Southwest Regional Partnership on Carbon Sequestration

Quarterly Progress Report

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Executive Summary

Tasks addressed in this quarter were Tasks 2, 4 5, 6, and 8.

In Task 2–Public Outreach and Education, the SWP-Velo framework was adopted as the working platform for sharing documents and data, and communicating progress. During this period the research team requested four new capabilities for the framework. A beta version of the project management tools was implemented and an Alfresco file synching application was temporarily implemented and demonstrated in the SWP-Velo framework, but the SWP research team has notdecided whether to fully implement this capability until protocols for collaborative synching of files are established.

In Task 4–Site Characterization and Planning, a number of objectives were accomplished. In *Initial Reservoir Model Development*, researchers conducted a review of Farnsworth Unit core at the CGG Core Repository, Schulenburg, TX and completed a report on their findings (attached). A master database was constructed identifying wells that penetrated the Arbuckle Group throughout Oklahoma, the principal CO_2 sequestration "sink" in Oklahoma. A geologic model for FWU was constructed to predict miscible displacement and researchers developed the founding equation of state algorithms for STOMP-EOR. A baseline velocity model was created Schlumberger's Petrel 2013 software and interval velocity data, which allows conversion of TWT seismic data to the depth domain. This velocity model will also be useful for generating synthetic seismograms. Researchers developed a protocol for inverse analysis to detect potential high permeability zones and used inverse analysis for estimation of a leakage pathway in a homogeneous domain, with multiphase flow. A generalized/fundamental analysis of impacts of chemical reactions on injectivity was performed using several CO_2 sequestration scenarios, and chemical reactions of minerals, with the goal of developing a template for analysis of the FWU site using monitoring data. In *Risk Assessment*, researchers developed an integrated framework to optimize CO_2 sequestration in the FWU. *Work Plans* for MVA, Characterization, Risk, and Simulation were completed and an overall Gantt chart wascreated.

In Task 5–Well Drilling and Completion, planning moved ahead in this quarter for the drilling of the three characterization wells with the first planned to be spudded in November.

In Task 6–Operational Monitoring and Modeling, great progress was achieved with respect to surface monitoring preparations. Both the new eddy covariance flux tower and the new flux chamber – both capable of measuring fluxes of CO_2, methane and water vapor – were completed and testing, calibration and initial field surveys using both rigs began with the University of Utah campus as the “field laboratory.” About 80 soil collars were installed on site at the FWU, and water sample collection sites were selected and samples taken. In *Seismic Activities*, researchers presented a poster on the seismicity near the Farnsworth field at the DOE Carbon Storage R&D Project Review Meeting.Research results showed that there is no recorded earthquake within a region of approximately 30 km in radius from the planned CO_2 injection well. In *Reservoir Modeling*, researchers installed equation of state algorithms for STOMP-EOR, and processed seismic volumeswere delivered to SWP researchers

In Task 8–Project Management, the most significant achievement was finalization and signing of the contract between New Mexico Tech, the prime, and CELLC. In addition, the FWU site PMP was submitted to NETL, the Partnership Meeting was set for November 19–20, the software contract was finalized with Schlumberger, and interpretation of the 3D surface seismic data began. A core sampling strategy was also developed.