

Upper Jurassic Smackover Thrombolite Buildups and Associated Nearshore Facies, Southwest Alabama

Ernest A. Mancini¹, William C. Parcell², and Wayne M. Ahr³

¹Center for Sedimentary Basin Studies and Department of Geological Sciences, Box 870338,
University of Alabama, Tuscaloosa, AL 35487

²Department of Geology, Wichita State University, Wichita, KS 67260

³Department of Geology & Geophysics, Texas A&M University, College Station, TX 77843

ABSTRACT

Recent hydrocarbon drilling in Little Cedar Creek Field, Conecuh County, southwest Alabama revealed that the productive reservoir rocks are thrombolite boundstone and associated nearshore grainstone and packstone that occur near the depositional up-dip limit of the Upper Jurassic Smackover Formation. Here, the Smackover section ranges from 70 to 110 ft in thickness and consists of six lithofacies. From top to bottom, these facies include: (1) peritidal lime mudstone and dolomudstone to wackestone, (2) shallow subtidal nearshore fossiliferous, peloidal, ooid grainstone to wackestone, (3) deeper subtidal lime mudstone, (4) subtidal microbially-influenced lime mudstone to packstone, (5) subtidal peloidal thrombolite boundstone, and (6) transgressive subtidal lime mudstone and dolomudstone. Haynesville (Buckner) argillaceous beds disconformably overlie upper Smackover beds, and the Smackover unconformably overlies Norphlet conglomeratic sandstone beds. The thrombolite and higher energy nearshore grainstone and packstone rocks are the hydrocarbon reservoirs. Porosity in the grainstone and packstone reservoir includes mainly diagenetic moldic pores, and pore types in the thrombolite reservoir are chiefly secondary vuggy pores. Smackover lime mudstone overlying the thrombolite reservoir, and Haynesville (Buckner) argillaceous beds immediately overlying the grainstone and packstone reservoir serve as the vertical seal rocks. These reservoir facies are interpreted to have accumulated in water depths of less than 10 ft and within 3 mi of the paleoshoreline; and in contrast to most other thrombolites in southwest Alabama, these buildups did not grow directly on Paleozoic basement. This new information about paleobathymetric settings, pore types, and stratigraphic associations of the thrombolite and associated grainstone and packstone reservoirs should reveal new strategies for exploration for other Upper Jurassic carbonates in the Gulf of Mexico.