Kentucky Geological Survey

The Hancock County Test Well

Name: KGS No. 1 Marvin Blan well

Purpose: Collect subsurface data and test CO_2 injectivity to assess carbon storage potential in western Kentucky

Cost: $8+ million (approximately)

Funding Sources: Kentucky Incentives for Energy Independence Act 2007; Western Kentucky Carbon Storage Foundation; TVA; Illinois Department of Commerce and Economic Opportunity; U.S. Department of Energy; and in-kind industry contributions

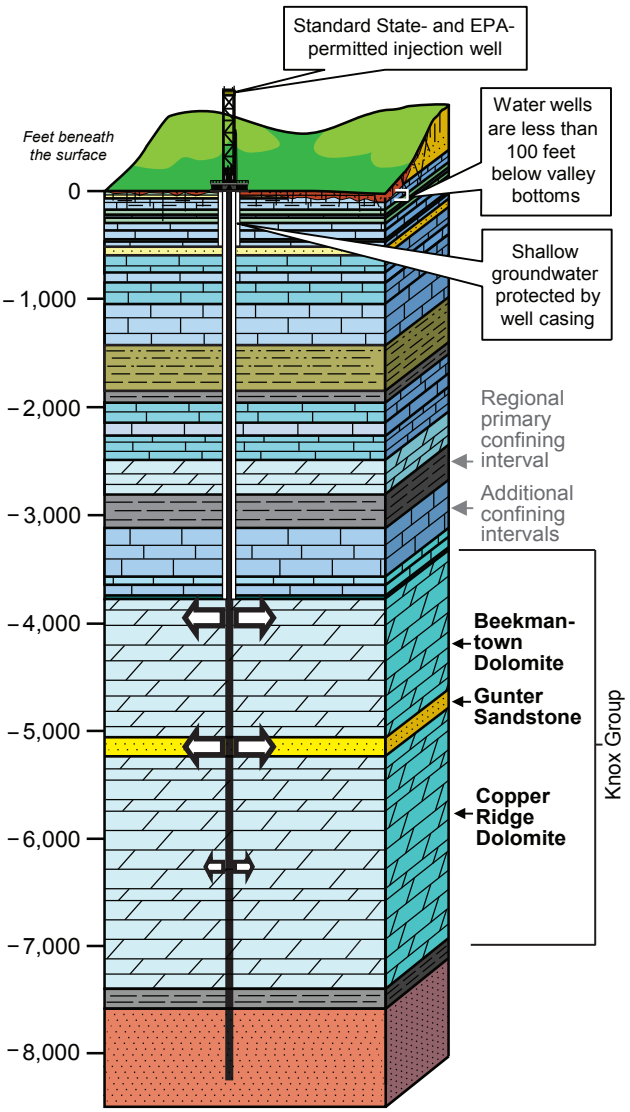
Well Type: EPA UIC Class V injection well

Total Depth: 8,126 ft

Primary Targets: Beekmantown Dolomite, Gunter Sandstone, and Copper Ridge Dolomite (Knox Group)

Data Collected:

- 24 miles of 2-D reflection seismic data
- 395 ft of conventional rock core
- 30 supplemental sidewall cores
- Full suite of downhole geophysical logs including formation image log
- Standard and advanced laboratory analyses
- Pressure and temperature measurements
- Subsurface formation water samples
- 3.5 years monitoring of two nearby wells and two springs to check for leakage from well



Rock units penetrated in the well and intervals tested (arrows). Unit names in black are potential reservoirs. The Copper Ridge Dolomite contains both potential reservoirs and confining intervals.

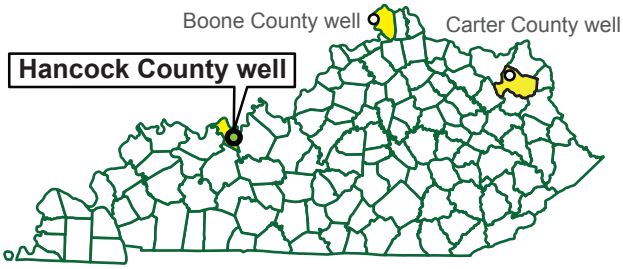
Subsurface Testing:

- Two phases of testing totaling 656 tons of CO_2 injected
- Standard step-rate test to determine in-place rock strength for target intervals

Results:

- → Good storage reservoir properties in the three Knox Group targets tested
- → Multiple, good, thick, confining intervals in strata above the Knox Group
- → Well abandoned per EPA and State regulations, and the wellsite reclaimed per landowner's specifications

Photo of the KGS No. 1 Marvin Blan well site. Supervisory personnel, coring contractors, and wellsite geologists were on the location 24 hours a day for 63 days. Photo used with permission of Sandia Technologies.



Location of the Hancock County well and two other carbon storage data-gathering wells in Kentucky.

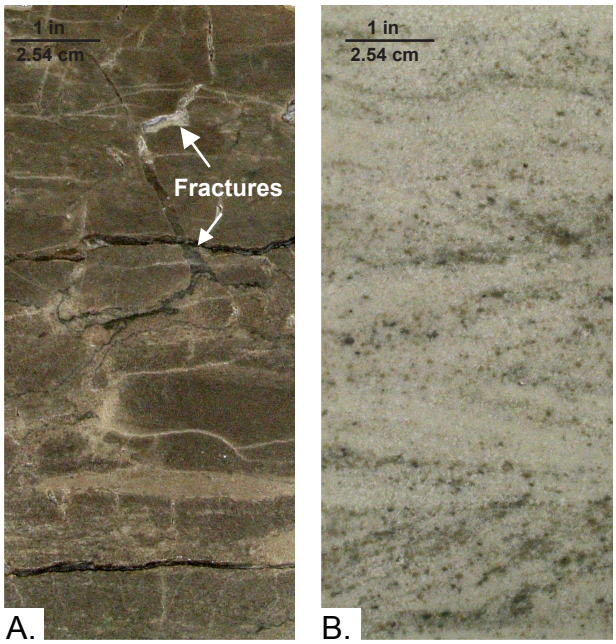
The Ohio River is an important industrial and electric generation corridor. Because future regulation may limit CO_2 emissions from these and future sources in the area, it is important to understand potential geologic storage options beneath the surface.

Laboratory analyses, well log analyses, and subsurface testing indicate two potential reservoirs at depth with adequate overlying confining zones for potential CO_2 storage.

The Beekmantown Dolomite (Upper Knox Group) is 1,310 ft thick and has porosity of 3 to 13 percent, and permeabilities of 0.012 to 0.626 millidarcies. The Gunter Sandstone interval is 140 ft thick and has porosity of 3 to 18 percent and permeabilities of 0.0003 to 580 millidarcies.

A step-rate test of an interval in the Copper Ridge (lower Knox Group) established the maximum injection pressure in the well. CO_2 injection testing of both the Beekmantown Dolomite and Gunter Sandstone showed good injectivity with little pressure build-up.

Strata overlying the Knox Group were evaluated for their capacity to confine CO_2 deep underground. The primary confining interval was found to be more than sufficient for this purpose.



[Left] (A) Core from the Beekmantown Dolomite (3,875 ft) showing fractures in fine-grained dolomite. (B) Bedding features in core from the Gunter Sandstone (5,109 ft). (C) Microscopic view of the Beekmantown Dolomite (3882 ft) showing intercrystalline porosity (blue) between carbonate minerals (gray and white) that form the rock. Photo C is used with permission from Conoco Phillips Corporation.