

# GEOLOGY OF THE GUM ISLAND AND FRENCH ISLAND AREAS, JEFFERSON COUNTY, TEXAS

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## ABSTRACT

The Gum Island field is located adjacent to a small topographic feature of the same name elevated over five feet above tidal marsh about 13 miles west of Port Arthur, Texas. French Island field lies along Taylors Bayou, four miles due north of Gum Island. Figures 1 and 2 demonstrate the position of these fields, both with respect to the Hackberry embayment and nearby points of geographic interest. The two fields, discovered as a result of the same initial exploration effort, are combination stratigraphic and structural traps. The principal reservoirs are Oligocene middle Frio-Hackberry in age. They are localized as a result of rapid filling of downwarped troughs created by older growth fault structural movement, principally of Vicksburg age, but persistent during lower and middle Frio. These troughs became the locality of subsequent turbidity current scours. Pre-Hackberry structural maps, Hackberry sand distribution maps, structural and stratigraphic maps, both prior and subsequent to discovery, as well as seismic and subsurface cross-sections, demonstrate the nature of the oil and gas traps, as well as the geological history of the area.

At both French Island and Gum Island, an erosional surface of significant magnitude at the base of the Hackberry has been described, and its principal area of effect depicted. The resulting unconformity does not greatly affect Hackberry accumulation at French Island, but at Gum Island the stratigraphic position of the unconformity relative to older beds is not only indicative of strong pre-Hackberry structural uplift, but also of a prominent adjacent downwarp and erosional scour providing a turbidity current avenue. The unconformity also bears a direct relation to individual subsequently deposited Hackberry sand reservoirs. Figure 3 demonstrates the complex erosional channel, channel fill and fault complex at French Island. Figure 4 indicates a similar but less complex erosional, depositional, and structural sequence of events resulting, in part, in the Gum Island, Hackberry field. Both fields are productive, not only in Hackberry beds, but younger beds of Anahuac and upper Frio age. Gum Island also demonstrates limited Miocene accumulation of oil and gas.

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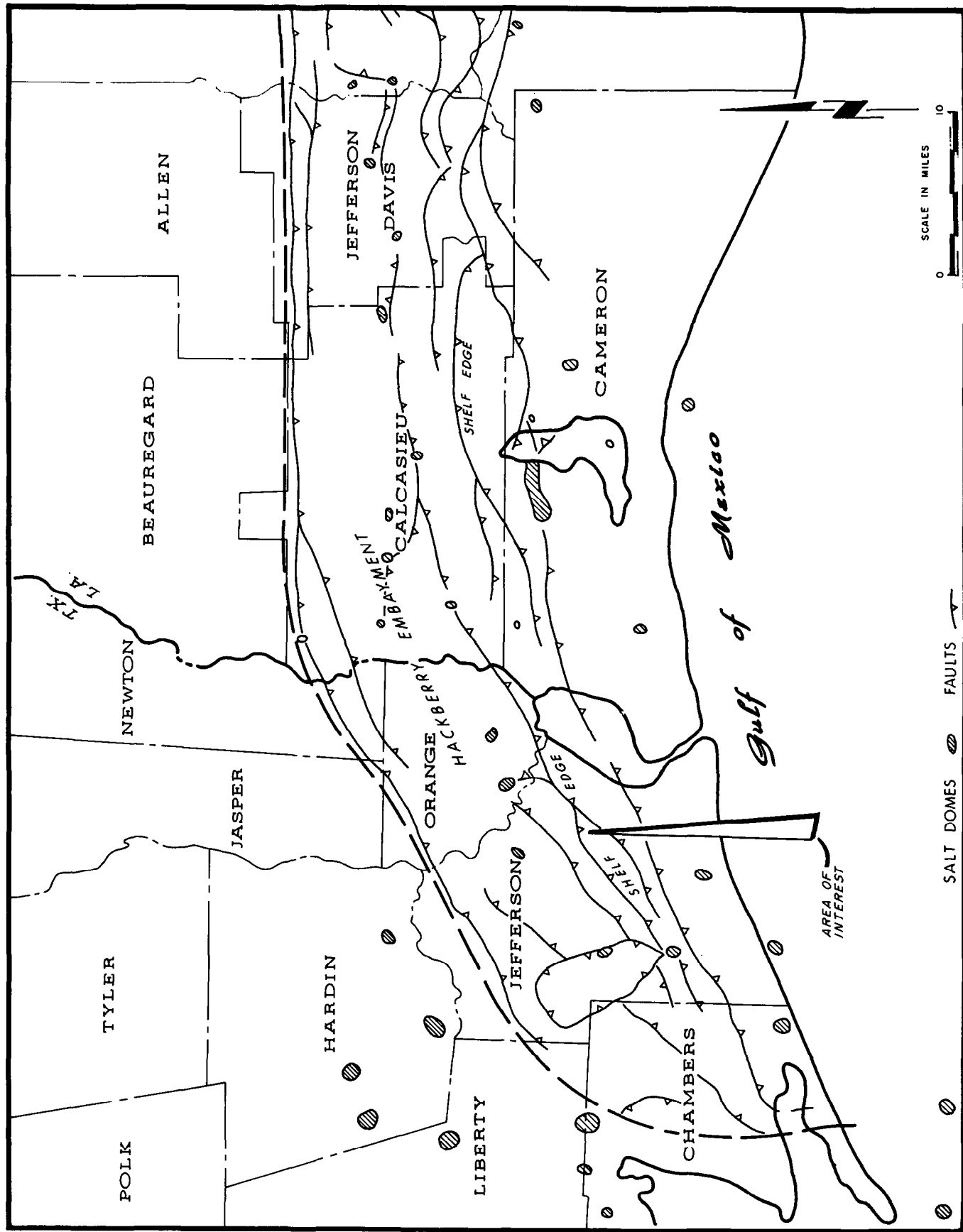


