Lithologic and petrologic analysis indicates that the Olmos was formed in two major sedimentary environments. Deltaic distributary channel, levee, marine bay, marsh, and crevasse splay sequences are recognizable in cores from updip wells. However, cores from downdip wells show open marine shelf sequences, occasionally interrupted by ordered, graded, and thin-bedded sandstones deposited by density flows.

Net sandstone isopach maps of the Olmos show that the Olmos was deposited updip as a series of overlapping, lobate sand bodies. Downdip sands have a sheetlike morphology and are much thinner. Structure maps of the top of the Cretaceous show gentle southeast dip in updip areas, indicating stratigraphic trapping of gas in those areas. However, downdip, gas is trapped against a series of down-to-the-coast normal faults.

Gas production trends closely parallel depositional trends. Updip wells produce an average of 52 mmcf/year/well, whereas downdip wells average only 33 mmcf/year/well. Depositional environment is the controlling factor on Olmos sand thickness and morphology, and thus, gas production.

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Ecostratigraphic Model for Shelf Platform Development of Middle Cretaceous (Stuart City) Limestones of South-Central Texas

A new shelf platform model has been developed for the middle Cretaceous strata of south central Texas based on an ecostratigraphic basin analysis. The concept of ecostratigraphy integrates the various ecologic parameters along time planes so that sequential distribution of magnafacies is observed.

Analyses of the Stuart City trend and associated facies suggest that the shelf platform is formed in a subsiding basin and is developed in two stages. The first involves a platform stage, the second a vertical stacking stage.

Shelf platform development is a continuous process beginning in the ramp limestones assigned to the lower Glen Rose Formation. These Trinitian carbonates develop barrier reefs and prograde across the shelf. The debris slope at the base of the barrier reefs forms an elevated platform that maintains the reef organisms within their preferred shallow-water habitat and above the relatively deeper waters of the shelf. When the debris slope reaches the early Fredericksburgian shelf edge, which is maintained by the continental slope, the material is carried beyond the point of stabilization of the debris slope and moves down the continental slope to the abyssal plain. Progradation ceases, but barrier-reef development continues and forms a nearly vertical zone of barrier reefs associated with the continental shelf edge.

The barrier trend, which is created at the close of the platform stage, forms the base upon which vertical barrier growth is initiated. In this region, the vertical stage formed during the Fredericksburgian, continued into the Washitan, and developed as a result of stretched, upward-shoaling cycles.

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Regional Jurassic Lithostratigraphy of Alabama

Jurassic units in the subsurface of Alabama include the Werner Formation, the Louann Salt, the Norphlet Formation, the Smackover Formation, the Haynesville Formation (including the Buckner Anhydrite Member), and the Cotton Valley Group. These units range in age from early Callovian to late Tithonian, (Middle to Late Jurassic) with the Jurassic-Cretaceous boundary possibly occurring in the upper part of the Cotton Valley Group. Deposition was controlled by pre-Jurassic paleohighs, diapiric salt structures, and the peripheral fault system that rims the Gulf Coast basin. Climates during the Jurassic ranged from hot and dry during Early Jurassic to hot and humid during Late Jurassic. The Werner Formation consists of a lower sandstone and shale sequence, overlain by an evaporitic unit, and lies disconformably either on the Paleozoic basement or the Eagle Mills Formation of Late Triassic age. Deposition of the Werner represents the initial transgression of marine waters into the Gulf Coast basin. The Louann Salt is a massive halite unit that formed a southward tilting ramp on which younger Jurassic strata were deposited. The Norphlet Formation is a sandstone sequence with thin interbedded shale that lies disconformably on the Louann. The Smackover Formation consists of two units, a lower laminated mudstone and brown dense limestone, and an upper dolomitic grain-supported limestone. The Smackover lies conformably on the Norphlet, and in places is gradational with it. The Haynesville is a sequence of calcareous, anhydritic sandstone and interbedded, anhydritic, micaceous shale. The Haynesville may consist of either a sequence of interbedded, calcareous mudstone, anhydritic shale and sandstone, limestone, dolostone, and salt stringers, or a massive anhydrite (Buckner) at the base. In places the Buckner is gradational with the upper Smackover. The Cotton Valley Group is a sequence of fine to very coarse-grained to conglomeratic sandstone, interlayered with silty micaceous shale, very thin limestone beds, and in the Mississippi Interior Salt basin, thin coal and lignite beds. The Cotton Valley was deposited in a terrestrial to littoral environment and the absence of fossils, to date, makes it difficult to distinguish from the sandstone units of the overlying Hosston of Early Cretaceous age.

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Use of High-Altitude Color Infrared Imagery in Structural Mapping of Monument Spring Area, West-Central Marathon Uplift, Brewster County, Texas

The Monument Spring area of the Marathon uplift, was analyzed using a Kelsh plotter and NASA high-altitude color infrared (CIR) imagery.

Structurally, the Marathon uplift is a broad dome from which the Cretaceous cover has been eroded, exposing the Paleozoic structures. These Paleozoic rocks, ranging in age from Late Cambrian to Pennsylvanian, are complexly deformed and exhibit a variety of structural attitudes.

The Marathon region was originally mapped extensively by P. B. King in 1937. The Monument Spring area contains two of the most prominent structural features described by King: the Marathon anticlinorium and the Pena Colorada synclinorium. These features are characterized by tight folds and thrust faults striking in a northeasterly direction. North-trending shears are also found within the area.

Although there is a general agreement between present maps and King's original interpretation, the use of high-altitude specialized photography and quantitative Kelsh data provides additional information on the structural complexities of the area. This information, derived from the high-resolution model (obtained with the Kelsh Plotter) is perhaps not readily apparent in the field. The interpretations derived from this information are outlined in the detailed mapping of the Rock House Gap, Sunshine Spring area, and one additional area southeast of Monument Creek.