

# EOLIAN RESERVOIR FACIES WITHIN THE UPPER JURASSIC SMACKOVER FORMATION, WESTERN-CENTRAL MISSISSIPPI: A NEW EXPLORATION TARGET

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## ABSTRACT

The Late Jurassic upper Smackover Formation in Mississippi is primarily composed of an overall regressive sequence of marine carbonate ramp deposits. In central Mississippi, however, carbonate deposition was interrupted by a large influx of siliciclastic sediment. Tchula Lake field is unique because it produces gas and condensate from dolomitic quartz sandstone deposited in a mixed siliciclastic-carbonate environment and because we interpret this sandstone to have been deposited as an eolian dune.

Although several facies in the Smackover Formation in this area are productive, the best reservoir unit is composed of porous and permeable sandstone. This facies consists of fine-grained, dolomitic quartz sandstone, having average mean porosity of 10 - 20 % and permeabilities of 0 - 800 md. The sandstone is comprised of tabular planar cross-laminations capped by a small set of wedge-planar cross-laminations. These laminations are commonly inverse graded and contain vadose meniscus cements.

This sandstone was deposited as small eolian dunes that were probably migrating seaward along the direction of prevailing winds. Deposition of the different facies was controlled by fluctuations in sea level that occurred during deposition, leading to an aggradational stratigraphic sequence. These fluctuations likely occurred basin wide, making the Tchula Lake depositional model applicable along the entire updip limit of the Smackover Formation in west central Mississippi. This depositional model creates the potential for new hydrocarbon reservoirs in a region of Mississippi presently underexplored for hydrocarbons in the Smackover Formation.