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PALEOECOLOGY, STRATIGRAPHY, PRODUCTION—GETTING IT ALL TOGETHER IN OFFSHORE LOUISIANA

Statistical studies based on the mapping of paleoecologic zones, sandstone conditions, and production in offshore Louisiana indicate a positive correlation among these parameters. Oil and gas production for given depth is associated with a narrow range of preferred environments of deposition and sandstone development. For example, in the depth range 10,000–12,000 ft in the eastern offshore area (Ship Shoal through Main Pass), about 70% of all oil wells are completed where the section contains 10–30% sandstone and is in the inner neritic environment.

An IBM 1130 computer with attached Calcomp plotter was used to prepare (1) structure and environment maps of various biostratigraphic surfaces, (2) environment maps of the interval between biostratigraphic surfaces, and (3) environment maps at constant depth slices. To aid in statistical comparisons, the following maps were constructed in 2,000-ft-thick depth intervals: (1) average weighted environment; (2) sand percentage, net sand, sandstone-shale ratio, and number of discrete sandstones; and (3) oil and gas completions.

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EARLY MIOCENE DEPOSITIONAL ENVIRONMENTS INTERPRETED FROM EXPOSURES IN CANE RIVER DIVERSION CHANNEL, LOUISIANA

A Miocene deltaic sequence, 75 ft thick, is exposed continuously for 4 mi in the Cane River Diversion Channel 25 mi northwest of Alexandria, Louisiana. This outcrop permits a detailed study of the abrupt lateral and vertical variations of lithologic character, sedimentary structures, bed geometry, and diagenetic alterations in a prograding deltaic sequence. From this study, the sedimentary features of channels, point bars, levees, swamps, and distributary mouth bars have been characterized and compared with those of modern deltaic environments. Deltaic paleoenvironments commonly are found in the subsurface, *e.g.*, the oil producing Wilcox of central Mississippi and Louisiana. This study provides a model to aid in understanding the seemingly random occurrences of lithologies and their related correlation problems of the subsurface.

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TURBIDITY GENERATION AND DISTRIBUTION IN TAMPA BAY MONITORED WITH TOWABLE OPTICAL TRANSMISSOMETER

Turbidity in Tampa Bay was monitored for 6 months using a towable 1-m optical transmissometer system. The system provided for continuous chart readout and allowed short-term water-mass migrations to be mapped quantitatively. Transmission readings ranged from 80% in the open Gulf of Mexico to zero in Hillsborough Bay.

Five major sources of turbidity were identified: (1) resuspended bottom sediment, present both naturally over shoals and caused artificially by dredging and other developmental activities, most important; (2) suspended phytoplankton ("seston") important locally, especially in Hillsborough Bay, where the pollutional nutrient input is excessive and promotes plankton blooms; (3) sewage outfalls and miscellaneous inputs related to urbanization; (4) river-borne tripton; and (5) surf-generated fine debris.

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"G_2" CHANNEL SANDSTONE, MAIN PASS BLOCK 35 FIELD

The Main Pass Block 35 field is in the Gulf of Mexico about 50 mi southeast of New Orleans in 10 ft of water. The general structure of the field is that of a rollover anticline on the downthrown block of a south-dipping contemporaneous fault which at the "G_2" level has about 200 ft of displacement. The Miocene "G_2" sandstone, the largest single reservoir in the field, is a classic example of oil production from a stream channel. The channel has a maximum width of about ½ mi, and its edges are closely defined by dense well control. The gas-oil contact is at 6,636 ft subsea and the oil-water contact at 6,690 ft subsea. Nineteen wells or sidetracks have been completed in this sandstone, and ultimate recovery will exceed 12 million bbl of oil.

The "G_2" channel sandstone is a clean, well-sorted, fine-grained quartz sandstone with up to 20% feldspars and minor amounts of clay and carbonate. Average porosity is about 34%, and average permeability is in excess of 3 darcys. Bottomhole pressure data indicate that continuity within the channel is excellent. In contrast to the channel sandstone, the associated natural levee and backslope deposits are very fine-grained sandstone or siltstone. Average porosity is about 26%, and average permeability is about 75 md. The "G_2" sandstone series is part of a delta system which was advancing from the northeast toward the southwest. Following deposition of the "G_2" channel sand, the delta abandoned this channel and the entire area subsided. The overlying shales are of marine deposition.

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LOWER CRETACEOUS SLIGO REEF TRENDS IN CENTRAL LOUISIANA

Reef limestones within the Lower Cretaceous Sligo Formation form a trend within the Gulf Coastal province and have been traced in the subsurface from Mexico to Mississippi. This trend probably continues beneath the Gulf of Mexico in the general vicinity of the West Florida shelf.

The Sligo forms 2 reef trends in central Louisiana. The main biohermal trend extends roughly east-west through Vernon and Rapides Parishes, then southeast through Avoyelles, southern Catahoula, and southern Concordia Parishes. It has a maximum known width of about 40 mi and a maximum known thickness of about 500 ft. The few deep tests that have been drilled within this reef indicate a fossil assemblage consisting mostly of caprinids (sessile pelecypods) and algae plus miliolids and other small forms in a sparry or micrite matrix. Up to 50% of the Sligo in this trend is dolomite, and porosity is generally less than 9% in tests drilled to date.

North of the main reef is another biohermal trend up to 250 ft thick which forms an arcuate pattern through eastern Natchitoches, Winn, southern Jackson, and western Caldwell Parishes. The term "patch reef" has been applied to some local thickenings within this