

# **Integrated Approach to Characterizing the Upper Jurassic Smackover Carbonate Ramp Succession in East Texas**

**Peter Schemper<sup>1</sup>**

<sup>1</sup>University of Texas at Austin, Sedimentology, Austin, TX USA  
schemperpeter@utexas.edu

## **ABSTRACT**

The Smackover Formation is a significant hydrocarbon-producing formation along the Gulf Coast of the United States. Production within the Smackover comes from commonly dolomitized oolitic grainstones present in the Upper Smackover. Upper Smackover reservoirs are sourced from organic-rich Lower Smackover mudrocks (often referred to as the Brown Dense). A debate remains as to whether these low-energy laminated mudrocks were deposited on the deep-water slope or in a shallow-marine lagoon environment within the East Texas Basin. These drastically different interpretations pose a significant problem because they affect our understanding of depositional processes, shoreline locations, and relative sea-level oscillations for the given time period. Without a clear understanding of the depositional environments and sequence stratigraphy of the Lower Smackover, it is difficult to assess its potential as an unconventional reservoir. In this study, we focus on a long, continuous core in Van Zandt, Texas—the Travis Gas Unit No. 1—which has produced 13,639 million cubic ft per day (Mcf/d) of natural gas. The core is 700 ft long, containing 95% (550 ft) of the Smackover Formation and the lower section (150 ft) of the overlying Buckner Formation. It covers the complete spectrum of Smackover facies, ranging from contentious low-energy organic-rich laminated mudstones to skeletal and oolitic grainstones. Geochemical and lithologic analyses are integrated to develop a high-resolution stratigraphic section that can aid in defining the depositional systems and reservoir characteristics of the upper and lower sections. Goals for this project are the following: (1) Develop a refined depositional model for the Smackover in East Texas. (2) Create a type section for use in defining Smackover facies distributions in East Texas. (3) Apply an integrated approach to evaluate unconventional and conventional reservoir quality for the Smackover Formation. (4) Provide insight on origin and characteristics of micro- to macropore networks in conventional reservoirs and nano- to micropores in unconventional reservoirs. A renewed understanding of the Smackover petroleum system, specifically the lower portion, will aid in continued exploration of age-equivalent unconventional targets along the Gulf Coast and in understanding Jurassic source rocks in the Gulf of Mexico.