

Geological Carbon Sequestration (GCS) Potential in Upper Silurian to Middle Devonian Strata in the Michigan Basin, USA, David A. Barnes, William B. Harrison III, and Amanda Wahr, Michigan Geological Respository for Research and Education, Department of Geosciences, Western Michigan University, Kalamazoo, MI 49008, barnes@wmich.edu; Phil Jagucki and Neeraj Gupta, Battelle Memorial Institute, 505 King Ave., Columbus, OH 43201

The Core Energy, State-Charlton #4-30 well in Otsego County, Michigan, was drilled in late 2006 in conjunction with ongoing DOE/NETL funded, MRCSP Phase II studies of GCS potential in Upper Silurian to Middle Devonian saline reservoir and caprock units in the Michigan Basin. New downhole data from conventional and sidewall core and modern, wireline logs from the #4-30 well, along with an enhanced understanding of existing subsurface data from elsewhere in the the basin, have greatly improved the resolution of and confidence in regional estimates of GCS potential. Excellent, potential GCS saline reservoir targets are recognized in porous dolomite of the Upper Silurian Bass Islands Group. Uppermost Bass Islands strata in Michigan underlie the base-Kaskaskia unconformity surface, and correlative strata are present in much of the MRCSP region. Diverse and distinctly cherty lithofacies in the Middle Devonian Bois Blanc Formation in much of the Michigan Basin apparently lack suitable injectivity and are not considered a GCS reservoir target in the #4-30 well. Fossiliferous limestone of the Middle Devonian Amherstburg Formation contains minimal porosity throughout the basin and mostly non-detect permeability in the #4-30 well. The Amherstburg is a suitable caprock unit throughout most of the Michigan Basin. Using preliminary estimates of reservoir thickness and average porosity, GCS storage capacity in the Bass Islands in the Michigan Basin ranges from 1.4Gt to 6.8Gt of CO₂ at critical point conditions and equates to approximately 310–1,544 metric tons of CO₂ per hectare. Geologic data from the proposed pilot injection test well are being used with reservoir modeling to evaluate actual injectivity potential and develop permit and operational strategies for a geologic storage demonstration phase of the project to be conducted during 2007.