

Southwest Regional Partnership on Carbon Sequestration

Quarterly Progress Report

Reporting Period: July 1, 2018–September 30, 2018

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Executive Summary

Task 2–Public Outreach and Education: SWP continued to support the Domain Name System (DNS) and registration of the SWP Internet presence. The project team also continued improvements to the MVA data website to allow for more secure and user-friendly SWP-wide access. Researchers continued to maintain SWP-Velo with no significant bugs reported.

Task 6–Operational Monitoring and Modeling: the MVA Database was maintained and updated. In *6.1 Surface and Near-Surface:* Neither gravity field work nor CO₂ flux sampling were done, although water chemistry and tracer sampling were performed. The LiCor eddy covariance system required two trips to the field for adjustment and maintenance; the tower remained well-secured and sound. By early September, more than 16 gigabytes of LiCor data were collected. In *6.2 Subsurface:* CO₂ storage accounting resumed. Aqueous- and vapor-phase tracer samples from various well patterns at the FWU continued to be analyzed and a tracer poster for the NETL review meeting in Pittsburgh was prepared. Work continued on analysis of pre-injection CMR logs from well #13-10A. A journal article was officially accepted for publication in *Geophysical Journal International*. In *6.3 Seismic:* Reprocessed 3D surface seismic data analysis and construction of the velocity model in Petrel continued; researchers developed an efficient 3D compressive-sensing data interpolation method using a local FK operator. Researchers developed a 3D velocity model building method using plane-wave migration velocity analysis. Researchers worked on a python script for decomposition of microseismic moment tensor and calculation of microseismic attributes with verification against the Harvard CMT Database. In *6.4 Reservoir Modeling:* work continued on the STOMP three-phase reactive transport model for a five-spot well pattern based on FWU data. Researchers added a geochemical component comprising seven minerals. Tracer transport simulations of the 1-3-6-NSDA tracer with STOMP-EOR for the 13-10a five spot pattern were completed. The milestone report, “History Matching Model for Improved Characterization Model 2018,” concluded in Q43, was sent to NETL in August 2018. History matching for field-scale coupled reactive transport modeling progressed. Work continued on various aspects of relative permeability–multiphase flow characterization. Researchers designed, ran, and analyzed an additional suite of 11 simulations to support wellbore leakage analysis (Task 6.5). Researchers continued to analyze relative permeability relationships derived from laboratory-measured capillary pressure data from Morrow core, and worked on developing a Python software package to help with moving reservoir models between simulation packages. All relative permeability coreflooding experiments were completed. Researchers finished converting (MICP) Morrow data into three-phase relative permeability relationships compatible with the Eclipse simulator. Noble gas analysis was concluded (Task 6.4 Project Milestone). A relative permeability chapter for SWP’s book was finished. In *6.5 Risk Assessment:* researchers continued using NRAP tool RRROMGEN for generating response surfaces from SWP’s process modeling simulators to convert grid and simulation results to the format that the NRAP-IAM-CS tool recognizes. The Caprock Integrity chapter for SWP’s book was finished. Column experiments to quantify effluent water chemistry changes began.

Task 8–Project Management and Oversight: Fieldwork focused on the eddy covariance system; BP4 preparation dominated work activities. Book preparations continued and researchers attended the NETL meeting in Pittsburgh, August 13–16. Two presentations were given: “SWP Phase III Demonstration: Farnsworth Unit” and “Aqueous- and Vapor-Phase Studies at the SWP Farnsworth Unit” (poster).

TASK 2 Public Outreach and Education

Subtask 2.2 Project Website

Website Maintenance

SWP researchers continued to assist with the Domain Name System (DNS) and registration of the SWP Internet presence. The project team also continued improvements to the MVA data website to allow for more secure and user friendly SWP-wide access.

All teleconferences are recorded, with audio/video recordings made available on the main SWP website, <https://www.southwestcarbonpartnership.org> in the password-protected “Members Area.” Slide and presentation updates, and archived minutes of teleconferences are also available. All files can be sorted and searched by filename, and PDF versions of minutes and slides/presentations can be searched by content.

SWP-Velo

SWP-Velo is the data repository and management system for the SWP Phase III project.

During the quarter, the SWP-Velo system was maintained. No significant bugs were reported during the quarter concerning the operation or functionality of the new SWP-Velo system.

TASK 6 Operational Monitoring and Modeling

MVA Database

The MVA database supports SWP’s extensive monitoring activities within the FWU during the operational phase of the project.

During the quarter, the project team continued to incorporate new data into the MVA Database from the past months.

Subtask 6.1 Surface and Near-Surface Monitoring

Geophysical monitoring activities at the FWU include gravity, microseismic, and electric potential measurements. Gravimetry is done to find subsurface variations in density; microseismic