

Geology and Assessment of Undiscovered Oil and Gas Resources in the Arbuckle Group, Anadarko Basin, Oklahoma, Kansas and Texas

Stephanie B. Gaswirth

U.S. Geological Survey, Box 25046, MS 939, Denver Federal Center, Denver, CO, 80225, sgaswirth@usgs.gov

The U.S. Geological Survey (USGS) assessed the technically recoverable undiscovered oil and gas resources from the Anadarko Basin of Colorado, Kansas, Oklahoma and Texas, and defined two total petroleum systems (TPS) that contain nine conventional assessment units (AU) and two continuous AUs. The Woodford Composite TPS includes Cambrian- through Mississippian-aged strata and is defined as the area which contains current and potential petroleum resources for each AU, including the Arbuckle-Ellenburger AU.

Production in the Arbuckle Group is commonly structurally controlled, though porosity development is enhanced by karstification, fracturing or late diagenesis. The best production within the AU is associated with late dolomitization of the Arbuckle Group on the Anadarko Basin shelf. The majority of the exploration and production is focused along structures in the eastern and southern part of the basin and in the upper 250 feet of the Arbuckle Group. There is a large area in the deep Anadarko Basin that is mostly unexplored. Woodford Shale vitrinite reflectance values in this area are >1%, though the Woodford Shale would probably only contribute updip of the subcrop edges of the Woodford Shale due to migration. There may be potential source rocks deeper than the Woodford in this part of the basin, as has been suggested, but debated for the Arbuckle Group. Burial history 1-D models calibrated to temperature and vitrinite reflectance data suggest that potential Arbuckle Group source rocks started generating oil ~350 Ma in the deep basin and are still within the oil generation window on the Arbuckle Group's shelf.