

Reservoir Analysis of the Cypress Sandstone (Chesterian) for Enhanced Oil Recovery and Carbon Sequestration, Henderson County, Kentucky, Kathryn G. Takacs and T.M. Parris, Kentucky Geological Survey, University of Kentucky, Lexington, KY 40506-0107, ktakacs@uky.edu, mparris@uky.edu

The Cypress Sandstone in Euterpe Field in Henderson County is being evaluated for possible CO₂ injection and enhanced oil recovery. Geophysical well log analysis and mapping suggest that oil is structurally and stratigraphically trapped at subsea depths of -1,486 to -1,466 feet; injected CO₂ will thus reside in the reservoir as an immiscible gas. Log analysis further shows an oil-water contact at variable subsea depths, suggesting the reservoir might be compartmentalized. Using an average core porosity of 17 percent, the calculated reservoir pore volume is approximately 26,951 acre-feet. Microscopic and X-ray diffraction analysis shows that the Cypress is a fine-grained, quartz-rich sandstone with smaller amounts of kaolinite (~5 percent), calcite (~4 percent), and ankerite (~2 percent) cements. Overlying seal rocks of the Golconda Formation are composed of siltstone and mudstone. Golconda rocks are mineralogically more diverse and contain significant amounts of feldspar (~6 percent), calcite (~7 percent), siderite (~7 percent), illite (~10 percent), and chlorite (~3 percent). Future sampling and analysis of Cypress waters will provide data to model geochemical reactions between formation waters, minerals in the reservoir and seal rocks, and injected CO₂. Further study of the Cypress Sandstone will examine how reservoir characteristics at Euterpe compare to other Cypress and Mississippian sandstone reservoirs in the Illinois Basin of western Kentucky for suitability for enhanced oil recovery and carbon sequestration.