DOUBLE PRESENTATION— SEPTEMBER 25, 1985

THOMAS E. EWING—Biographical Sketch

Dr. Thomas E. ("Tom") Ewing is a consulting geologist with Frontera Exploration Services. He has over five years of research and exploration experience in petroleum geology and geophysics. He has concentrated on the relationship of regional tectonics and local structure to sedimentation patterns and hydrocarbon traps.

He received a B.A. in Geology from Colorado College in 1975, an M.S. in Geochemistry from New Mexico Tech in 1977, and a Ph.D. in Geological Sciences from the University of British Columbia in 1981. From 1980 until recently, Dr. Ewing was a research geologist at the Texas Bureau of Economic Geology. His research activities included growth-fault systems, geopressured geothermal energy in the Gulf Coast Basin, Cretaceous volcanism in South Texas, and Hackberry deep-water depositional systems in southeast Texas. He served as a compiler for the Tectonic Map of Texas, and co-authored the *Atlas of Major Texas Oil Reservoirs*. Dr. Ewing is now president and director of research for Frontera Exploration Services in San Antonio, Texas. In this capacity, he designs and carries out regional geophysical, structural and stratigraphic studies in the Gulf Coast and Mid-Continent areas.

He has spoken extensively at local, regional and national geological meetings, receiving the A. I. Levorsen Memorial Award in 1982. He also has presented a successful one-day short course in Permian Basin tectonics.

Tom Ewing is a member of various regional and national professional societies including the American Association of Petroleum Geologists, the Geological Society of America and the American Geophysical Union. He has served as secretary of the Austin Geological Society and as its delegate to the AAPG House of Delegates. He presently serves as Editor of the Gulf Coast Association of Geological Societies *Transactions*.

HACKBERRY SANDSTONES OF SOUTHEAST TEXAS — ANATOMY OF A DELTA-FRINGE SUBMARINE CHANNEL-FAN SANDSTONE COMPLEX

Deep-water sandstones of the Hackberry unit of the Frio Formation form one of the most prospective exploration targets in southeast Texas and southwest Louisiana. The Hackberry is a wedge of sandstone and shale containing bathyal fauna that separates upper Frio barrier-bar - strandplain sandstones from lower Frio neritic shales and sands. Major Hackberry sandstones lie above a channeled unconformity that forms the base of the unit. The deep-water "embayment" lies on the flank of the Houston delta system to the west and a delta system in south-central Louisiana, and downdip from a barrier-bar sequence.

Sandstones in a typical sand-rich channel at Port Arthur field grade upward from a basal, confined channel-fill sandstone to a more widespread, broad fan channel deposit, proximal to medial fan deposits and overbank turbidite deposits. The sequence suggests that Hackberry sandstones were laid down by an onlapping submarine canyon-fan complex. Fans with shallow channels formed southeast of 800-ft deep canyons that eroded headward into the contemporaneous Frio barrier system.

Time-depth plots of water depth and sediment thickness indicate that most of the Hackberry Embayment in Texas could have been formed by normal subsidence during the late Oligocene, if the embayment was cut off from its supply of muddy sediment. Thick, sandy, lower Hackberry deposits filled deep canyons eroded into the retreating shelf margin, and formed small fan deposits seaward of the deep canyons.

Deep submarine canyons are found in delta-fringe settings in the Wilcox (Lavaca County area), the Frio (South Texas, Hackberry) and the Miocene of the Texas Gulf Coast, as well as in the Niger Delta and other Quaternary deltas. Many but not all, of these are associated with net transgression following major progradation — conditions that may favor sediment bypass and propagation of shelf-edge slumping. However, only the Hackberry has abundant clean, channel filling sandstones. This may be due to ponding of the fan facies in intraslope basins between salt diapirs, which raised base level and backed up sand deposition into the channels. If so, other delta-fringe environments within the salt basins may contain Hackberry-like, probably geopressured channel sandstones. Areas to examine include the Wilcox in Liberty and Hardin Counties, the Yegua in the same area, and the Pleistocene in High Island South and Galveston South areas.

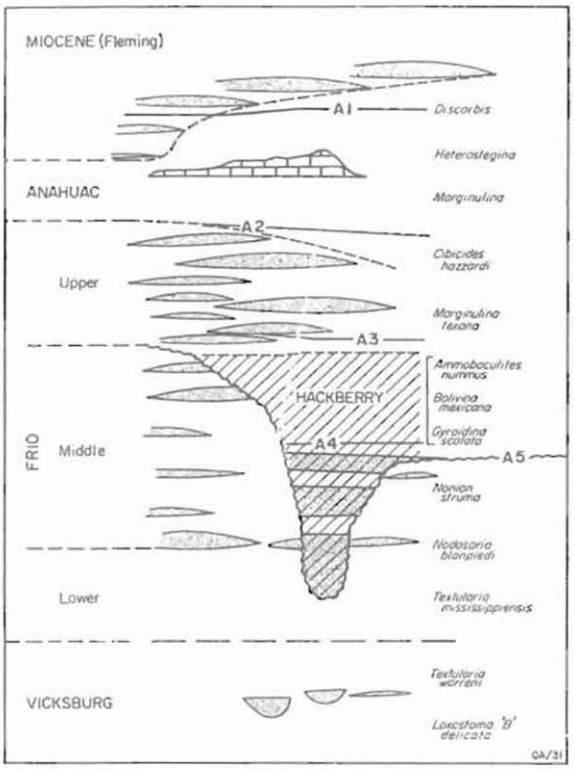

Figure 1. Stratigraphic diagram of Frio and related strata, Jefferson County area, and diagnostic foraminifers, sand-body distribution (shaded), and marker horizons used for this study (A1 through A5).