Weiner information function, E = species equability] among the 14 doubly sampled stations indicate that the following ranges and averages (X) exist at high tide: S = 2 to 13, X = 7.5; H(S) = 0.311 to 2.046, X = 1.25; E = 0.306 to 0.720, X = 0.522. Low-tide samples have these ranges and averages: S = 2 to 12, X = 7.0; H(S) = 1.721 to 3.750, X = 1.08; E = 0.326 to 0.727, X = 0.488. In comparison to low-tide samples, high-tide samples have a higher species diversity, slightly lower dominance, and are more equable.

Three microbiotopes occur among the 14 stations: (1) beach at 3 stations, (2) lacustrine at 3 stations, and (3) bayou-fluvial at 8 stations. Among the microbiotopes, the beach marshes have the highest diversity (S = 10), the least dominance [H(S) = 1.36], and are least equable (E = 0.400). Lacustrine environments exhibit the greatest dominance [H(S) = 0.969] and equability (E = 0.635), although the diversity is midrange (S = 6.5). The bayou-fluvial marshes show a lower diversity (S = 6.12) and have midrange values for dominance and equability (S = 1.17; E = 0.510).

In the beach and bayou-fluvial marshes, arenaceous foraminifera dominate; however, a calcareous form, *Discorbis* sp., dominates the lacustrine marshes. Numerical abundance (number of individuals) and the diversity of the less common species appear to cause the greatest differences between microbiotopes.

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Isotopic Characteristics of Brines from Three Oil and Gas Fields, Southern Louisiana

Isotopic analyses of 20 brine samples from two diapir-related oil fields and one growth-fault-related gas field in southern Louisiana lend support to a model proposed by A. L. Workman and J. S. Hanor that brines from the geopressure zone are mixing with hydropressured formation waters along the flanks of the Iberia salt dome and, within the limits of the sampling, suggest that this hydrodynamic process may be characteristic of the region. The $\delta^{18}O$, δD and $^{87}Sr/^{86}Sr$ determinations suggest that formation fluids above 2,000 m depth have partly equilibrated with terrigenous clastic rocks. Fluids below 2,000 m appear to be mixed Oligocene and Miocene seawater and clay-mineral water or evolved hydrocarbon-bearing water. These fluid compositions vary with depth due to mixing and possibly to temperature variations. Some samples may contain constituents derived from salt dissolution.

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Subsurface Lignite Occurrence in Wilcox Group, Northeast Louisiana and Northwest Mississippi

An investigation of lignite occurrence in the Wilcox Group of northeast Louisiana and northwest Mississippi revealed high lignite concentrations associated with a highly constructive elongated delta in the lowermost Wilcox Group. Bar-finger sandstone and distributary channel sandstone facies of an elongated delta lobe were recognized trending north-south through the central portion of the study area by sandstone percent maps, net sandstone isopach maps, and characteristic SP curves on electric well logs. Lignite isopleth maps identified principal areas of lignite occurrence adjacent to the elongate delta. Fewer, but thicker seams were found in the northern regions, where a maximum of four seams ≥ 5 ft thick were identified. To the south, a greater concentration of thinner seams occur. The distribution is attributed to a change in the position on the deltaic plain. Numerous, thin lignite beds in the southern region are indicative of lower delta-plain environments, where bifurcating distributaries, crevasse splays, and marine inundation inhibited thicker peat development. The presence of thicker, but fewer lignites to the north supports a transitional to upper delta-plain environment.

Mapping of individual sandstone beds revealed dip-oriented, bifurcating, fanlike geometries indicative of a lower to transitional delta plain. Capping lignite seams are blanket type, having areal extents of up to several hundred square miles and thicknesses ranging from 2 to 20 ft. Thicker seam development occurs along the delta-lobe margins, extending landward into adjacent interdistributary basins. The large extent of the blanket seams is in part attributed to (1) lignite beds capping channel-fill deposits, and (2) distributary channel and point-bar sandstones directly overlying lignite beds, with no truncation evident. Cross sections illustrate subsidence of the lignite beneath the overlying channel deposits.

High-quality lignite originates in transitional to upper delta-plain environments. Optimal areas for high-quality lignites in the Wilcox Group should be the extreme northeastern and northwestern portions of the study area, and farther north into central Tensas and Franklin Parishes, where thicker, transitional to upper delta-plain paleoenvironments should exist. Minimum subsurface depth to the highly lignitic, lowermost Wilcox Group ranges from approximately 5,000 ft (1,510 m) in the northwestern region to 7,000 ft (2,114 m) along the extreme southern boundary.

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Correlation of Cenozoic Sediments on Gulf of Mexico Outer Continental Shelf: Galveston Area Offshore Texas to Vermilion Area Offshore Louisiana (Part 1)

Detailed stratigraphic correlations of the Texas and Louisiana outer continental shelf (OCS) of the Gulf of Mexico have been conducted for the past several years as part of the geological and geophysical effort included in the resource evaluation program.

Part 1 of this study includes the area from Galveston, offshore Texas, to Vermilion, offshore Louisiana. Part 2 will extend down the Texas coast to Port Isabel. Part 3 will extend eastward beyond the Main Pass area. Other parts in the series are contemplated for the eastern gulf and the deep-water areas.

The study area for part 1, Galveston through Vermilion, was selected because it is centrally located and includes portions of most of the productive trends on the federal OCS, and it includes a stratigraphically complex region characterized by the transition from the deltaic sedimentary sequences of the central Gulf of Mexico OCS to the offshore bar facies of the western Gulf of Mexico.

The primary objective of this investigation is to establish a regional stratigraphic correlation grid including all major productive intervals based on electric-log, seismic, and paleontological data. Twenty-five stratigraphic horizons have been identified and regionally correlated.

The correlations of regional markers are presented on both electric-log (geologic) cross sections and on seismic sections that closely parallel the geologic cross sections. The regional markers correlated on the E-logs were projected onto nearby seismic sections and correlated from well to well to verify the accuracy of the electric-log correlations. Time-depth values were calculated from borehole velocity surveys and integrated sonic logs. Approximately 30 electric log and 40 seismic sections have been constructed. Work on part 1 included the detailed analyses of more than 1,500 wells, three-quarters of which had paleontological data, and the interpretation of 12,000 line-mi of seismic data.

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Local Carbonate Production on a Terrigenous Shelf

During the past 10 years, the Department of Oceanography at Texas A&M University has been involved in investigating reefs and banks on the Texas-Louisiana outer continental shelf. Studies were conducted on the geologic structure, sediment distribution, biology, and water and sediment dynamics at over 30 reefs and banks. Because of the influence of the Mississippi River and other streams, the dominant sediments in this part of the Gulf of Mexico are terrigenous sands and muds. Uplift of the sea floor caused by salt diapirism exposes bed rock that serves as a substrate for colonization by calcareous organisms.

Sediment facies and biologic zones at the Flower Garden Banks are closely related. The presence of a bathymetric high influences the direction and velocity of bottom currents. Factors that control sediment facies are biologic components and depth of the nepheloid layer (turbid water). Factors that control biologic zonation are the nature of the substrate, the water depth, and the depth of the nepheloid layer.

No land-derived sediment (silt and clay) are present above a depth of 75 m. Studies of the physical characteristics of the water column indicate