Figure 1. Location map of area of interest relative to the salt basin and the Hackberry embayment.

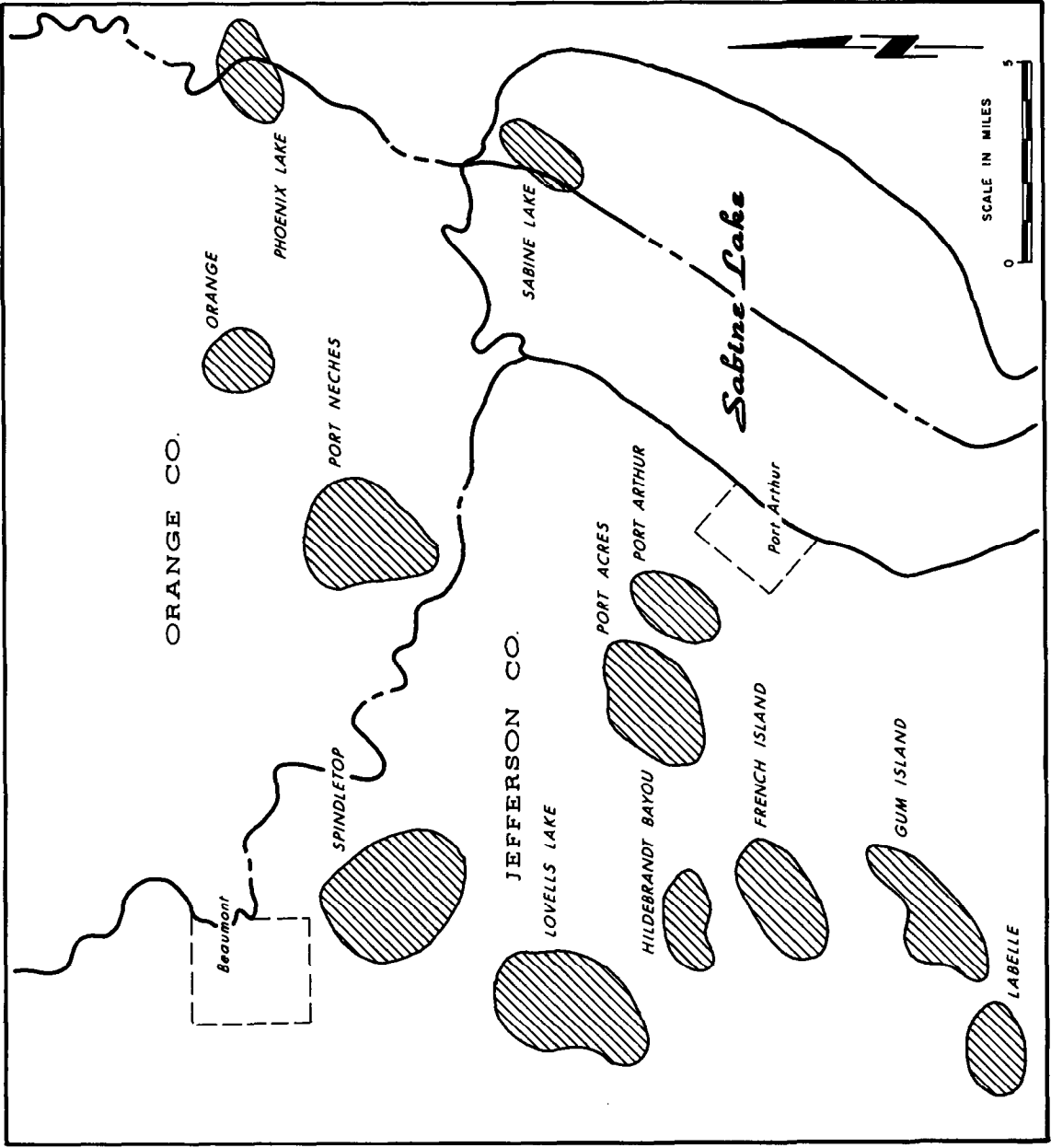


Figure 2. Location map showing French Island-Gum