

Predicting Potential Unconventional Production in the Tuscaloosa Marine Shale Play Using Thermal Modeling and Log Overlay Analysis

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ABSTRACT

The Tuscaloosa Marine Shale formation (TMS) of central Louisiana and southern Mississippi was suggested as a potential hydrocarbon play with up to seven billion barrels of reserves in a 1997 study by Louisiana State University's Basin Research Institute. The TMS is a Upper Cretaceous gray to black fissile marine shale and occurs at depths between 10,000 and 19,000 ft in the study area. Since 1997, horizontal drilling and hydraulic fracturing have enabled exploration and documentation of oil reserves in this play. In this study, information from sonic logs and resistivity logs from 43 wells were used to estimate thermal maturation. Model results indicate that TMS is in the oil to condensate-wet gas zones with vitrinite reflectance ranging from 0.6 to 1.2 %Ro. Total organic carbon (TOC) was estimated using an overlay technique for sonic and resistivity logs. Estimated TOC in the study area ranges from 0.5 to 3% and has a complex spatial distribution. TOC results were calibrated using core and cuttings data provided by operators active in the TMS. This research has provided a technique to predict areas with higher concentrations of TOC that are thermally mature, which are commonly associated with areas of unconventional production potential.