Central Appalachian Basin Unconventional (Coal/Organic Shale) Reservoir Small-Scale CO_2 Injection Test

Award Number: DE-FE0006827

Project Summary:

Researchers aimed to evaluate the long-term storage potential of carbon dioxide (CO_2) in coal seams and organic shales by injecting up to 20,000 metric tons of CO_2 into these unconventional reservoirs in central Appalachia. This project planned to design and implement characterization, injection, and monitoring activities to test the ability of coal and organic shale formations to store CO_2 economically and safely as well as to track the migration of CO_2 throughout the injection and post-injection phases. In addition, this research planned to test the injectivity of CO_2 into unmineable coal seams and the potential for enhanced coalbed methane recovery (ECBM) by stressing coals under continuous CO_2 injection for a period of one year.

Prime Performer:
Virginia Polytechnic Institute and State University

Principal Investigator:
Dr. Michael Karmis

Project Duration:
10/1/2011 – 12/31/2017

Performer Location:
Blacksburg, Virginia

Field Sites:
Buchanan County, Virginia
Morgan County, Tennessee

Program:
Carbon Transport & Storage

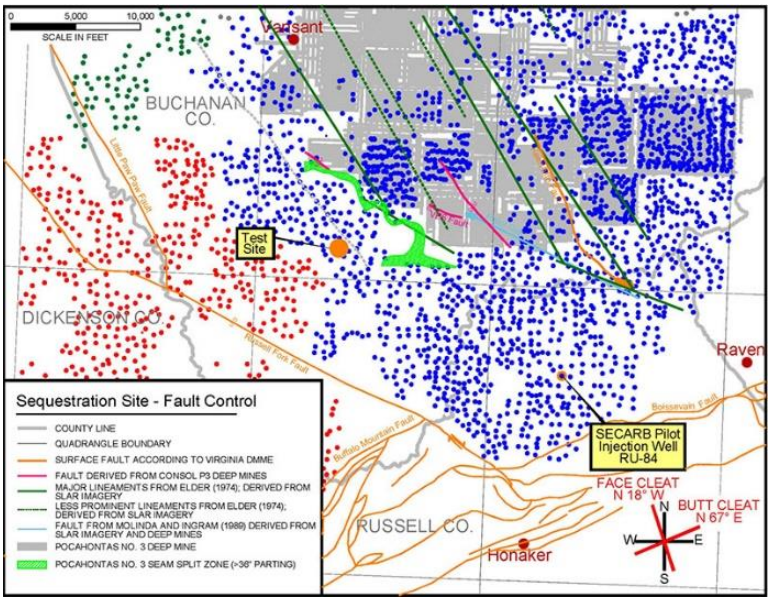

Figure 1: Proposed test site location near Buchanan County, Virginia and surrounding well locations.

Project Outcomes:

This project successfully completed two field projects: (1) a 510-ton scale "huff-and-puff" CO_2 injection into a legacy horizontal Chattanooga Shale in Morgan County, Tennessee; and (2) a 13,263-ton CO_2 injection into three legacy coalbed methane wells in Buchanan County, Virginia. Comprehensive geologic characterization and monitoring programs were developed for these sites. Storage was verified and monitored through monitoring techniques such as pressure, flowback, and microseismic monitoring. Unique reservoir monitoring and downhole tools were also designed and implemented to track CO_2.

Presentations, Papers, and Publications

Final Report: Central Appalachian Basin Unconventional (Coal/Organic Shale) Reservoir Small Scale CO_2 Injection Test (May 2018) Michael Karmis, Nino Ripepi, Ellen Gilliland, Andrew Louk, Xu Tang, Cigdem Keles, Charlers Schlosser, Ed Diminick, Michael McClure, Gerald Hill, Brian Hill