

Five factors warrant particular consideration to assure maximum success. One, is the relative dependence placed on effective judgments of experienced workers, as compared to that placed on any predetermined geologic models or apparent implications of data sets. Second, is having effective contributors who can properly apply newly-accepted or evolving geologic principles affecting hydrocarbon occurrence. Third, is the degree to which contributors identify and use geologic analogs properly or improperly. Fourth, is how correctly assessors view the exploration maturity for basins being studied. Fifth, is the manner in which members of an assessment team communicate with each other regarding such elements as geologic concepts and models, adequacy and significance of data bases, statistical approaches, and constructive criticism—"communicating" involves both transmitting and receiving.

Continuing to advance our science is paramount for preparing future and better resource assessments. Concurrently, correctly identifying, educating, organizing, and supporting the right earth scientists for the assessment task is of equal importance.

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Lower Cretaceous Viking Barrier Island, Southwestern Alberta, Canada

A subsurface study of cores and electric well logs from the lower Cretaceous (Albian) Viking reservoir sandstone near Calgary, Alberta, reveals its deposition as a regressive barrier island along the shores of the *Haplophragmoides gigas* sea.

The barrier island trends northwest-southeast parallel to the paleoshoreline for more than 120 km (75 mi) and attained a maximum thickness of more than 30 m (100 ft). Swales characterized by isopach thinning suggest that the island was probably breached by two tidal channels. Bentonite chronostratigraphy indicates that the barrier island prograded in a northeasterly and/or easterly direction for up to 24 km (15 mi). This seaward growth was briefly interrupted by an isostatic transgression. Thus, sandstone depositional pattern is of the imbricate type with younger units successively displaced seaward in the direction of progradation.

The barrier-island facies sequence comprises eleven intergradational facies, i.e., ebb-tidal delta, marginal (spillover) channel, middle shoreface, marine shales, upper shoreface beach, dune, back-barrier mud flat, marshy lagoon and overwash, mixed tidal flat, tidal creek channel, and overbank. This sequence differs slightly from that of the Recent classic regressive Galveston Island, Texas, and the ancient Muddy barrier island, Montana, in the presence of an ebb-tidal delta and marine shelf shales beneath and above the middle shoreface facies, respectively. On this basis the South Carolina Recent barrier islands are considered closer modern analogs.

The writer suggests that this sand body be explored further for oil and/or gas accumulations because of its excellent reservoir properties and the generally low well density.

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Lignite Occurrence in Relation to Depositional Facies, Eocene Wilcox Group, Sabine Uplift Area, East Texas—Regional and Local Comparative Studies

Lignite occurrence was related to sandbody geometry in two subsurface studies: a 12-county regional study and a local study of the Trawick gas field area, north-central Nacogdoches County. For both studies, the Wilcox Group was informally divided into lower progradational (deltaic) and upper aggradational (fluvial) units. The local study utilized closely spaced data to investigate a more detailed Wilcox stratigraphy.

The most continuous lignite-bearing zone lies at the transition between lower and upper Wilcox strata. Mapping of lignite occurrence in both studies shows this zone to be coincident with distributary channels indicative of delta-plain settings. Lignites and laterally equivalent muds rest on platforms of sandy sediments. Initiation of peat accumulation in interdistributary basins, with upward and subsequent lateral development as blanket peat, is inferred from the local study. Thickest and most laterally extensive seams occur in Shelby and Panola Counties on the flanks of major delta lobes.

Thick upper Wilcox lignites (> 5 ft, 1.5 m) occur regionally between major fluvial channel sand belts and cap 30 to 40-ft (9 to 12-m) upward-coarsening sequences (crevasse splay?). These lignites are surface-mined in Panola and Harrison Counties at Martin Lake and Darco. Westward,

in northern Cherokee County, our drilling shows thick lignites (up to 11 ft, 3.4 m) have limited lateral extent in channel sand belt areas. Similarly, the local study lies within a major sand belt; small interchannel basins limit lateral continuity of lignites.

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Regional Distribution of Wave- and Fluvial-Dominated Deltaic Deposits of Olmos Formation (Upper Cretaceous) in Maverick Basin, Southwest Texas

Regional subsurface analysis in southwest Texas indicates that the Olmos Formation (Gulfian) was deposited by a complex of wave- and fluvial-dominated delta systems in two depocenters. Sediment influx was from the north and northwest. Five deltaic subunits, A through E, were deposited in the western depocenter. Three other deltaic wedges (F, G, H) formed the second depocenter farther east in present-day Frio and LaSalle Counties. Subsidence was greater in the western half of the Maverick basin where thickest (1,300 ft; 395 m) deltaic sediments were deposited. Lower Olmos strata represent a succession from wave-reworked, strike-elongate deltas of subunit A, similar to those of the underlying San Miguel Formation, to fluvial-dominated, dip-elongate deltas of subunits B and C. Extensive (1,200 mi² or 3,100 km² in Texas) aggradational floodplain deposits of B and C are characterized by diverse electric-log patterns; variation in log character is a response to complex depositional facies on the delta platform. Downdip, toward the Cretaceous shelf edge, delta-plain facies merge with upward-coarsening delta-front sandstones.

Uppermost subunits D and E were deposited by a prograding barrier-island system in an interdeltaic embayment marginal to high constructive deltas of the eastern depocenter. Lagoonal and fluvial-channel deposits are recognized from cores. Eastward migration of deposition was accompanied by an abrupt change of depositional style in the western depocenter from deltaic to coastal-interdeltaic.

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Relationships of Bexar Shale, Hensel Sandstone, and Hensel Dolomite (Basal Upper Trinity, Comanchean Cretaceous) in South-Central Texas

The Bexar Shale has been considered the offshore equivalent of the Cow Creek Limestone, the overlying Hensel sandstone, or of the discontinuity between them in outcropping sections.

Cores and outcrops in Comal, Kendall, and northern Bexar Counties preserve calcitic and dolomitic caliche in the top of the Cow Creek Limestone. Above the caliche is 8-16 m (25-50 ft) of laminated or bioturbated, dolomitic siltstone and silty dolomite (Hensel dolomite). Dolomite is euhedral and silt-sized. The lower part contains colophane grains and oyster shells replaced partly by chaledony. Carbonate grains within the upper part include angular and well-rounded mollusk and echinoid fragments; many are pyritic and coated by glauconite. Terrigenous grains in Hensel dolomite grade upward from silt to coarse subarkose sand from central Texas.

In southern Bexar County, about 35 m (115 ft) of silt-, clay-, and calcite-mudstone referable to the Bexar Shale sharply overlie shallow marine Cow Creek Limestone, and grade abruptly upward into about 7 m (23 ft) of Hensel dolomite. Dolomite is overlain by calcarenite of the Glen Rose Formation containing subarkose sand grains. Similar distinctive sand grains occur in well cuttings of basal Glen Rose beds northeastward through Travis County.

The Bexar represents a flood of clay-sized sediment from a distant source, spread across the San Marcos arch during a rapid transgression. Slightly younger sand, silt, and local clay of the Hensel sandstone were eroded from central Texas by a few flash floods during a major period of caliche formation in that area.

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Grain Size Vertical Progressions as an Exploration Tool

Previous studies of grain size as an indicator of sandstone depositional environments have had mixed results; for that reason, the method is sel-