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Petroleum Potential of Aggrading Sandstones of Transgressive-Regressive Cycles in the Mississippi-Alabama Area

To date, more than 291 million barrels of oil and 4.1 Tcf of natural gas have been produced from Jurassic and Cretaceous aggrading sandstone reservoirs associated with transgressive-regressive cycles in the Mississippi-Alabama area. The prolific nature of these reservoirs is attributed to their depositional history and reservoir quality, thickness, and areal extent and their relationship with petroleum source rocks, seals, and traps. The major aggrading reservoirs include the eolian and fluvial sandstones of the Upper Jurassic Norphlet Formation, the fluvial and coastal sandstones of the Lower Cretaceous Hosston Formation, and the stacked coastal barrier sandstones of the Upper Cretaceous Tuscaloosa Group ("Massive sand"). The deposition history of these facies results in sand-rich, thick (hundreds to thousands of feet), and geographically extensive (up to thousands of square miles) sandstone bodies. The depositional events of the aggrading facies mark the change from stratigraphic base level fall and erosion to base level rise and sediment accumulation. The aggrading section signals the initiation of the creation of accommodation space and is typically characterized by a high terrigenous supply that keeps pace with the increase in accommodation. These depositional processes can produce widespread and thick continental and coastal plain sand-rich deposits. Based on the depositional history and reservoir quality, thickness, and extent of the aggrading facies, these sandstones make excellent hydrocarbon exploration targets. An exploration strategy that targets the Jurassic and Cretaceous aggrading sandstones associated with structural traps related to salt movement should continue to be successful in the Mississippi-Alabama area.