous, they lack well connected permeability and hence function as baffles or barriers to fluid flow.

Garber , R. A., and P. M. Harris , 1990, Depositional facies of the Grayburg/San Andres dolomite reservoirs; Central Basin platform, Permian basin, in D. G. Bebout and P. M. Harris , eds., Geologic and engineering approaches in evaluation of San Andres/ Grayburg hydrocarbon reservoirs Permian basin: University of Texas at Austin, Bureau of Economic Geology, p. 1-19.