MEETINGS

DINNER MEETING—FEBRUARY 8, 1988

ROBERT J. FINLEY—Biographical Sketch

Dr. Robert J. Finley is the Program Director for Gas Resources and currently the Acting Deputy Director for the Bureau of Economic Geology, The University of Texas at Austin. Dr. Finley has been with the Bureau since 1975 where he has conducted research on oil and gas resources and on remote sensing for mineral and hydrocarbon applications. He currently directs studies on tight gas sandstones, oil and gas reserve growth, coalbed methane, and the development of an atlas of major Texas gas reservoirs. He holds a Ph.D. in geology from the University of South Carolina, specializing in sedimentology, and is currently Chairman of the AAPG Committee on Development Geology.

GEOLOGY OF TRAVIS PEAK FORMATION TIGHT GAS SANDSTONES WITH AN EXAMPLE FROM CHAPEL HILL FIELD, EAST TEXAS*

Regionally, the Travis Peak formation forms part of a 500- to 2,500-ft-thick terrigenous clastic blanket that produces gas from Texas to Mississippi. Most of the formation has low permeability and requires hydraulic fracture treatment to produce at economic rates. The formation lacks laterally persistent internal stratigraphic markers, and correlations are difficult where the formation is sand-rich. The origin of Travis Peak sandstones can best be defined by detailed studies within specific fields.

Chapel Hill and adjacent Chapel Hill North and Northeast fields produce gas, oil, and condensate from the upper Travis Peak formation on a north-south elongate anticlinal structure in Smith County, Texas. In 1985, 12.8 Bcf of gas and 1.1 million bbls of liquids were recovered from gross perforated intervals mostly 100 to 200 ft thick within the 300-to 350-ft upper delta fringe facies of the formation. The Travis Peak at Chapel Hill is a quartzarenite to subarkose with abundant quartz overgrowths (15 to 20%), and minor ankerite and dolomite (<3%) and authigenic clay minerals (<3%). Where present, reservoir bitumen typically amounts to 5 percent of rock volume and occludes porosity. Porosity varies from 2 to 17 percent; permeability, which varies from <0.001 to 99 md, averages <0.05 md and is highly variable vertically. Hydraulic fracture treatments are required for economic production rates.

The Lower Cretaceous Travis Peak in the eastern East Texas basin consists of regressive fluvial-deltaic facies overlain by marginal-marine delta fringe facies. Productive upper delta fringe sandstones at Chapel Hill are interpreted as distal edges of lower delta plain to bay, tidal flat, and distributary channel deposits. Individual sandstones show highly variable thickness and mud content that is reflected in gamma-ray log character. The sequence is sand-rich with no shale barriers to contain hydraulic fractures, and reservoir quality of sandstones is dependent, in part, on amounts of admixed silt and clay and the degree of bioturbation. Thin (4 ft), areally limited mudstones and muddy carbonates 80 ft below the top of the Travis Peak indicate local marine transgression. High sandstone percent trends show northwest to north-northwest sediment input directions consistent with regional patterns. Core and log data can be used to recognize repetitive sandstone types, but hydraulic fracturing precludes relating these types to hydrocarbon productivity.

The Travis Peak probably has been underestimated as a gas producer. Many areas of production in the Sligo/Pettet carbonates also show Travis Peak potential; Sligo/Pettet leases should not be abandoned without considering the gas potential of the immediately underlying 300 to 800 ft of Travis Peak. Furthermore, depleted Cotton Valley gas wells may have the potential to be recompleted uphole in the Travis Peak based on new formation evaluation techniques now being developed by the Gas Research Institute.

**With Shirley P. Dutton*