



Depositional Systems, Lithofacies, Nanopore to Micropore Matrix Network, and Reservoir Quality of the Upper Cretaceous (Cenomanian) Buda Limestone in Dimmit County, Southwestern Texas

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ABSTRACT

The Upper Cretaceous Buda Limestone is a well-explored fractured reservoir in South Texas. It is composed of highly burrowed, calcisphere-planktic foraminifer lime wackestones and some packstones with a coccolith-hash matrix. The depositional setting is interpreted to be a deeper water, below-storm-wave-base, quiet-water, aerobic environment. The dominance of planktic biotas with rare benthic biotas, along with abundant bioturbation, is evidence of this setting. The full Buda section is composed of alternating in-place strata and thick-bedded mudflows of resedimented deepwater material with abundant soft-sediment clasts. The major hydrocarbon producing pore network is composed of fractures. Evidence of larger scale fractures commonly associated with faults and flexures were not noted in the two cores investigated, but many smaller, calcite-filled fractures related to chemical (solution seams) and mechanical compaction were noted. Matrix pores consist of interparticle nanopores to micropores between coccolith hash. The original pores have been partly to totally occluded by calcite overgrowth cement. Porosity ranges from 1 to 5%, and permeability is generally less than 0.1 md. Pore throats range from 5 to 200 nm. It is speculated that even though hydrocarbon production depends on fractures, the matrix may contribute some hydrocarbons, especially into the large widespread flat conduits created by the fractures.

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