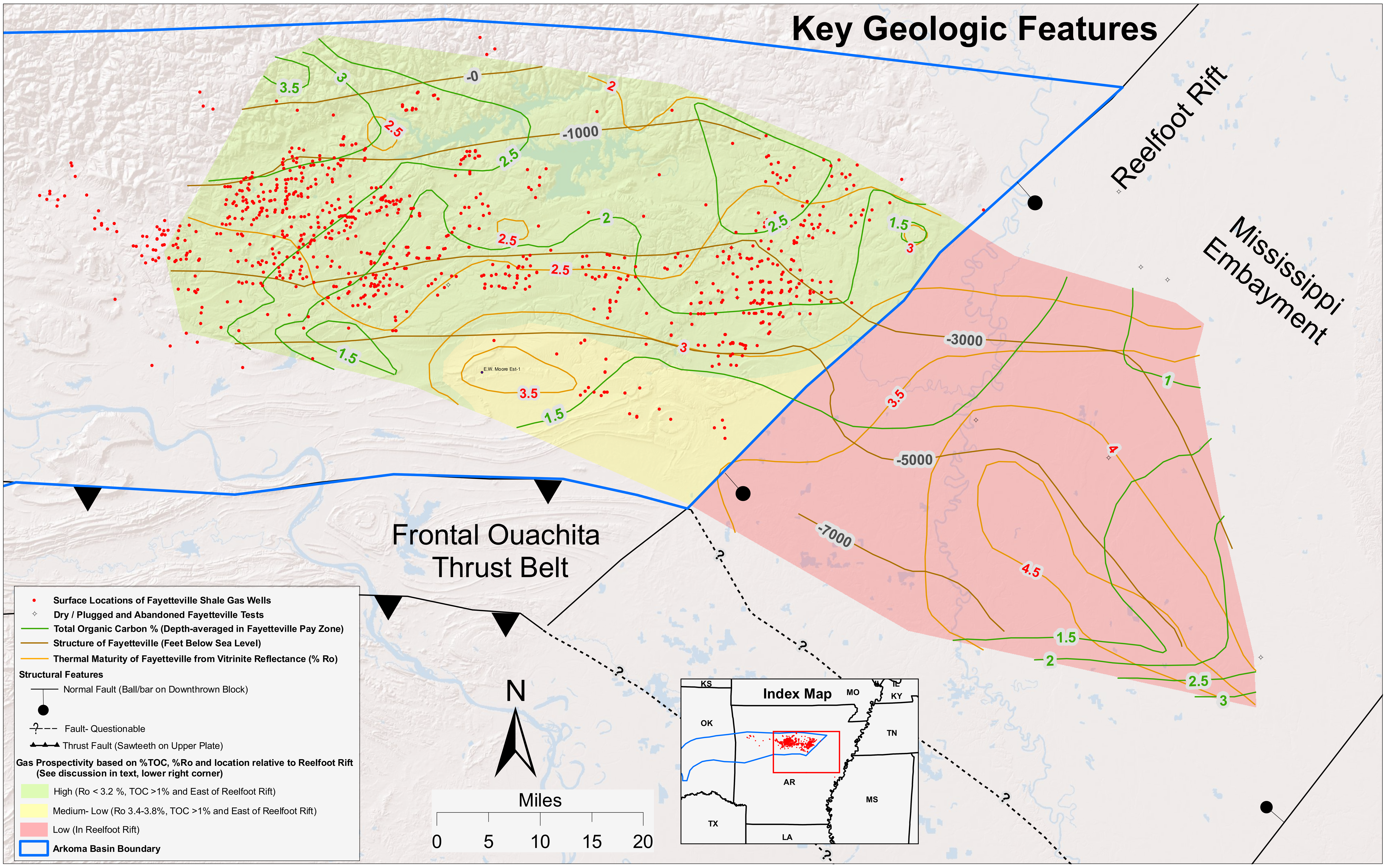
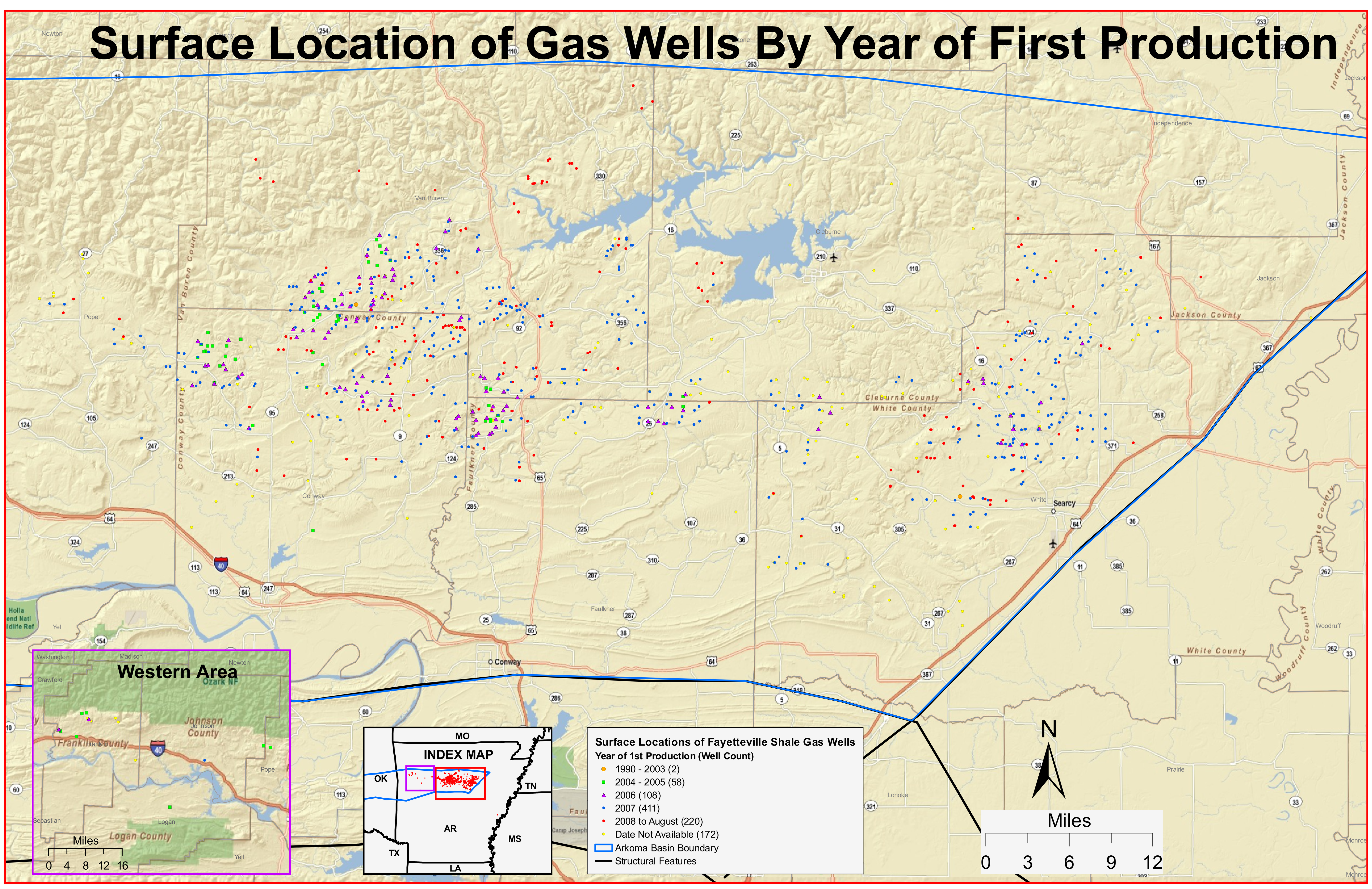
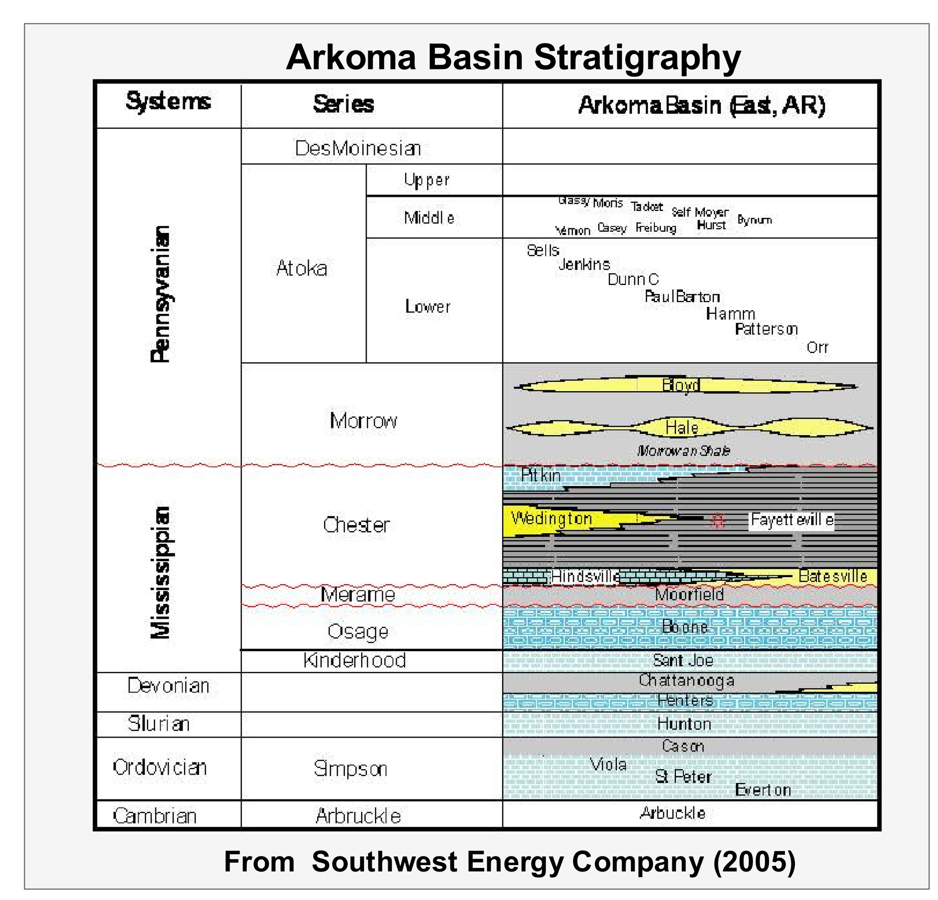
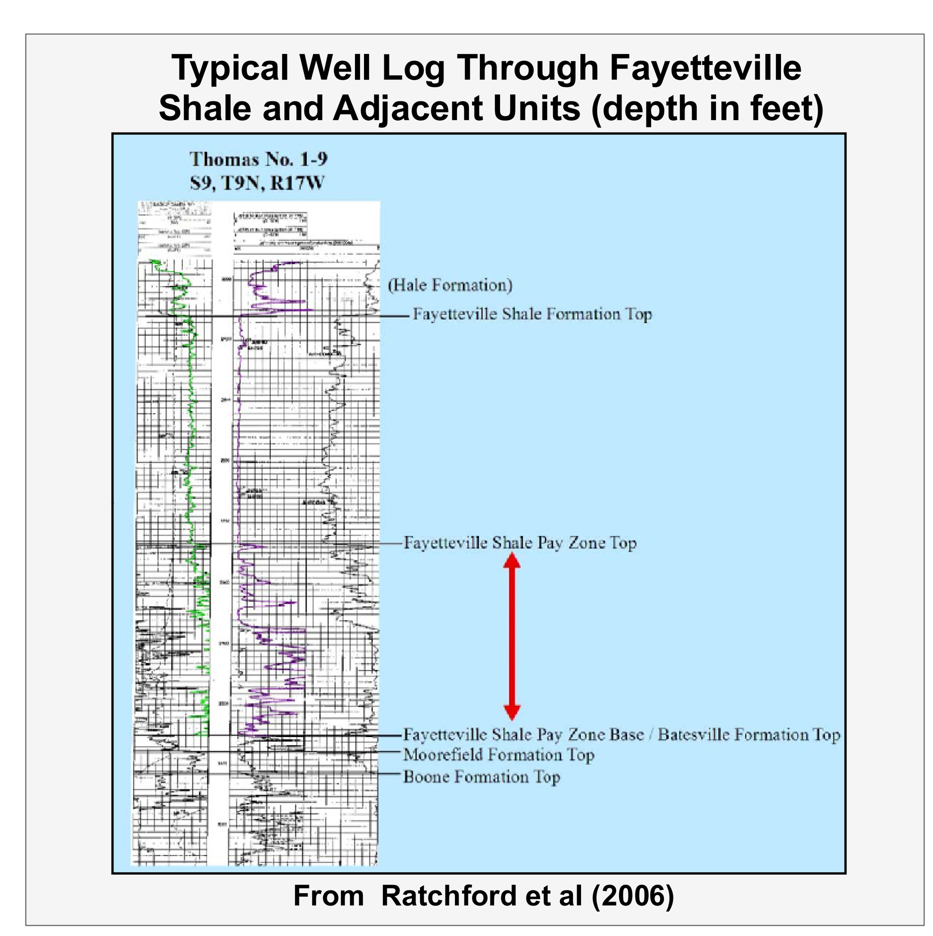
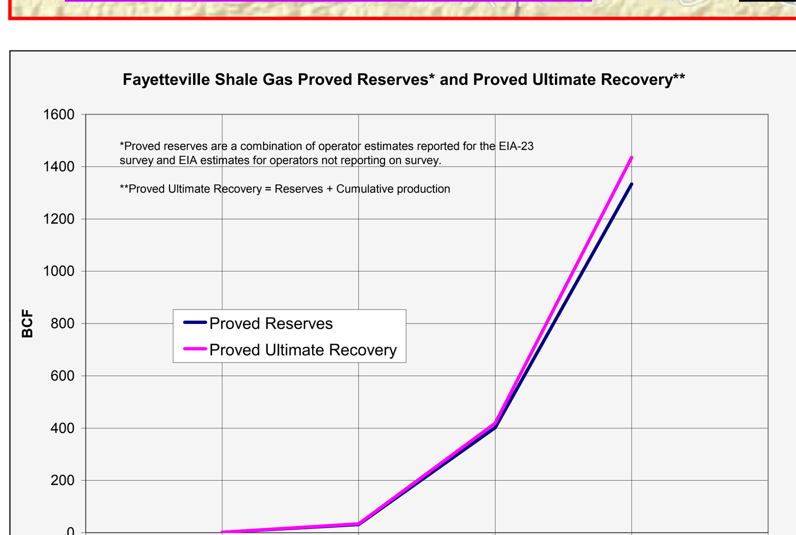
Fayetteville Shale, Arkoma Basin, Arkansas

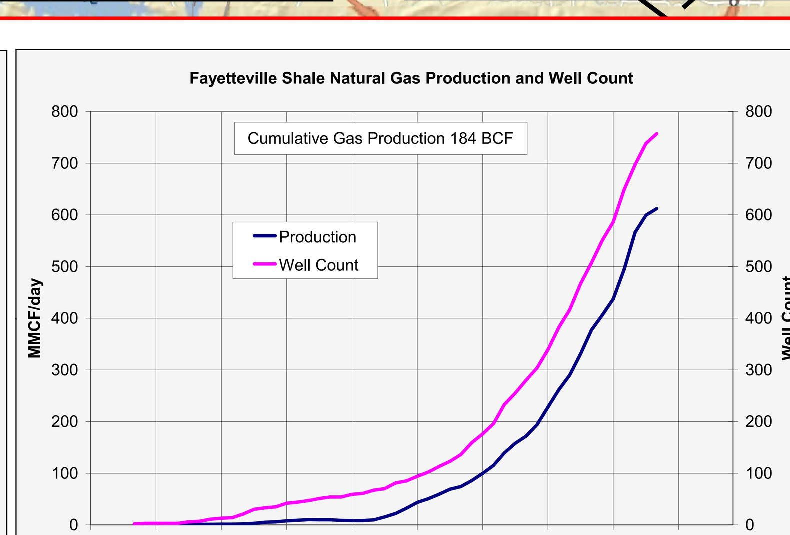












The Fayetteville Shale Gas Play is in early development. The only publication addressing geologic factors critical to its productivity is the Arkansas Geological Commission's Information Circular 37 (IC-37), Organic Geochemistry and Thermal Maturation Analysis within the Fayetteville Shale Study Area - Eastern Arkoma Basin and Mississippi Embayment Regions, Arkansas, authored in 