

LATE JURASSIC REEFS OF THE SMACKOVER FORMATION - A PRELIMINARY REPORT

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ABSTRACT

Algal and coral reefs are recognized in conventional cores of the upper Smackover Formation from southwestern Arkansas eastward into the panhandle of Florida. While only one known reef has produced commercial hydrocarbons, attractive porosities and permeabilities (mean porosity of 15 percent, mean permeability of 20 millidarcies) result from fresh-water leaching, fracturing, or dolomitization. In addition, the reefs may have provided a positive structural aspect to localized areas during later Smackover deposition and diagenesis.

Smackover reefs formed in the Late Jurassic during periods of maximum marine transgression (good circulation, clear water, normal marine salinity) in three major paleogeographic settings: 1) the margins of Paleozoic highs protruding into the Smackover basin, *i.e.*, Vocation field in Alabama; 2) upthrown basement fault blocks, *i.e.*, Melvin field in Alabama; and 3) the seaward edges of upthrown, salt-cored fault blocks, *i.e.*, Walker Creek field in Arkansas, Hico Knowles and North Haynesville fields in Louisiana, and West Paulding field in Mississippi. The buildups are commonly elongate, 3 to 40 meters (10 to 130 feet) thick, and generally cover an area of several square kilometers. The reefs appear higher (younger) in the stratigraphic section downdip. Also, the reefs are younger and have a more diverse biota in Arkansas and Louisiana than in Alabama and Florida.

Smackover reefs in Alabama and Florida were constructed by algae. Vertical relief on the reef surface during growth may have been a few meters. Similar reefs in southern Arkansas and northern Louisiana show a vertical zonation suggesting an evolving reef community. These buildups are *Tubiphytes*-stromatolitic algal boundstones containing scattered corals toward the base; diversity increases upward with the addition of abundant corals (*Actinastrea*, *Complexastrea*, *Thamnas-teria*, and others), sponges, skeletal algae, and byozoans. The reefs are commonly underlain and overlain by subtidal, peloidal-lime packstones containing oncolites and scattered fossils; and they can develop in close proximity to subtidal quartz sands.

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