

Poster 9 Geological and Geochemical Factors Influencing the Emerging Coalbed Gas Play in the Cherokee and Forest City Basins in Eastern Kansas

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Coals and black shales in the Middle Pennsylvanian Cherokee and Marmaton Groups are becoming increasingly important commercial sources for unconventional gas in eastern Kansas, with over 200 wells being drilled in the last two years. Most of the development is in a five-county area in southeastern Kansas (i.e., Chautauqua, Labette, Montgomery, Neosho, and Wilson counties), but gradual expansion of this production northward and westward is anticipated, particularly along existing pipeline corridors. Initial data indicate that several coals can be perforated and produced in an individual well, but overall gas content may decrease NNE along regional strike and certainly eastward where strata rise updip onto the Ozark dome. Although gas content of the coals generally increases with depth and confining pressure to a maximum of 250 to 300 scf/ton, some shallow coals at less than 700 feet in depth have unexpectedly large gas contents (> 100 scf/ton) exceeding that of immediately deeper coals. Compositional (i.e., hydrocarbon gas wetness) and isotopic analyses ($\delta^{13}\text{C}$, δD for methane) for desorption and production gases suggest that a microbial component to these gases may account for some of this local enrichment. Analyses of conventionally-produced gases from Pennsylvanian and Mississippian reservoirs in eastern Kansas indicate that these gases also can have a microbial component, with a thermogenic influence increasing with increasing depth into the Cherokee Basin. Unconventional gases are anticipated to also follow this pattern.