Geology of the Planned Carbon Sequestration Demonstration Well, Boone County, Kentucky: A Test of the Mount Simon Sandstone on the Cincinnati Arch, Stephen F. Greb, James A. Drahovzal, Kentucky Geological Survey, University of Kentucky, Lexington, KY 40506-0107, greb@uky.edu, drahovzal@uky.edu; John A. Rupp, Wilfrido Solano, Indiana Geological Survey, Indiana University, Bloomington, IN 47405; Lawrence Wickstrom, Ohio Geological Survey, Ohio Department of Natural Resources, Columbus, OH 43229; Neeraj Gupta, Philip Jagucki, and Joel R. Sminchak, Battelle, Columbus, OH

The Midwest Regional Carbon Partnership (MRCSP) is part of DOE's regional carbon sequestration partnership program to evaluate CO_2 sequestration feasibility in the U.S.A. MRCSP researchers are conducting three small-scale injection demonstrations in Appalachian Basin, Michigan Basin, and Cincinnati Arch geologic provinces. The Cincinnati Arch test is being conducted at Duke Energy's East Bend Power Station, Boone County, Kentucky. The demonstration consists of site characterization, injection well construction, permitting and stakeholder outreach, injection of a few thousand tonnes of CO_2, monitoring, and site closure.

Bedrock at the surface of the East Bend site consists of Upper Ordovician carbonates. These are underlain by the Knox Supergroup (1,600–2,000 feet) including the Beekmantown, Rose Run Sandstone, and Copper Ridge Dolomite; Eau Claire Formation (500–550 feet); Mount Simon Sandstone (300–385 feet); and a thick sequence of Middle Run Precambrian sedimentary rocks. The Mount Simon is considered to have significant potential as a sequestration reservoir in the region, and is at depths of 3,400 to 3,700 feet at the well site. Analysis and interpretation of seismic data acquired in 2006 confirm the estimated depth and thickness and suggest that both the reservoir and confining interval are tabular with shallow northeast dip.

Pre-drilling site characterization has been completed. Construction of the test hole will include coring of injection zone and caprock layers, geophysical logging, and injection testing. The results of these tests and analyses will be used to design the CO_2 injection permit and monitoring program. Pre-test modeling suggests that the plume of injected CO_2 should not travel far beyond the well site (hundreds of feet).