

Integrated Mid-Continent Stacked Carbon Storage Hub

Award Number: DE-FE0029264

Project Summary:

The objective of this project was to study the pre-feasibility of an integrated carbon dioxide (CO₂) storage hub in the mid-continent region of the United States, with the ultimate objective of storing anthropogenic CO₂. As part of the Integrated CCS Pre-Feasibility phase of the Carbon Storage Assurance Facility Enterprise (CarbonSAFE) Initiative, researchers developed a scenario complete with preliminary plans for implementation that address site-specific geologic, engineering, operational, legal, and regulatory aspects of the project. The study developed preliminary economic estimates that will aid in planning future phases of the project, helping to develop an integrated storage hub utilizing potential stacked storage reservoirs in Nebraska and Kansas (Figure 1). Tasks included identifying and reviewing major sources of CO₂, conducting a sub-basinal geologic stacked storage assessment, and determining the parameters for the proposed storage facility. Additionally, the testing of selected National Risk Assessment Partnership (NRAP) tools were incorporated into several steps of the geological assessment.

Figure 1: Study area covering Nebraska and Kansas showing stacked storage corridors alongside CO₂ sources and oil fields.

Project Outcomes:

The study evaluated a CO₂ source corridor, a CO₂ storage corridor and the associated subsurface, and financial and economic scenarios. Eighteen ethanol plants located in the source corridor were identified as the primary sources for this project because, combined, they could supply 50 million metric tons (MMT) of CO₂ for storage and had simpler and cheaper capture processes than power plants. The Sleepy Hollow field in Nebraska was identified as the primary storage site. The sub-basinal analysis identified the four subsurface groups at the Sleepy Hollow field with the potential for storage of 50 MMT of CO₂ using stacked saline storage. The area of review was modeled and found to be about 40 kilometers (approximately 25 miles) in diameter. The total cost of a CCUS project was estimated to be between \$31 and \$67 per metric ton of CO₂. Economic evaluation found that the 45Q tax credits alone would not be enough to offset the cost of storage. However, starting the stacked storage project with CO₂-enhanced oil recovery may provide revenues from oil production to offset the cost of capture and transportation infrastructure, reducing capital costs for later storage phases.

Presentations, Papers, and Publications

[Final Report: Integrated Mid-Continent Stacked Carbon Storage Hub, Phase I Final Report](#) (October 2018) – Diana H. Bacon, Dan Blankenau, Dana Divine, Andrew Duguid, Isis Fukai, Justin Glier, Jared Hawkins, Martin Jimenez, R.M. Joeckel, Scott McDonald, Richard Middleton, Rick Peterson, Mackenzie Scharenberg, Valerie Smith, Signe K. White, Sean Patrick Yaw

Prime Performer:
Battelle Memorial Institute

Key Performers:
Archer Daniels Midland
Nebraska Geological Survey
Schlumberger Carbon Services

Principal Investigator:
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Project Duration:
2/13/2017 – 6/30/2018

Performer Location:
Columbus, Ohio

Program:
Carbon Storage

