

Update on Mt. Simon Geologic Characterization Activities Associated with the FutureGen 2.0 Carbon Sequestration Project in Illinois

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Carbon capture and storage (CCS) offers the potential to greatly reduce carbon dioxide emissions associated with power plants, cement plants, refineries, and other stationary industrial sources through containment in deep geologic formations. The primary objective of the FutureGen 2.0 project is to demonstrate carbon capture and secure storage technologies on a commercial scale, using CO₂ from a power plant in Meredosia, Illinois. Upgrading of the power plant with advanced oxy-combustion technology will allow the capture of its CO₂, which will be transported by conventional CO₂ pipeline to the storage site, which is expected to receive final approval by 2012. Storage will be in the Mt. Simon Formation, a regionally widespread, heterogeneous Cambrian sandstone that contains non-potable brines.

Proposed sites in four counties (Christian, Douglas, Fayette, and Morgan) were down-selected in January, 2011 and approximately forty miles of new 2D seismic lines were shot along state and county roads to facilitate first order evaluation of reservoir and seal thickness and structural integrity at those sites. Three of these sites are now the subject of intensive surface and subsurface characterization to support an environmental impact statement (EIS) conducted by DOE in compliance with the National Environmental Policy Act (NEPA). The candidate ultimately selected for CO₂ storage will be fully permitted by the Illinois Environmental Protection Agency to assure its safety and to provide the opportunity for community input. The final site will include a visitors' center as well as research and training facilities in support of its mission.

The first potential site to be tested with a characterization well is in Morgan County, proximal to the Devonian Sangamon Arch. Two-D seismic imaging integrated with regional subsurface data indicates that the Mt. Simon at the Morgan County site is likely to be at a depth of approximately 4000 feet; with a thickness between 800 and 1000 feet thick. The Eau Clair Formation, which consists of low permeability shales, limestones and siliciclastics and is a regional seal for natural gas storage fields, is expected to be approximately 500 feet thick, similar to observed thicknesses at the Waverly field, 12 miles southeast of the Morgan Site. The Maquoketa and New Albany shales form secondary seals at all of the proposed sites, and the Ironton/ Galesville and St. Peter form potential monitoring zones. This presentation summarizes the drilling and other characterization activities to date, along with comments on features in the newly acquired seismic data.