Southwest Regional Partnership on Carbon Sequestration

Quarterly Progress Report

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Executive Summary

Task 2–Public Outreach and Education*:* Website and SWP-Velo maintenance continued, as well as improvements to the MVA data website for more secure access. The website was updated with information on the Annual Meeting December 12–14, including presentations.

Task 6–Operational Monitoring and Modeling: the MVA Database was maintained and updated. In *6.1 Surface and Near-Surface:* basic studies continued for improving in-situ monitoring and data analysis. Since July 2017, SP of the two well electrodes monitored have been very unstable. Background CO_2 surface flux was taken from sampling locations. The eddy flux system could not be installed as planned, but the hardware was moved from Amarillo to a storage facility in Perryton. Water samples collected in September were analyzed. Researchers performed CO_2 leakage simulations to investigate a recent batch of Farnsworth USDW chemistry data that showed a consistent increase for DIC and ORP for nearly all shallow groundwater wells in and around the FWU since 2014. Simulations showed the increase in DIC values were likely the result of regional groundwater recharge of groundwater higher in CO_2 or carbonate. Such perturbations in the DIC signal could potentially compromise evaluation of storage integrity. In *6.2 Subsurface:* During October 2017, 29,267 metric tonnes of CO_2 were injected and 13,089 net metric tonnes of CO_2 stored. Analysis continued of the vapor- and aqueous-phase tracers injected in 2015 and 2016. Vapor phase results continued to show tracer concentrations returning to near background values for most production wells and aqueous-phase tracer results indicated breakthrough and return to near-background values. A paper on CMR data processing was completed and submitted to *Geophysical Journal International*. In *6.3 Seismic:* the VSP seismic survey was completed in December. Work continued on analysis of Farnsworth time-lapse seismic data. In *6.4 Reservoir Modeling:* tracer simulations were updated with the most recent well data and comparisons against recent tracer data. Researchers completed a summary of history-matching efforts for primary, secondary and tertiary recovery processes for FWU. In multiphase flow characterization, researchers conducted a control flow-through experiment and a series of post-mechanical tests on three experimental samples interacted with CO_2-rich brine. Analysis continued on the effects of uncertainty in the relative permeability relationship on numerical simulations of CO_2-EOR operations. Researchers worked on a journal article and book chapter linking diagenetic controls of the major flow units of the reservoir to relative permeability measurements. Closure corrections for mercury porosimetry data were made to improve interpretation of capillary pressure and pore size distributions. Work focused on finalizing and documenting TOUGHREACT reactive transport simulations. Analysis of noble gas data (a Task 6.4 milestone) progressed and researchers worked with the 3D surface seismic data used in the geomodel. The geomodel update was presented at the SWP annual meeting. In *6.5 Risk Assessment*: researchers began to use RROMGEN for generating response surfaces from SWP's process modeling simulators and evaluated the performance of NRAP-IAM-CS (formerly CO2-PENS). Work continued on a three-phase numerical model for FWU with reactive transport using CMG-GEM, with the FWU Eclipse model continuing conversion to CMG-GEM format. The caprock study (Task 6.5 milestone) progressed, integrating all caprock integrity analyses.

Task 8–Project Management and Oversight: Fieldwork was postponed until December, including the VSP survey, owing to unexpected delays and the new ownership of FWU. In early October, the sale of Farnsworth was confirmed and PIs planned to meet the new owner (Perdure) at a later date. In December, SWP personnel met with DOE to relate experiences in permitting wells. The SWP Annual Meeting was held in Socorro, NM on December 12–14.