Island fields in relation to nearby producing fields.

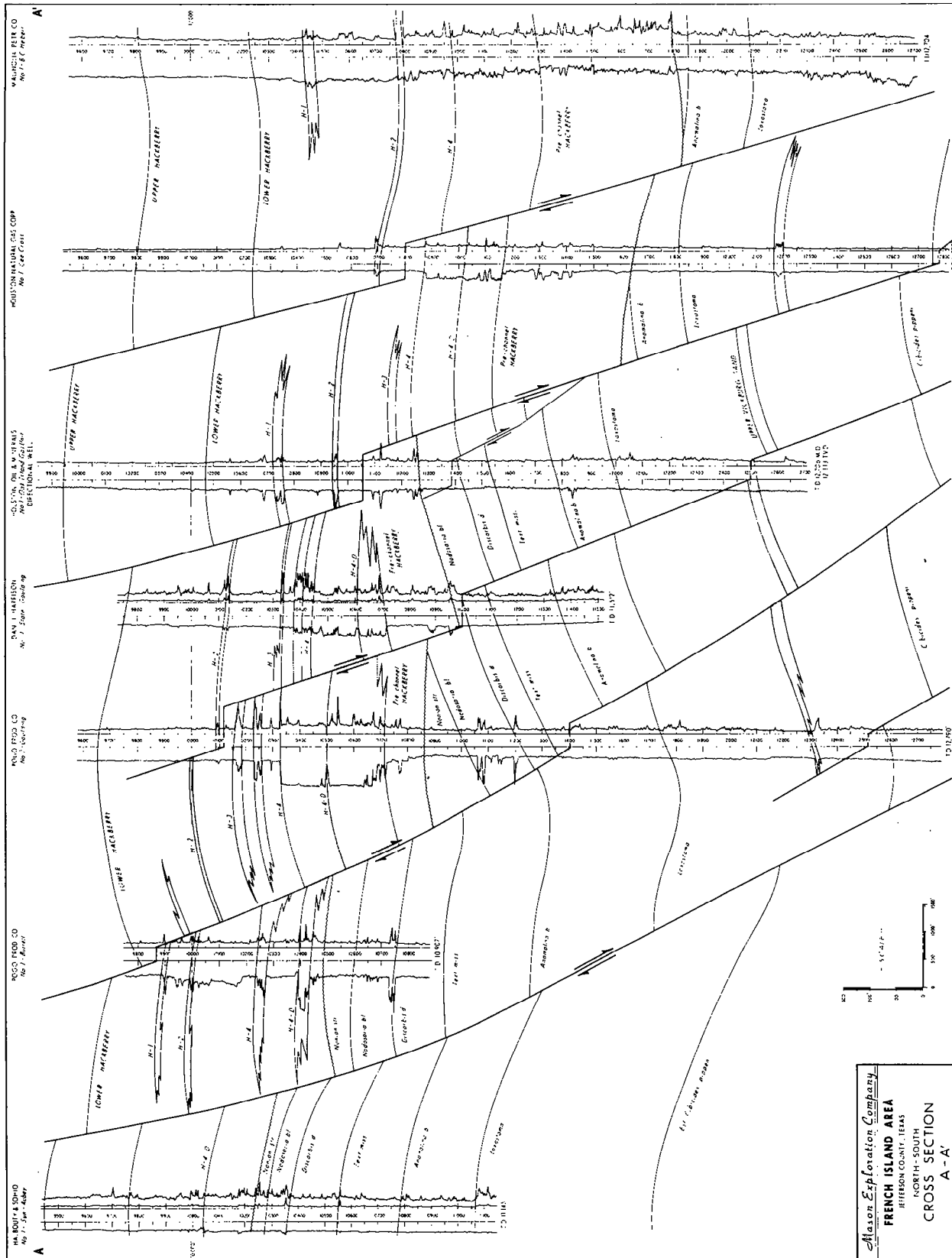


Figure 3. North-south cross-section through the French Island area, Jefferson County, Texas.

