and a southern offset in Sec. 33, T6S, R15W) and are nearing completion. A northern offset in Sec. 18, T6S, R15W is presently being drilled and further development is planned.

The Catahoula Creek Cotton Valley sands are presently not definable by seismic methods, therefore, structure interpretation is based on the upper Smackover-Haynesville carbonate reflection approximately 950 ft (290 m) below the top of the Cotton Valley sand complex, or the middle Cotton Valley carbonate reflection approximately 1,000 ft (300 m) above the pay zones. The Catahoula Creek field is underlain by a high relief (900 to 1,000 ft; 275 to 300 m) northwest-southeast-trending salt-created closed structure at the upper Smackover-Haynesville carbonate level, bounded by major and minor down-to-the-coast faults. The structure at the middle Cotton Valley carbonate level is almost flat, and only the major faults seem to carry through up to this level, indicating a Late Jurassic time of structural growth.

The Cotton Valley gas sands (Kimmeridgian) in the Catahoula Creek field were deposited in a shelf environment and can be numbered according to porosity zones from 1 through 11. At this stage in the field development only zones 1 through 7 have been perforated, but there are indications of hydrocarbons in all zones.

The reservoir rock exhibits matrix porosity of 4 to 18%, which is directly related to mineralogy, lithology, and diagenetic history. Matrix permeability is low, $0.3 > K > 0.01$ md or less, but intense vertical fracturing is prominent, and fracture permeability has been measured in the range of 1 to 4.3 md, explaining the high flow rates while testing.

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Prediction of Deep-Sea Reservoir Facies

Global changes in sea level, primarily the results of tectonism and glaciation, control deep-sea sedimentation. During periods of low sea level, the frequency of turbidity currents is greatly increased. Episodes of low sea level also cause vigorous contour currents which winnow away the fines of turbidites. In the rock record, the occurrence of most turbidites and winnowed turbidites closely corresponds to global lowstands of paleo-sea level. An important exploration attribute of this model is the possibility of predicting the occurrence of potential deep-sea reservoir facies in frontier areas of exploration. This model may also be useful in resolving the controversy over a shallow-versus deep-water origin for certain Gulf Coast reservoirs.

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Depositional Environment of Carter Sandstone (Chesterian) of Black Warrior Basin in Northwestern Alabama and Northeastern Mississippi

The Late Mississippian (Chesterian) Carter sandstone, which is present in the subsurface of the Black Warrior basin in northwestern Alabama and northeastern Mississippi, was deposited as lower to subaqueous delta-plain facies of a high-constructive delta. Specific deltaic environments identified include bar finger, which is a combination of distributary mouth bar and channel facies, delta front, and prodelta or interdistributary bay. These paleoenvironmental interpretations are based on primary sedimentary rock properties and characteristic spontaneous potential curves.

The Carter delta prograded from the northwest toward the southeast in the basin. The morphology of the delta is elongate through most of the basin; however, in the area of the southeasternmost extent of Carter deposition the morphology becomes lobate. The change in morphology is a result of reworking of the delta-front sands by marine proceses. The overall compositional maturity of the sandstone suggests that the constituents had a long distance of transport, with the source area being most likely a sedimentary source terrane. The direction of transport was from the northwest to the southeast, as indicated by sandstone morphology, grain size and thickness trends, paleontology, and facies distribution.

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Tectonic Evolution of Trans-Pecos, Texas

Southern Trans-Pecos Texas contains parts of two of the major overthrust belts of North America, the older Ouachita and the younger Cordilleran. In addition, this area has been deformed by two other major tectonic episodes. As early as 1,000 m.y. ago, the Van Horn mobile belt was formed by the closure of an inner arc basin during the formation of a proto-Pangea. This mobile belt provided the base upon which the Diablo platform formed. Recent petrologic evidence suggests that the Van horn mobile belt continues southward into Mexico and underlies the Coahuila platform. During Late Pennsylvanian to Early Permian time, this platform, a continental promontory, impeded the northward movement of the overriding Ouachita orogenic thrust sheets, bending them southwestward at the intersection of this thrust complex.

During the late Mesozoic, the Diablo platform acted as a stable buttress, against which sediments of the Chihuahua trough were deformed and thrust. These folds and thrusts comprise the Chihuahua tectonic belt, which forms part of the Cordilleran thrust belt of North America. East of this platform, faulted monoclines may represent the southern limit of the fault-bounded, basement-cored uplifts of the front ranges.

Finally, western Trans-Pecos Texas was overprinted by extensional basin and range faulting during the Cenozoic, with concomitant igneous intrusive and extrusive activity. The igneous intrusions occur in a belt trending roughly north-northwest, following the trend of the basin and range faulting. These intrusions are scattered through most of Trans-Pecos except for an area to the south where the four tectonic belts intersect. Here, extensive crustal fracturing and extension have resulted in the emplacement of a greater density of igneous material into the overlying crust.

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Depositional Environments and Gas Production Trends, Olmos Sandstone, Upper Cretaceous, Webb County, Texas

The Olmos Sandstone is part of the Upper Cretaceous Taylor Group of south Texas. It is overlain by shales and sands of the Escondido Formation, and underlain by shales of the lower Taylor Group. In the subsurface of Webb County, the Olmos has produced over 142 bcf of gas from 11 fields.

The composition, texture, and sedimentary structures of the Olmos were examined from more than 300 ft (91 m) of full-diameter, diamond bit cores and 50 thin sections. The morphology of the sandstones was determined by correlation of over 300 electric logs.