separation. Towed electrical measurements are complementary to high-resolution subbottom profiling.

Sediment samples collected from Heald Bank were placed in a small wooden trough to appraise some of the properties that control the sediments' resistance and spontaneous potential as well as to obtain insight into the relation between depth of measurement with various electrode spacings. The experimental electrical studies show the same spontaneous potential variations as were found over Heald Bank.

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Clay Mineralogy of Lewisville Member of Cretaceous Woodbine Formation in Arlington, Tarrant County, Texas, Area

One hundred clay-sized samples selected from two cores and two measured sections of the Lewisville Member, three samples from the overlying Arlington Member, and five from the underlying Dexter Member of the Cretaceous Woodbine Formation in eastern Tarrant County, Texas, were analyzed. The amounts of each clay mineral present were calculated from X-ray diffractograms of natural, ethylene glycol–saturated, and heated samples. The average clay mineral assemblage was approximately 28 percent illite, 36 percent kaolinite, and 36 percent expandable lattice clays.

Floral and faunal assemblages and sedimentary structures demonstrate that the Lewisville Member in the Arlington area is part of a deltaic interdistributary complex association where admixing of fresh and saline water creates a transition zone. Vertical changes in clay-mineral distributions correlate well with the changes in depositional environments from fluvial to swamps and bays and finally to marine by the end of Lewisville deposition. Apparently for the Lewisville Member specifically, and probably for the Woodbine Formation in general, clay-mineral distributions are environmentally significant.

The predominant expandable lattice clay in the Lewisville Member is Ca-Mg montmorillonite. In his studies of the Woodbine in east-central Texas, Beall found these exchangeable cations to be most abundant in nearshore sediments with Na+ cation content increasing basinward, reflecting the more marine character of the sediments.

Kaolinite is the most abundant clay mineral in the five Dexter Member samples and in samples from the lower 5 to 10 ft of the Lewisville Member. Several lenticular channels, extensive sands, and interbedded silts and clays provide evidence that the Dexter Member is part of the meander-belt facies. The basal Lewisville marks the transition between a fluvial environment below and swamp and bay environments above.

Randomly interstratified montmorillonite/illite is present throughout the sampled intervals, but no clear relation between this type of clay and depositional environment is apparent, as the semiquantitative method used in this investigation is useful only in determining the relative amounts of the end members of the mixed-layer clay.

An increase in kaolinite and expandable-lattice clays with respect to the average composition in the upper Lewisville and in three Arlington Member samples reflects an increase in transport energy and a westward shift in the strandline.

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East Cameron Block 270, Pleistocene Field

Exploration of the Pliocene-Pleistocene in the Gulf of Mexico since 1970 has resulted in the discovery of significant hydrocarbon reserves. One of the better gas fields has been the Block 270 East Cameron field. Utilization of a coordinated exploration plan with Schlumberger has allowed Pennzoil as operator to develop and put on production the Block 270 field in minimum time.

Block 270 field is a north-south trending faulted nose at 6,000 ft. At "G" sand depth (8,700 ft) the structure has closed, forming an elongated north-south structure with dip in all directions from the Block 270 area. Closure is the result of contemporaneous growth of the east-bounding regional fault.

Structural and stratigraphic interpretations from dipmeters were used to help determine the most favorable offset locations. The producing zones were found to consist of various combinations of barlike, channellike, and distributary-front sands. The sediment source for most of the producing zones was southwest of the area. However, two zones are exceptions and derived sediments from the north through a system of channels parallel with the east-bounding fault.

Computed logs were used to convert conventional logging measurements into a more readily usable form for evaluation. The computed results were used for reserve calculations, reservoir quality determinations, and confirmation of depositional environments as determined from other sources.

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Modern and Ancient Reef Complexes and Associated Limestone Diagenesis of San Andres Island, Colombia

San Andres is a small coralline island 136 km east of the Caribbean coast of Nicaragua. Surface mapping and paleontologic data indicate reefs have been growing actively in the area at least since early Miocene time. Because of the offlap relations of the ancient reef complexes, accessibility of progressively younger rocks is simplified.

Field and laboratory examination of both modern and ancient reef complexes indicates five major bottom facies: (1) forereef flank, (2) reef, (3) backreef platform, (4) backreef lagoon with patch reefs, and (5) shore area. Principal builders of the reefs were *Millepora* and lime-secreting algae with abundant *Acropora, Diploria, Montastrea*, and *Porites*.

From X-ray and petrographic studies of the limestones, a sequence of carbonate diagenesis has been determined for the San Andres area. During early stages of diagenesis, sediments initially are cemented by grain welding and aragonite precipitation between grains. This early type of cementation is most common in the supertidal and intertidal zones. Subsequent calcite cementation occurs by dissolution-precipitation after aragonite. After calcite precipitation, no evidence can be found of the preexisting aragonite cement. Although inversion of aragonite to calcite commonly occurs in grain material, dissolution-precipitation seems to be the major process of cementation.

During the diagenetic sequence, four responses may be expected: (1) magnesium is removed and high-magnesium calcite stabilizes to low-magnesium calcite, (2) aragonite can stabilize to calcite, (3) aragonite may be dissolved, and (4) sediments may become dolomitized. The time required for any of these reactions is variable and depends on the chemical environment. X-ray analyses indicate that all samples older than middle Pleistocene have stabilized to low-magnesium calcite or dolomite. The result of the diagenetic sequence is the development of a low-magnesium calcite limestone, a dolomite, or a combination of the two.

Porosity in the San Andres area is primary, secondary, or occluded and development depends on exposure of carbonate material to a subaerial environment before mineral stabilization occurs.

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Shear Zones in Salt-Dome Stocks Delineate Spines of Movement

Ever since Balk's studies of the 1940s, the idea has been grow-