

Southwest Regional Partnership on Carbon Sequestration

Quarterly Progress Report

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Table of Contents

Table of Contents	2
List of Figures and Tables	3
Executive Summary	5
TASK 1 Regional Characterization	6
1.4 Continued Assessment	6
TASK 2 Public Outreach and Education	6
Subtask 2.2 Project Website	6
TASK 6 Operational Monitoring and Modeling	10
Subtask 6.1 Surface and Near-Surface Monitoring	11
Subtask 6.2 Subsurface Monitoring	19
Subtask 6.3 Seismic Activities	22
Subtask 6.4 Reservoir Modeling	25
6.5 Risk Assessment	47
TASK 8 Project Management and Oversight	56
Cost Status	64
Summary of Significant Accomplishments	70
Anticipated Delays	70
APPENDICES	70

List of Figures and Tables

Figure 1. Screenshot of data.southwestcarbonpartnership.org showing dynamic data search with graph.	8
Figure 2. Clone of the public SWP website, currently offline but available for viewing at http://testing.southwestcarbonpartnership.org . The website is constructed to allow for easy and secure access by SWP team members for rapid file-sharing and public contributions.	9
Figure 3. A map view of the CO ₂ surface flux measurement locations.	12
Figure 4. Map view of PFC injection and sampling wells.	17
Figure 5. Tracer concentration curves for select production wells and the recycled CO ₂ from the PTCH tracer injection of May 2015.	18
Figure 6. Integrating 3D surface seismic, vertical seismic profile and crosswell seismic data.	22
Figure 7. 3D porosity distribution of layer 4 for dynamic modeling.	29
Figure 8. Saturation distribution of layer 4 at the end of CO ₂ history match (December 2014). Lower saturations spots indicate the location of WAG injectors where CO ₂ saturation is higher.	29
Figure 9. Layer 4 CO ₂ sequestered within the Morrow formation expressed in lb-mol/rb.	29
Figure 10. Oil production of the FWU including CO ₂ history and predicted profiles.	30
Figure 11. Zoom in on incised Morrowan Sandstone within the regional model, plus reservoir fluid composition, saturations, and phase predictions at two different locations within the reservoir.	31
Figure 12. Present day 2D PSM temperature prediction using calibrated McKenzie basal heat flow model to vitrinite reflectance data at FWU. Heat flow maps were created for each timestep in PetroMod based on McKenzie heatflow trends for 2D calculations. Model also includes a radiogenic heat production model.	32
Figure 13. Porosity by well from modified PHIT_QEPP log.	33
Figure 14. Permeability by well from modified KINT_GEO_QEPP.	33
Figure 15. Porosity by facies for all three wells combined.	35
Figure 16. Permeability by facies for all three wells combined.	35
Figure 17. Porosity versus Permeability by facies for all three wells.	36
Figure 18. Porosity versus Permeability for each well determined from core plug data.	36
Figure 19. Predicted mineral abundances as a function of reaction progress in reaction path simulations where quartz precipitation was suppressed. (a) Model fluid AWT3, 100:1 water:rock ratio; (b) Model fluid AWT3, 10:1 water:rock ratio; (c) Model fluid AWT4, 100:1 water:rock ratio; (d) Model fluid AWT4, 10:1 water:rock ratio.	38
Figure 20. Isosurface plots of the mass of carbon precipitated as minerals in kg/m ³ of bulk porous medium in the Morrow B Sandstone in the Farnsworth Unit after 25 years of simulation time.	39

Figure 21. Total production (blue) versus pressure (red) for the central production well. The oil saturation (purple) and water saturation (green) are also shown.	41
Figure 22. Oil saturation for the model at the end of 100 years of primary production using Dirichlet boundary conditions.....	42
Figure 23. Oil saturation in the model after 100 years of primary production using closed boundary conditions.....	43
Figure 24. Initial pressure distribution at the beginning of the PISC monitoring period (end of EOR simulation).	44
Figure 25. Final pressure distribution at the end of a 50 year PISC monitoring period.	44
Figure 26. The simulated profiles of changes of volume for minerals calcite (a), kaolinite (b), magnesite (c), illite (d), smectite (f), and CO ₂ mass sequestered by carbonate minerals (e) after 1000 years.	45
Figure 27. Upscaled FWU model showing the permeability distribution.	47
Figure 28. FWU geological model showing the permeability distribution.	47
Figure 29. The results of oil saturation and water saturation profiles for the base case simulation with the new 3D FWU model.	49
Figure 30. Conceptual sketch of dual-porosity, single-permeability model showing fracture system domain, matrix system domain, and fracture-matrix interporosity connections.	53
Figure 31. Statistical analysis of net CO ₂ /water injection (a-d) and oil/gas production (e-g).	55
Figure 32. Field production and injection for FWU for 2012–2015.....	60
Figure 33. Current and projected rate of storage, as well as what was originally estimated and the total for FWU including pre-Phase III injections.	62
Table 1. CO ₂ Surface Flux Data	13
Table 2. Perfluorocarbon (Vapor-Phase) Tracer Sampling Schedule for the Wells Surrounding the #13-13 Injection Well	16
Table 3. Water Sample Analyses	21
Table 4. Operational Parameter Constraints for Various Prediction Cases	30
Table 5. Summary of Results for Various Prediction Cases Including CO ₂ History (25 years) ...	30
Table 6. Probabilistic Assessment of CO ₂ Storage in Five Layers at Time 1, Time 2, and Time 348	
Table 7. Project Budget and Expenditures for the Quarter October 1–December 31, 2015.....	65
Table 8. Milestone Plan Status (Quarters of Federal Fiscal Year)	66

Executive Summary

Task 1–Regional Characterization: Researchers became heavily involved with seismicity issues and water disposal problems associated with the Arbuckle Group.

