



Plains CO₂ Reduction (PCOR) Partnership
Energy & Environmental Research Center (EERC)

Plains CO₂ Reduction (PCOR) Partnership Monthly Update July 1–31, 2012

PHASE III ACTIVITIES

Task 1 – Regional Characterization (Wesley D. Peck)

Highlights

- Continued to acquire updated cumulative oil production numbers for the fields and pools in the U.S. portion of the PCOR Partnership region. This effort includes gathering reservoir values in Montana, Nebraska, and Wyoming, such as original oil in place, porosity, permeability, and production acres, that will be used to update CO₂ enhanced oil recovery (EOR) estimates for many fields.
- Continued discussing options for the characterization of a third target area (Deliverable [D] 7, due September 2014).
- Began the annual update of the source attributes in the PCOR Partnership region (D1, due September 2012).
- Began review of the source data available through the U.S. Environmental Protection Agency (EPA) greenhouse gas reporting system.
- Continued gathering data for upload to the demonstration project reporting system located on the Decision Support System (DSS, © 2007–2012 EERC Foundation®).
- Programming and mapping staff attended the Esri International User Conference on July 23–27, 2012, in San Diego, California.
- Continued Rival oil field characterization efforts, including the following activities:
 - Performed uncertainty and sensitivity analysis on the updated geologic model.
 - Continued work on the drill stem test review and static pressure analysis.
 - Held a meeting with TAQA North, Ltd. (TAQA), at the Energy & Environmental Research Center (EERC) on July 11 and 12, 2012. Topics discussed included an update on the geologic and simulation model and action items.
 - Reran the 3-D modeling workflow and prepared additional uncertainty and sensitivity analysis cases based on TAQA input.
 - Continued work on the dynamic model.

Task 2 – Public Outreach and Education (Daniel J. Daly)

Highlights

- Prepared a draft script for the value-added video short focused on smart casing installation for carbon capture and storage (CCS) reservoir monitoring.
- Submitted an update the public Web site (D13) on July 31, 2012.

- Compiled a draft list of recommendations for revision of the “test-phase” outreach materials-tracking database.
- Gave a presentation (and distributed 50 tote bags containing PCOR Partnership outreach materials) at the Missouri Minerals Education Foundation 13th Annual “Missouri Is a State of Mines – Rocks, Minerals, and Our Environment” workshop held July 15–20, 2012, in Park Hills, Missouri (www.mmef.org/workshops.htm).
- Reviewed upcoming scheduled deliverables with management.
- Continued planning for a Prairie Public Broadcasting (PPB) filming trip to the Bell Creek site in August 2012 to capture the 3-D seismic survey and baseline surface water- and soil-sampling activities.
- Discussed filming schedules for the summer and fall of 2012 with PPB.
- Participated in an outreach advisory group conference call on July 8 for the Aquistore Project, led by the Petroleum Technology Research Centre (PTRC).
- Participated in monthly Outreach Working Group (OWG) conference call on July 19 in preparation for an OWG meeting scheduled on August 20 prior to the U.S. Department of Energy (DOE) Carbon Storage R&D Project Review Meeting in Pittsburgh, Pennsylvania.
- Discussed the OWG poster to be presented on message mapping at the upcoming 11th International Conference on Greenhouse Gas Technologies (GHGT-11) scheduled for November 18–22, 2012, in Kyoto, Japan.
- Provided a summary of the goals and objectives for PCOR Partnership outreach to the OWG on July 25.
- Began planning for the distribution of outreach materials at upcoming regional library association meetings.
- Initiated the preparation of a poster accepted for the DOE Carbon Storage R&D Project Review Meeting in Pittsburgh, Pennsylvania.

Task 3 – Permitting and NEPA (National Environmental Policy Act) Compliance (Lisa S. Botnen)

Highlights

- Attended the Enhanced Oil Recovery Institute (EORI) 6th Annual Wyoming CO₂ Conference held July 11 and 12, 2012, in Casper, Wyoming.
- Continued planning for and held the 4th Annual Regulatory Roundup meeting July 31 – August 1, 2012, in Deadwood, South Dakota.
- Sent out the agenda and travel information to Regulatory Roundup invitees.
- Began preparations to proceed with the research conducted with the Interstate Oil and Gas Compact Commission (IOGCC). Finalized subagreements are anticipated in early August.
- With regard to the Lignite Site (Phase II) closure: visited the site on July 19, 2012, to monitor the reclamation process with the following results:
 - Canadian thistle is present, triggering the need for weed spraying.
 - The missing solar panel for the electric fence is still under investigation.

