Subsurface Geology of Corpus Christi Bay, Nueces County, Texas

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Prolific Production in Corpus Christi Bay has occurred mainly in the regressive Frio Barrier System and the associated shore face/shelf environment. All production in the CC Bay area is below the Anahuac transgressive wedge with the greatest accumulation in the 1st *Marg.* Sand, which has produced a minimum of 680 BCF of gas from the Red Fish Bay/Mustang Island Common 10 reservoir. It is the largest single reservoir in South Texas. The 1st *Marg.* Sands have produced in excess of 990 BCFG from four fields in Corpus Christi Bay.

Shallow hydrocarbons in CC Bay are associated with the South Texas Frio Barrier Bar System and are structurally trapped on large fault bound anticlines or up-to-the-coast relief faults.

Deeper production from the Frio Sands is mainly on the Barrier Bar shore face and associated with fault-bounded anticlinal closures. Structural complexity increases with depth especially along the large strike oriented growth faults. Some have up to 4000 ft of displacement with associated rollover anticlines, subsidiary faults and shale plugs. These deeper reservoirs are usually pressure depletion drives.

The oil industry can point with pride to the coexistence with the fragile bay environment while extracting huge reserves.

Predicting Permeability With Magnetic Resonance Imaging in the Edwards Limestone/Stuart City Trend, Texas

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Determining pore size and pore geometry relationships in carbonate rocks and relating both to permeability is difficult using traditional logging methods. This problem is further complicated by the presence of abundant microporosity (pore size < 62 microns) in the Edwards Limestone. The use of Magnetic Resonance Imaging (MRI) allows for an alternative approach to evaluating the pore types present by examining the response of hydrogen nuclei contained within the free fluid pore space. By testing the hypothesis that larger pore types exhibit an MRI signal decay much slower than smaller pore types, an estimate of the pore type present, (ie) vuggy, interparticle, or micropores, can be inferred. Calibration of the MRI decay curve to known samples with measured petrophysical properties allows for improved predictability of pore types and permeability. The next stage of the analysis involves the application of the calibration technique to the borehole environment using an MRI logging tool to more accurately predict production performance.