2006 by Ratchford, Bridges, Jordan, Dow, Colbert and Jarvie. Based on data obtained via analysis of well cuttings from the limited number of Fayetteville Shale wells then available, this study proposed a two component model wherein shale with a Total Organic Carbon (TOC) content greater than 1% by weight combined with a vitrinite reflectance between Ro = 1.1% and 3.2% would be expected to have the highest gas production potential (green background area on above map). TOC values of less than 1% by weight were considered to have insufficient source rock potential by analogy to studies of the Barnett Shale (Ft. Worth Basin). Shale with a vitrinite reflectance Ro > 3.2% was expected to have decreased porosity and permeability. Fayetteville wells drilled in the Reelfoot Rift area subsequent to that study have been abandoned with no gas production reported. These poor results may be due to clastic dilution of organic materials deposited during rift filling and/or to higher heat flow associated with crustal thinning under the rift or nearby plutonic bodies (Ratchford, Arkansas Geological Survey, personal communication). The rift area is thus shown as low potential (red background area on above map). The area shown with yellow background on the above map has TOC > 1% but vitrinite reflectance between Ro = 3.2% and 3.8%, with the contouring significantly influenced by the Ro value of 3.8% in the E.W. Moore Estate-1 well. While significant gas production is not expected from rocks with maturity > 3.2%, some gas producers have been drilled in this yellow-colored area, so the 3.8% high value may be a localized feature. This area is thus labeled as medium to low potential. The vitrinite reflectance contours and the model will evolve as more wells are drilled and analyzed for additional control.

Well data from HPDI, Arkansas State Oil and Gas Commission and Arkansas Geological Survey; Geologic Data from Ratchford et al (2006)
Projection UTM-15, NAD83 Map date: December 2008

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