

PROJECT facts

Carbon Sequestration

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U.S. DEPARTMENT OF ENERGY
OFFICE OF FOSSIL ENERGY
NATIONAL ENERGY TECHNOLOGY LABORATORY



LEVERAGING REGIONAL EXPLORATION TO DEVELOP GEOLOGIC FRAMEWORK FOR CO₂ STORAGE IN DEEP FORMATIONS

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Background

The Midwestern region encompasses numerous coal-fired power plants that could be adversely impacted by carbon dioxide (CO₂) emission control restrictions. Geologic sequestration could be a viable option to mitigate the CO₂ emissions within this region. Unfortunately, the understanding of rock properties within deep formations in the region is poorly understood due to lack of deep well data. Under this project, regional geologic characterization is being refined with new rock property data being collected in collaboration with regional oil and gas drilling companies.

Description

The project is designed to develop an improved understanding of the geologic framework of deep formations in the Midwestern United States, identifying potential reservoirs for CO₂ storage. Developing the regional framework for continuity and hydrogeologic parameters is vital to determining lateral extent and capacity of the containment rock. The emphasis for developing this framework will be on obtaining parameters for quantitative assessment of geologic storage potential, such as formation thickness, structural controls, permeability, and porosity data. Ultimately, the comprehensive assessment of the compiled data along with knowledge of the sedimentary history of the area can be used to develop models and improve predictability of sequestration targets in this region. The scope of the project is to work with local drillers to "piggyback" on their existing projects to allow for a thorough regional geological characterization. Through this process, the project is able to collect pertinent geologic data on targeted reservoirs at a fraction of the cost of drilling new stand-alone wells.

Primary Project Goal

Develop an improved understanding of the regional geologic framework of the deep geologic formations in the Midwestern U.S. and, in the process, identify potential future CO₂ storage reservoirs.

Objectives

- Identify, analyze, and evaluate potential opportunities based on planned drilling in the region
- Develop a collaboration plan with the well operator to obtain deep geologic data of interest to region including liability clauses



PARTNERS

William Rike
Oil and gas exploration and service
companies in Midwestern USA

COST

Total Project Value
\$2,524,625

DOE/Non-DOE Share
\$2,019,700 / \$504,925

ADDRESS

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- Incorporate the new information into a geologic framework to update regional maps and cross-sections
- Report findings and recommend new areas of interest

Accomplishments

- Nine total wells have been identified and characterized, six located in Ohio, one in West Virginia, and two in Michigan.
- Data from at least five additional wells drilled for related projects has been accessed and incorporated into the regional framework.
- Characterization has included information from targeted formations including the upper Cambrian layers such as the Mt. Simon Sandstone, Copper-Ridge and Beekmantown Dolomites, and the Rose Run Sandstone in the Appalachian Basin as well as the Devonian carbonate layers in the Appalachian and Michigan Basins.
- Project has developed the foundation for future collaborations with oil companies that will continue to fill subsurface geologic data gaps and refine storage potential evaluation in the region.

Benefits

The results of these studies will help reduce the cost of CO₂ storage by potentially minimizing the pipeline requirements and finding new reservoirs, increasing public confidence in storage capacity, helping develop monitoring and verification technologies specific to the geologic setting, and helping verify the storage potential in various target formations by validating current theoretical estimates with actual field geologic data. Due to collaboration with oil and gas companies, the geologic characterization has been conducted at a fraction of the total cost of drilling new wells. The project supports the DOE's overall goal of developing safe, effective, and low-cost geologic sequestration options and specifically helps with measurement and verification of the geologic storage potential in a critically important region that is heavily dependent on coal-based power generation



Wireline logging at Dager Well, Licking County, Ohio