Task 2–Public Outreach and Education: Researchers continued to maintain the project website, beginning to move the MVA database into a WordPress website and continuing improvements to the MVA data website to allow for more secure and user friendly SWP-wide access. They began to address an upgrade for the main SWP website, currently hosted by a company in Albuquerque, NM. Work on SWP-Velo was ongoing during the quarter, focused on creating a friendlier user interface.

Task 6–Operational Monitoring and Modeling: Work progressed in several areas: The project team continued to refine the MVA database, incorporating additional data gathered over the last months. In *6.1 Surface and near-surface:* gravity data, and CO₂ soil flux measurements were taken and researchers began to develop a protocol for tracer injection and sampling. The LICOR eddy covariance (EC) tower was set up on the UU campus and calibration began in early November. Work continued on wellhead sampling for the aqueous- and vapor-phase tracer slugs that were injected in October and November. In *6.2 Subsurface:* water chemistry measurements were made. In *6.3 Seismic:* work continued processing the 3D VSP, Crosswell tomography data and performing the inversion. Repair and restoration focused on the GPS system following a power surge in September of 2015 at the data shed at the FWU that led to the failure of the GPS system and the necessary repair of both Geodes. Researchers continued to study key potential geomechanical processes in the Morrow sandstone formation and associated effects on CO₂ capacity and injectivity. In *6.4 Reservoir Modeling:* scenario-based prediction models were constructed from a history-matched model for the Farnsworth field Unit. All three petroleum system models (PSM) were constructed and full simulations and sensitivities run. Available porosity and permeability data were analyzed from the porosity log PHIT_QEPP and the permeability log KINT_GEO_QEPP along with core plug data for wells 13-10A, 13-14, and 32-8. In work on the numerical reactive transport model with TOUGHREACT, researchers re-executed all of their reaction path simulations suppressing the precipitation of quartz. Researchers team investigated the effects of boundary conditions on primary production in the FWU. They also continued to analyze the relative permeability relationships for four different rock materials for simulation with STOMP-EOR. They also worked on converting a three-phase history-matched model of FWU from Eclipse to STOMP and investigated the fate and transport of CO₂ during the EPA's PISC monitoring period and how specific relative permeability relationships effect CO₂ distribution, phase behavior, and trapping. In *6.5 Risk Assessment:* Researchers studied spatial and temporal distribution of sequestered CO₂ in a generic 3-D CO₂-EOR reservoir, based on results from 1000 Monte Carlo simulations. Work focused on developing fracture system capabilities into STOMP-EOR. Researchers continued the detailed analysis of FEPs and focused on quantitative risk analysis of potential chemical impacts on groundwater due to CO₂ leakage.

Task 8–Project Management: The annual project review meeting took place at the UU in Salt Lake City on December 2–4, preceded by a data management meeting. This was arranged primarily to to address potential solutions to problems with Velo, which was initially selected as a data management platform, but which has been underutilized, in part because of slow transfer speeds.

TASK 1 Regional Characterization

1.4 Continued Assessment

Arbuckle Group

During this period, Arbuckle researchers became heavily involved with seismicity issues and water disposal problems associated with the Arbuckle Group. In this effort, researchers needed to identify water disposal sites in the Arbuckle that fell within the target depth of 3,000–13,000 ft. These locations were then projected onto the Arbuckle thickness map in addition to their estimated water injection volumes. This was necessary to document disposability volumes that may be comparable to CO₂ disposal volumes, should such ever take place. This effort is ongoing.

TASK 2 Public Outreach and Education

Subtask 2.2 Project Website

Website Maintenance

During the quarter, the project team continued to provide maintenance of the Domain Name System (DNS) and registration of the SWP Internet presence assistance with contact email for the SWP website. All SWP email requests from the website(s) are routed through info@southwestcarbonpartnership.org, which is forwarded to Rich Esser at UU, who then forwards messages on to the proper SWP personnel/workgroup. Future email requests can easily be routed through different addresses or different SWP personnel from unique pages on any SWP website (e.g. seismic@southwestcarbonpartnership.org to Robert Balch at NMT).

The project team continued to prepare for the SWP Annual Review meeting to be held in Salt Lake City on December 2, 3 and 4 (<http://meetings.southwestcarbonpartnership.org/>), arranging facilities and catering for the meeting. Researchers also worked on planning for the Data Management workshop that will immediately precede the annual meeting. A draft agenda was circulated to the relevant SWP personnel (those participating); the agenda can be found: http://meetings.southwestcarbonpartnership.org/download/DRAFT_SWP_DataManagement_Agenda_2015_1027.pdf. Additionally, example files of data management plans for the SWP team were posted to use as a starting point for formulating an SWP-specific data management plan (<http://meetings.southwestcarbonpartnership.org/data-management-plans-examples/>). The pro-