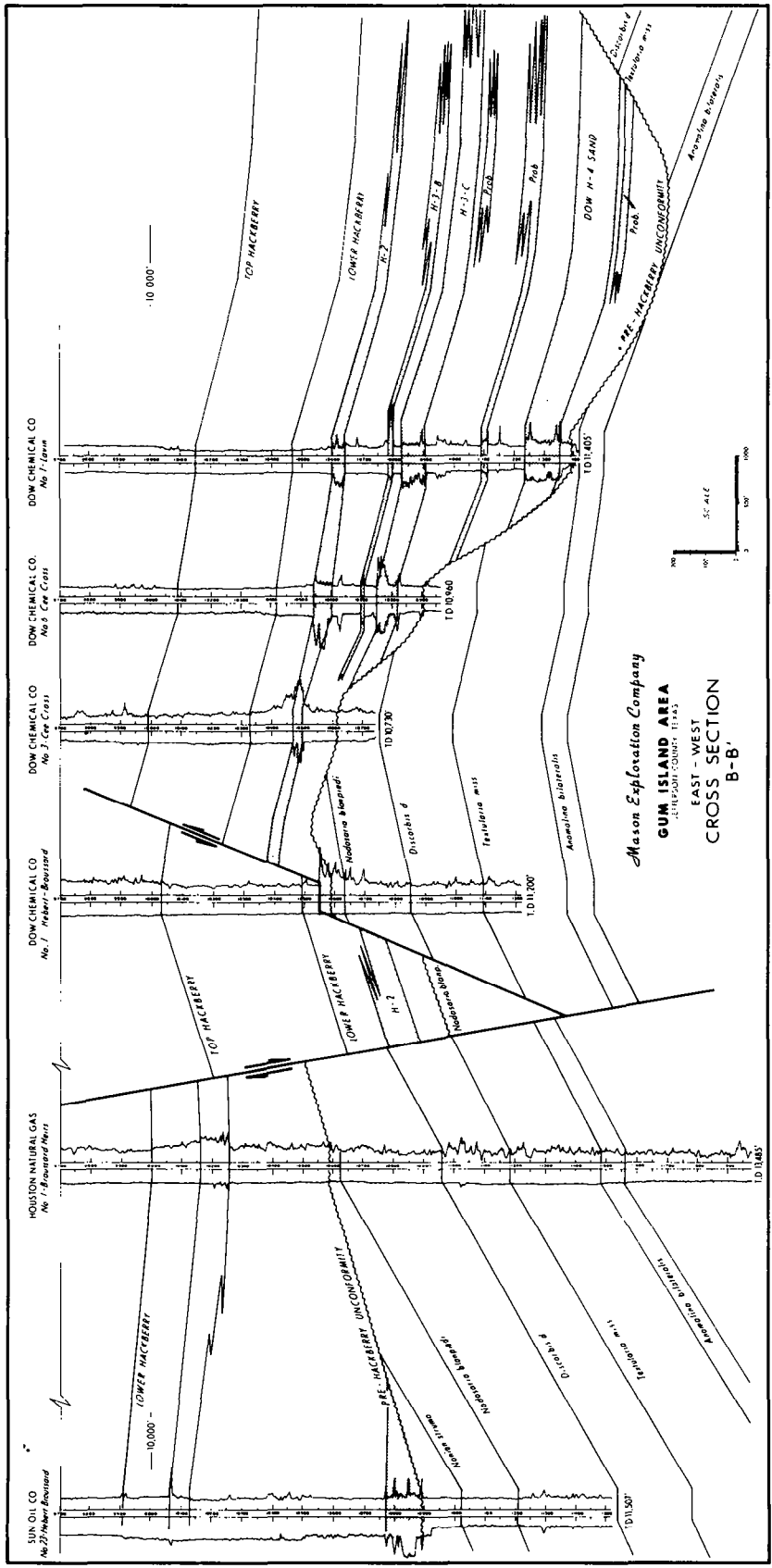


Figure 4. East-west cross-section through the Gum Island area, Jefferson County, Texas.