Task 4 – Site Characterization and Modeling (James A. Sorensen)

Highlights

- Fort Nelson test site activities included the following:
 - Continued building a 1-D mechanical earth model (MEM) and began preparation of a summary and report.
 - Began planning for the 3-D MEM.
 - Created several plume maps.
 - Provided technical assistance to Spectra Energy on its presentations to the British Columbia Oil and Gas Commission and Spectra Energy upper management.
 - Continued work on improving the latest iteration of the static geologic model, particularly with respect to well log analysis and lithofacies distribution.
 - Continued the multimineral analysis of well logs for the updated static geologic model.
- Bell Creek test site activities included the following:
 - Continued work on the 1-D MEM.
 - Began planning for the 3-D MEM.
 - Continued work on the fieldwide 3-D geologic model, including the following:
 - ◆ Explored water saturation techniques.
 - ◆ Corrected gamma ray curves.
 - ◆ Continued integration of various core analyses data.
 - ◆ Computed the pressure gradient.
 - ◆ Continued petrophysics.
 - ◆ Analyzed wireline logs from monitoring well.
 - Continued work on the geomechanical model, including the following:
 - ◆ Finalized the 1-D model.
 - ◆ Initiated the 3-D model by incorporating the 1-D model results.
 - Continued work on the facies model, including the following:
 - ◆ Prepared digital core descriptions.
 - ◆ Began creating a poster for the upcoming 2012 American Association of Petroleum Geologists (AAPG) Rocky Mountain Section Meeting scheduled for September 9–12, 2012, in Grand Junction, Colorado.
 - Updated the PETRA database with new bottomhole pressure data and core permeability logs.
 - Continued sample selection for a CO₂ exposure study of 14 samples within the Mowry and Muddy Formations.

Task 5 – Well Drilling and Completion (John A. Hamling)

Highlights

- Began preparation of a technical presentation to be given to the PCOR Partnership Technical Advisory Board.
- Began preparation for the fourth round of baseline soil gas and water sampling MVA (monitoring, verification, and accounting) activities scheduled for August 2012.
- Continued work on a value-added preinjection surface water, groundwater, and soil gas baseline MVA sampling and analysis report including results.
- Continued evaluation of well completions throughout the Bell Creek Field.

- Finalized work on the Event 2 (April 23–29, 2012) landowner packages that include water analysis baseline MVA activities.
- Continued preparation of a mitigation plan under probable scenarios of vertical CO₂ migration.
- Continued deep surface-monitoring activities including an evaluation as to the feasibility of installing two deep groundwater-monitoring wells and planning preinjection baseline logging and seismic acquisitions.
- Staff attended the IEA Greenhouse Gas R&D Programme (IEAGHG) Environmental Impacts of CO₂ Storage Workshop held over 3 days in Bozeman, Montana.
- Continued planning for baseline MVA acquisitions, including seismic and pulsed-neutron well logs.

Task 6 – Infrastructure Development (Melanie D. Jensen)

Highlights

- Continued review of the interactive capture technology tree on the partners-only DSS test Web site.
- Attended the National Energy Technology Laboratory (NETL) CO₂ Capture Technology Meeting held July 9–13, 2012, in Pittsburgh, Pennsylvania. Progress on development and testing of 67 capture technology projects was presented at the conference.
- Attended advanced Integrated Environmental Control Model (IECM) training to learn techniques that can be used to perform “what-if” scenarios with the model. In addition, learned that the booster station calculator within the pipeline module will be included in the next update of the model, which is expected to be available within the next 6 months.
- Discussed pertinent information required to design compressors for use during in-field compression with Ramgen Power Systems personnel.
- Continued preparation of a paper and presentation on a phased approach to building a pipeline network for CO₂ transportation during CCUS (carbon capture, utilization, and storage) for the upcoming American Institute of Chemical Engineers National Meeting scheduled for October 30 – November 2, 2012, in Pittsburgh, Pennsylvania.
- Participated in an EERC-wide discussion of CO₂ capture activities that have been performed or are currently under way in-house. A summary of the PCOR Partnership Task 6 activities was presented.
- Prepared an outline for the paper on the phased approach to building a CO₂ pipeline network that will be submitted to GHGT-11.
- Hosted Nebraska Public Power District (NPPD) at a meeting on July 25, 2012. The discussion encompassed all projects performed at the EERC for NPPD as well as updates of PCOR Partnership activities, the PCOR Partnership Annual Meeting, and this task.

Task 7 – CO₂ Procurement (John A. Harju)

Highlights

- Participated in ongoing project discussions with Denbury.

