360 ft (110 m) thick, trending N30°E and curving to the north at its updip end. The erosional surface becomes more areally and vertically extensive in Halletsville field, 2 mi (3.7 km) south, and correlates with the Lavaca channel erosional surface in Valentine field 9 mi (17 km) to the southwest.

Kinkler field was drilled originally as a seismically defined anticlinal structure, and the discovery well was completed from a sand deposited within the shale-filled channel. Two additional producers and 5 dry or marginal wells from this zone delineate the sand. It is 2.5 mi (4.6 km) long, about 1,500 ft (457 m) wide, and reaches a net sand thickness of 39 ft (12 m). We call this a bay margin sand.

Another productive sand occurs directly below the erosional surface. This upward-fining sand is part of a lower Wilcox A delta and distributary- channel complex, which can be correlated across several square miles. Because individual reservoirs are discontinuous we think this is a point bar with clay drapes separating depositional lobes.

A compaction closure exists over the east margin of the channel. The structure is caused by counter-regional dip into the shale-filled channel on the west, in combination with regional dip to the southeast. Although the amount of closure, 25 ft (7.6 m), is small, the structure may have influenced overlying meander points and channel migration. Two overbank sands produce oil 700 ft (213 m) above the channel, and the compaction feature may have influenced the deposition of a gas-productive upper Wilcox sheet sand 3,000 ft (914 m) above.

The inferred geologic history suggests the lower Wilcox A section is an upward-coarsening progradational deltaic sequence ending in a delta- plain environment. Sea level lowering of several hundred feet caused the river to incise deeply into the flat-lying surface at about the end of lower Wilcox A deposition, resulting in an entrenched valley. Subsequent rapid marine transgression created a drowned valley that received fine clastics both from its marine and fluvial-deltaic ends. Sand spits developed along the valley margin as filling took place.

A present-day analog of the Kinkler field model is Lavaca Bay, a Pleistocene entrenched valley, with a documented record of erosion and sedimentation.

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Ouachita Orogenic Complex, Central Texas—Geophysical Measurements and Basement Offset

The outline of the buried Ouachita orogenic belt in Texas follows an ancient continental edge that has been involved in lithosphere plate interaction since late Precambrian time. Gravity and magnetic measurements along the central Texas part of the trend, combined with limited seismic and well information, indicate that the complex has been offset along a persistent zone of weakness during its history. The offset relationship of the gravity and magnetic anomaly patterns and their relationship, in turn, to the geology of this zone of weakness indicate a series of basement displacements through time. A broad negative gravity anomaly is related to the overthrust package developed during the collision phase. Broad magnetic anomalies are related to slivers of basement caught up in the collision. A belt of positive gravity anomalies is related to a concentration of dense rocks created during the collision phase, or to a mantle welt created during the pull-apart phase. Short-wavelength dipole magnetic anomalies are related to shallow volcanics extruded during this pull-apart phase. The detail in these patterns may provide a framework for interpretation of basement uplift and fracture patterns involved in the offset zone.

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Detailed Grain Size and Heavy Mineralogy of Sands of Northeastern Texas Gulf Coast—Implications with Regard to Coastal Barrier Development

The large volume of literature available on Gulf Coast sedimentology, along with recent advances in computerized analytical methods, now enables more detailed work to be accomplished. Numerous grain-size (automated settling tube) and heavy mineralogical analyses have been conducted on sand samples from the northeastern Texas Gulf Coast. Analyses of local point-bar samples result in the delineation of major river sand sources in the region. Kyanite/garnet/hornblende + pyroxene ratios seem to be the most useful criteria for distinguishing these sources. Grain-size data show combinations of discrete modes characteristic of each river system, whereas the subaerial delta lobes of these rivers consist of finer, better sorted sands, which are believed to represent the coarsest particles transported in suspension. Beach sands are slightly finer and much better sorted than wave-dominated delta sands.

The oldest sands of Galveston Island were derived from the Trinity River, implying a possible deltaic origin for the island. However. most of the island is comprised of Mississippi River, Brazos River, and Trinity-Sabine River sands, mixed in approximately equal proportions, suggesting an offshore Pleistocene source for these features. These sands were deposited on an irregular Pleistocene erosional surface, resulting in dramatic thickness variations. Modern offshore sands and those currently being accreted to barriers, contain a high proportion of Mississippi River sand. This change results from the depletion of offshore mixed sands and marks the onset of barrier retreat.

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Formation of Mississippi Canyon

The most prominent submarine physiographic trough in the northern Gulf of Mexico is the Mississippi Canyon. This submarine trough has an average width of 5 mi (8 km), length of 75 mi (120 km), and bathymetric relief of 985 ft (300 m). Its origin has generally been attributed to channel entrenchment of the Mississippi River during lowstands of sea level and erosion of the more distal parts by turbidity currents or submarine gravity flows. In the last 2 years, a dense, high-resolution seismic and side-scan sonar grid 1,000 ft (305 m), together with deep borings utilized to obtain samples for carbon-14 dating, has been used to establish a time-stratigraphic framework and origin for this feature. Nine horizons, chosen from borings and dated by carbon-14 and paleontologic methods, have been traced laterally on the seismic lines. These horizons range in age from Illinoian (~400,000 years B.P.) to late Holocene (3,500 years B.P.). During the interval from Illinoian to late Pleistocene (25,000 to 27,000 years B.P.), the Mississippi River deposited a series of fluvial and deltaic deposits of approximately 3,300 ft (1,000 m). There is no evidence that a submarine canyon existed in the vicinity of the present feature during this time interval. Approximately 25,000 years ago, a carbon-14-dated horizon was truncated by the initial formation of the submarine canyon. Samples dated by carbon-14, obtained near the base of the canyon fill, show that by 20,000 years B.P., canyon fill had commenced. Thus, this major submarine trough had, at most,