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The East Breaks Fold Belt and its Control on Middle Miocene Deepwater Deposition in the Western Gulf of Mexico

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Development of a new structural and depositional framework for the East Breaks area of the Gulf of Mexico has opened up new exploration opportunities and has resulted in the discovery of three gas fields. The East Breaks Fold Belt developed as a series of southeast trending folds and thrusts that cover some 2700 square miles of the Western Gulf of Mexico. Unlike other compressional regimes associated with growth faults, the southeast trend of this fold/thrust belt is generally perpendicular to the linked growth fault systems. This anomalous trend is due to the convergence of major slide masses basinward of the arcuate south Texas shelf-slope break. Major growth faults and their equivalent down-dip thrust faults detached within Oligocene shales and deeper salt levels and produced northwest-trending folds that young to the southwest. This pattern of progressive folding and thrusting controlled the location of the Middle-Miocene deepwater channel system responsible for the Falcon reservoirs. The Falcon gas field, discovered in 2001 approximately 100 miles east of Corpus Christi, can be traced on horizon slices, isopach maps and seismic attribute maps. The location of the channel complex and the thickness of the accompanying channel levees were controlled by the paleo-bathymetric expression of the incipient fold and thrust belt. 3-D seismic data show the deflection of the channel system around plunging anticlines as well as focusing of the channel system along associated synclines. Gas accumulations occur within well-developed asymmetric channel levees, an interpretation supported by well-log data and full-diameter core data.