Southwest Regional Partnership on Carbon Sequestration

Quarterly Progress Report

Reporting Period: April 1–June 30, 2016

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DE- FC26-05NT42591

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Executive Summary

Task 1–Regional Characterization: work on the Arbuckle Group part of the project was completed, with all goals met. Volumetric free- reservoir space in the Arbuckle at the projected depth of 3,000–13,000 feet could not be satisfactorily determined due to the vagueness of in-situ porosity at these depths.

Task 2–Public Outreach and Education: Researchers converted the self-hosted SWP website to the public-facing website and the commercial contract was terminated. The MVA data website was improved, for more secure and user-friendly SWP-wide access. Many GIS/mapping aspects of the MVA task were updated. The Alfresco-based version of SWP-Velo was completed and released to the SWP.

Task 6–Operational Monitoring and Modeling: Researchers continued to refine the MVA database. Processing was nearly completed on incorporating up-to-date FWU production/injection data into the MVA database. *In 6.1 Surface and Near-Surface:* CO_2 surface flux measurements and water sample analysis were performed and work continued on eddy flux research. *In 6.2 Subsurface:* CO_2 storage summaries resumed and breakthrough appeared in Well 20-8. Two separate PFT tracers were injected into wells 13-1 and 13-3. *In 6.3 Seismic:* results of the VSP Inversion Study were finalized and researchers worked on repairing the real-time data acquisition system, which had been damaged. *In 6.4 Reservoir Modeling:* several important modeling advances were made, including Petroleum System Modeling in the Northwest Anadarko Basin, the 3D, VSP-based detailed geologic model, fluid substitution modeling to determine the impact of CO_2 injection on seismic response for 3D VSP surveys, and completion of the new geologic model incorporating facies work and hydraulic flow units. Researchers began the 2016 annual review of RISK. Work progressed on the numerical optimization model for improving FWU CO_2 storage and oil recovery predictions. Researchers worked on mapping previously identified hydraulic flow units with the core. Work also proceeded on improving TOUGHREACT and STOMP reactive transport simulations and researchers began gathering data for a history-matching project using the new FWU geomodel. *In 6.5 Risk Assessment*: researchers studied forecast uncertainty for sequestered CO_2 in a generic 3-D CO_2-EOR reservoir, based on results from 12 alternative models and 1000 Monte Carlo simulations for each alternative model. They worked on sensitivity analysis of the impacts of diffusivity on CO_2–cement interaction with a 2-D conceptual model to analyze the impacts of reservoir pressure and CO_2 phase. Researchers adopted the newly upscaled history-matched reservoir models as the base model of multiple-realization reservoir simulations for PCE implementation. Work progressed on STOMP-EOR with verification testing, and researchers continued risk analysis on FEPs at FWU. Researchers continued conducting relative permeability testing for use in simulations, and working on caprock analysis.

Task 8–Project Management and Oversight: Fieldwork included sampling, maintenance, and tracer injection. NETL data analysis on the gas phase tracers began to be caught up. Data management plan results were delivered to SWP researchers. The new version of VELO was completed and presented, and a survey was initiated. The first meeting of the SWP Advisory Board was held via WebEx, with all advisory board members participating. An overview of the project was presented, with details on how to access project information. The Q & A session was vigorous, and the board planned to vote on a chair, and begin providing feedback to SWP. Retiring Project Director Robert Lee sent a letter to DOE recommending a contract modification making Robert Balch his replacement as Project Director.

TASK 1 Regional Characterization

1.4 Continued Assessment

Arbuckle Group

During this period, work on the Arbuckle Group part of the project was completed, with all goals met. Volumetric free- reservoir space in the Arbuckle at the projected depth of 3,000–13,000 feet could not be satisfactorily determined due to the vagueness of in-situ porosity at these depths.

TASK 2 Public Outreach and Education

Subtask 2.2 Project Website

Website Maintenance

Throughout the quarter, researchers continued assisting with the Domain Name System (DNS) and registration of the SWP Internet presence. In May, the project team converted the self-hosted "clone" of the SWP website to the public-facing website by re-configuring the DNS from the commercial web hosting service to a server belonging to a SWP Partner at UU. The commercial contract was terminated. The main SWP website now has a login option for SWP personnel. The "backend" site contains SWP materials that do not necessarily warrant public viewing (teleconference recordings, notes, publications, presentations, budgets, and other project management documents). All SWP affiliated websites now have authenticated SSL Certificates for maximum security.

The project team also continued improvements to the MVA data website to allow for more secure and user-friendly SWP-wide access.

Many GIS/mapping aspects of the MVA task and other aspects of the project were updated, including:

- Updated satellite photos for FWU and surrounding region.
- Digitization of CELLC FWU feed and production pipelines.
- Updated tracer injection and sampling wells.