

# **Geochemistry and Thermal Maturity of the Upper Mississippian Fayetteville Shale Formation, Eastern Arkoma Basin and Mississippi Embayment Regions, Arkansas**

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## **ABSTRACT**

The Upper Mississippian Fayetteville Shale Formation is the current focus of a widespread shale-gas exploration play that is largely concentrated within the eastern Arkoma Basin and Mississippi Embayment regions of Arkansas. The middle to lower stratigraphic section of the Fayetteville Shale is represented by an organic-rich facies consisting of black and pyritic shale, with subordinate amounts of interbedded, siliceous chert and siltstone. The most-prolific gas production from the Fayetteville Shale is associated with horizontal wells that have been completed with multi-stage fracs in the middle to lower portions of the formation.

An extensive research project was conducted to characterize the geochemistry and thermal maturation history of the Fayetteville Shale and adjacent geologic units in the study area. Well cuttings were sampled and processed for total organic carbon, rock-eval, vitrinite reflectance, and x-ray diffraction analyses. Statistical interpolation and superposition of various aspects of the geochemical data yield important information pertaining to the identification of prospective areas for natural gas exploration in Arkansas.