

**Preliminary Study of a Producing, Late Mississippian, Low-Stand Sand Body at the Base of the Big Lime on and near the Pine Mountain Thrust Sheet in Southeastern Kentucky and Northeastern Tennessee: Relationships to Ouachita Tectonism**, Frank R. Ettensohn, Department of Earth and Environmental Sciences, University of Kentucky, Lexington, KY 40506, fettens@uky.edu; and Matthew B. Vest, SAIC Inc., Oak Ridge, TN 37830

Exposures in southeastern Kentucky and northeastern Tennessee show the presence of a dolomitic sandstone unit at the base of the Big Lime (Newman Limestone), which unconformably overlies Fort Payne rocks. Study of the unit shows that it is the same as a gas-producing sandstone in the Mud Creek and Key Rock fields, just west of the Pine Mountain thrust fault. The unit occurs as fining-upward clastic-carbonate sequences in an apparent channel complex with thicknesses of 80 feet or more in channels and 30 feet or less in inter-channel areas. Porosity attains 15 percent in some intervals and permeability ranges from less than 1 mD to greater than 4,000 mD. Production in both fields is highly variable, with greatest production occurring in thicker channel sands. The sand body occurs just southeast of the Greenwood structural anomaly.

Stratigraphic and paleontologic evidence suggests that the unit is approximately equivalent to other early Chesterian sandstone and sandy-carbonate units (Warix Run Member, Loyalhanna Limestone, Keener Sandstone, and Greenbrier Big Injun) in the Appalachian Basin that occur on top of a post-Ste. Genevieve unconformity, which cuts down through earlier Middle Mississippian carbonate and clastic units near structural features. Post-Ste. Genevieve uplift and erosion, as well as uplift on regional structures, were probably related to Ouachita far-field tectonism from the south, and a subsequent influx of sands and sandy carbonates, partly eroded from the exposed surface, infilled adjacent low areas as peritidal, lowstand, sand bodies. These sand bodies seem to form the best reservoirs where they intersect subtle northwest-southeast-trending folds that can only be ascribed to later Ouachita compression. Hence, the sand body and its producing status may be wholly related to the influence of Ouachita tectonics in the Appalachian Basin. Future exploration should concentrate on the intersection of thick sand bodies with the subtle anticlines and on extensions of the sand body below the Pine Mountain thrust sheet.