Integrated Pre-Feasibility Study of a Commercial-Scale Carbon Capture Project in Formations of the Rock Springs Uplift, Wyoming

Award Number: DE-FE0029302

Project Summary:

The University of Wyoming performed a phase I pre-feasibility assessment for secure, commercial-scale carbon dioxide (CO_2) capture and storage at the Rock Springs Uplift (RSU), Wyoming. The project's initial scenario and related study objectives were to perform (1) a CO_2 source assessment based on post-combustion capture of CO_2 from PacifiCorp's Jim Bridger Plant (JBP); (2) a CO_2 transportation assessment; and (3) a high-level sub-basinal evaluation to identify additional storage reservoirs within the RSU beyond the presently characterized Madison and Weber formations to enhance storage capacities with stacked storage.

Prime Performer:
University of Wyoming

Principal Investigator:
Dr. J. Fred McLaughlin

Project Duration:
3/1/2017 – 2/28/2019

Performer Location:
Laramie, Wyoming

Program:
Carbon Transport & Storage

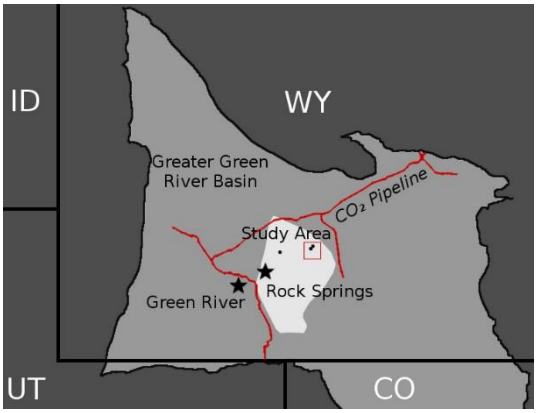

Figure 1: The three well sites (black dots) in the RSU (white area) in Wyoming's Greater Green River Basin (light gray). A nearby CO_2 pipeline is shown in red.

Project Outcomes:

This project analyzed the stacked Mesozoic reservoirs at the study site and found the Nugget sandstone to be well suited for CO_2 storage. Storage assessments from Mesozoic reservoirs were coupled with simulations from the site's Paleozoic reservoirs (the Weber Sandstone and Madison Limestone), which were the focus of a previous study. The fully integrated stacked reservoir pre-feasibility studies suggest that the Nugget and Madison formations alone could safely store 50 million metric tons (MMT) of CO_2 within the study site.

This study suggested that this site meets the CarbonSAFE Program's requirements of being able to feasibly store 50+ MMT of CO_2 over 25 years within the site's stacked reservoirs, especially if coupled with pressure management strategies. In addition, the site's proximity to existing CO_2 transportation networks, CO_2-EOR opportunities, ability to sell to markets that value low-carbon electricity, Wyoming's existing carbon regulatory framework, and a public that is well-educated with respect to energy markets and issues collectively increase the potential for implementing commercial-scale CCS adjacent to the JBP.

Presentations, Papers, and Publications

Final Report: Integrated Commercial Carbon Capture and Storage (CCS) Prefeasibility Study at Rock Springs Uplift, Wyoming (May 2019) – Dr. Fred McLaughlin, Kipp Coddington, Cindy Ishkanian