Southwest Regional Partnership on Carbon Sequestration

Quarterly Progress Report

Reporting Period: October 1, 2018–December 31, 2018

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DE- FC26-05NT42591

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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. A separate database was started for eddy tower data. In *6.1 Surface and Near-Surface:* No gravity measurement fieldwork was done and no water samples were collected. CO_2 flux measurements were taken (also taken in Q44; erroneously reported not taken). SWP continued work on LiCor data collected in Q44 and gathered the latest eddy tower data in December. In *6.2 Subsurface:* CO2 storage data as of September 2018 was reported; Phase III storage period did not meet goal of 1,000,000 metric tonnes, but this was met over the course of the CO_2 injection project started in 2010; over 2 million metric tonnes of CO_2 have been injected. Ongoing analysis of tracer tests continued. In order to interpolate and integrate seismic monitoring efforts into reservoir modeling grids, the project team investigated the open source seismic modeling package Madagascar. Coupled analysis of NMR logs and μCT imaging resumed in December. In *6.3 Seismic:* the velocity model for the reprocessed 3D seismic data was in the QC process. Seismic stratigraphic interpretation was completed. Memory pressure and temperature gauges were deployed in Well 13-10A and the new borehole seismic array, with downhole temperature and pressure gauges and DTS fiber cable, was placed in Well 1310. Internet connection between the data shed and NMT server was established and telemetry cables were installed. Planning for the surface microseismic array advanced. In *6.4 Reservoir Modeling:* Work continued on building and executing a STOMP three-phase tertiary recovery reactive transport model for a five-spot well pattern. Models successfully simulated the injection and physical migration of CO_2 but appeared to be underpredicting the pH of the formation water. Researchers detected and fixed some bugs in STOMP-EOR. Work progressed on completing current tracer simulations and interpretation of tracer experiments. Flow-through relative permeability core experiments were finished. Researchers continued to run simulations for the NRAP wellbore leakage study and finished creating the simulation cases for the 13 relative permeability relationships derived from MICP data on the Morrow Sandstone. The project team continued to work on a software project in Python that would allow for grids developed in Petrel to be run using other simulation codes. A Topical Report summarizing core measurements for relative permeability was initiated. In *6.5 Risk Assessment*: researchers continued using NRAP tools to characterize leakage at the Farnsworth site. Column experiments of CO_2 intrusion into the overlying groundwater aquifer (the Ogallala) began and assessment continued of the impact of geochemical reactions on CO_2 storage via three-phase reactive transport models of FWU. Modelling results showed stratigraphic trapping sequestered the most injected CO_2 . Early results with a two-dimensional reactive transport model of FWU caprock showed it would maintain its integrity in the scenario for at least 5000 years.
Task 8–Project Management and Oversight: Two field trips to the FWU were made. The first was to install P/T gauges in well 13-10A (see *6.3, Seismic*), to collect field data, and to meet with site personnel. The second was to reconfiguring computer wiring in the data shed (ongoing) and to investigate reported gas leaks in well 1310 (not found) and other tasks. The SOPO was submitted in October and the Continuation Application and Budget for BP4 in December 2018. Planning began for the 2018 SWP annual meeting February 6–7 in Allen, Texas. Book preparation continued and a number of presentations were given at meetings.