

Southwest Regional Partnership on Carbon Sequestration

Quarterly Progress Report

Reporting Period: January 1–March 31, 2017

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Executive Summary

Task 2–Public Outreach and Education SWP continued to maintain contact email for the SWP websites, the Domain Name System (DNS), including the “members only” site, and record/catalog the weekly SWP Science teleconferences and discussions (audio and video).

Task 6–Operational Monitoring and Modeling: MVA database update progressed, with new variables planned to be added to the database, including high-frequency (5 minute) fluid injection data. In *6.1 Surface and Near-Surface:* Gravity and CO₂ soil flux measurements and analysis continued. The LiCor eddy covariance system moved to a second location; projected deployment of multiple systems to the FWU is expected by the next quarter (spring or summer 2017). In *6.2 Subsurface:* CO₂ storage summaries showed a total of 1,024,198 tons stored since the inception of FWU CO₂ accounting. FWU water chemistry samples were collected and analyzed. Tracer testing continued, with aqueous-phase tracers in the #14-1 pattern showing significantly elevated concentrations, and vapor-phase tracers continued to show early breakthrough, although in most wells surrounding the #13-1 and #13-3 patterns, concentration dropped significantly, in many cases, to background levels. In *6.3 Seismic:* VSP repeat data processing was ongoing and 3D surface seismic depth processing started in January. It was decided to replace some of the monitoring well equipment. The near-surface velocity model was calibrated and the first iteration of tomography was completed. Work continued on data tuning for microseismic data recorded in well 13-10A. Time-lapse analyses of seismic data were underway at the end of the quarter. In *6.4 Reservoir Modeling:* work continued on improved CO₂ storage and oil recovery performance simulation for FWU and analysis of the effects of cP on CO₂-EOR forward models. Relative permeability experiments coupled with geomechanical property testing were ongoing, and researchers focused on identifying caprock characterization parameters for the simulation model. Work on STOMP focused on extending reactive transport simulations for CO₂ and water in the FWU. Characterization for the Booker Field also progressed. In *6.5 Risk Assessment:* The process influence diagram of the project, the risk matrix, and the future work plan of the Risk Working Group were evaluated. Preliminary work was done on a 3-D reactive transport model with CMG-GEM for the FWU. Researchers also worked on arsenic mobilization in shallow groundwater with CO₂ leakage; a field-scale reactive transport model was completed and the impact of CO₂ and brine leakage on groundwater quality was analyzed. Work on multiphase flow characterization continued. Researchers conducted a 3D hypothetical geomechanical simulation on caprock failure and CO₂ leakage through the fractured caprock using ECLIPSE and VISAGE. In addition, researchers worked on a book chapter manuscript on multiphase flow associated with CO₂ geological sequestration, as well as a journal manuscript of the risk assessment workflow applied to FWU. Research continued on geomechanical capabilities for STOMP and geochemical simulations with STOMP-CO₂ and STOMP-EOR.

Task 8–Project Management and Oversight: Planned fieldwork was performed, to collect quarterly field data. Data recording was temporarily suspended after a severe storm caused a regional power outage that lasted several days. Subsequently, several power poles replaced by the utility company resulted in removal of UO’s airborne sensors, so these were replaced on the poles by SWP’s field sampling personnel in February, when fieldwork was performed, including repair and redeploy of NETL seismometers and replacement of bottomhole temperature and pressure sensors in the 13-10 monitor well. Planning for replacement of declining borehole seismometer system began. Ongoing studies were: tracers, relative permeability, rock properties, geomechanical modeling, and history match revision using tracer data. The External Project Review was held in Pittsburgh in January and the Advisory Board met in March. A SWP PI made presentations on the Project to the Norwegian Oil Ministry, the International Research Institute of Stavanger, and the University of Stavanger.

TASK 2 Public Outreach and Education

Subtask 2.2 Project Website

Website Maintenance

During the quarter (January 1–March 31) SWP researchers continued to maintain contact email for the SWP websites. All SWP email requests from the websites are routed through info@southwestcarbonpartnership.org, then are forwarded to the proper SWP personnel/workgroup. The system allows for easy creation of additional email addresses routed to different SWP personnel from unique pages on any SWP website.

Researchers maintained the Domain Name System (DNS), including the “members only” site that contains SWP materials not available for public viewing (teleconference recordings, notes, publications, presentations, budgets, and other project management documents). All SWP affiliated websites are authenticated by SSL Certificates for maximum security.

Researchers continued to participate in and record/catalog the weekly SWP Science teleconferences and discussions (audio and video). All files relating to the SWP Science teleconference continued to be uploaded to the SWP website (SWP, member area only) for easy access.

SWP-Velo

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

TASK 6 Operational Monitoring and Modeling

MVA Database

Researchers continued to update the MVA database throughout the quarter, incorporating additional data gathered over this period. Among the new variables planned to be added to the database are high-frequency (5 minute) fluid injection data.