Task 8 – Transportation and Injection Operations (Melanie D. Jensen)

Highlights

- Nothing to note at this time.

Task 9 – Operational Monitoring and Modeling (Charles D. Gorecki)

Highlights

- Prepared and gave a presentation on FLAC3D™ at the in-house monthly modeling and simulation meeting.
- Modeling staff participated in Schlumberger OFM (Oil Field Manager) Fundamentals training on July 30 and 31, 2012, in Houston, Texas.
- Continued Fort Nelson site activities, including the following:
 - Continued incorporating Spectra Energy's feedback into the development of the deep geologic system MVA plan.
 - Continued revisions to the MVA plan for surface and shallow subsurface based on recent discussions with Spectra Energy.
 - Submitted a brief status update on simulation activities (D67) on July 31, 2012.
- Continued Bell Creek site activities, including the following:
 - Continued work on the Phase 1 model prediction.
 - Continued work on the Bell Creek Test Site – Simulation Report, Update 1 (D66, due August 2012).
 - Participated in an in-house static modeling update meeting.
 - Participated in an in-house meeting to discuss various predictive simulation scenarios.
 - Discussed and reviewed water saturation calculations.

Task 10 – Site Closure (to be announced [TBA])

- This task is anticipated to be initiated in Quarter 1 – Budget Period (BP) 5, Year 9 (October 2015).

Task 11 – Postinjection Monitoring and Modeling (TBA)

- This task is anticipated to be initiated in Quarter 1 – BP5, Year 9 (October 2015).

Task 12 – Project Assessment (Katherine K. Anagnost)

Highlights

- The next assessment report is due by December 31, 2012.

Task 13 – Project Management (Charles D. Gorecki)

Highlights

- Continued planning for the upcoming PCOR Partnership Annual Meeting and Workshop scheduled for September 11–13, 2012, in Milwaukee, Wisconsin. The preliminary agenda is now posted online at www.undeerc.org/pcor12.

- Held a task leader meeting on July 26, 2012. Topics discussed included the upcoming annual meeting and workshop, a Regulatory Roundup recap, upcoming conferences, key Bell Creek project dates, and upcoming deliverables.
- Participated on July 17 and 18, 2012, in the Geologic CO₂ Sequestration: Reevaluating Storage Efficiency Estimates Workshop in Austin, Texas.
- Continued preparations for the 34th International Geological Congress, including two oral presentations (PCOR Partnership and Bell Creek) and one poster (Fort Nelson).
- Reviewed a draft DOE Techline on the latest version of the PCOR Partnership Atlas.
- Submitted five poster abstracts for the upcoming DOE Carbon Storage R&D Review Meeting, including the following:
 - “PCOR Partnership Phase III”
 - “Regional and Project-Based CCS Outreach – The PCOR Partnership Experience”
 - “CO₂ Storage Resource Potential of the Cambro-Ordovician Saline System in the Western Interior of North America”
 - “A Simulation Study of Simultaneous Acid Gas EOR Storage at Apache’s Zama F Pool”
 - “IEAGHG Investigation of Extraction of Formation Water from CO₂ Storage”
- Deliverables and milestones completed in July:
 - June monthly update
 - Task 2: D13 – Public Site Updates
 - Task 9: D67 – Fort Nelson Test Site – Simulation Report (Update)
 - Task 13: D58/D59 – Quarterly Progress Report/Milestone Quarterly Report
 - Task 14: M23 – Monthly Water Working Group (WWG) conference call held

Task 14 – Regional Carbon Sequestration Partnership WWG Coordination (Ryan J. Klapperich)

Highlights

- Distributed notes from the June 28, 2012, conference call.
- Distributed a listing of potential research projects and a listing of completed and ongoing water and energy research projects in preparation for the July monthly conference call.
- Held the monthly conference call on July 24, 2012.
- Discussed options for additional fact sheet development.

Task 15 – Further Characterization of the Zama Acid Gas EOR, CO₂ Storage, and Monitoring Project (James A. Sorensen)

Highlights

- Submitted a poster abstract entitled “A Simulation Study of Simultaneous Acid Gas EOR and CO₂ Storage at Apache’s Zama F Pool” for the DOE Carbon Storage R&D Project Review Meeting scheduled for August 21–23, 2012, in Pittsburgh, Pennsylvania.
- Compiled data from Apache Canada, Ltd., for updated injection and production volumes.
- Worked on running history-matching simulations for the model using updated production and injection data (current through May 2012).
- Continued work on the dynamic model for the F Pool pinnacle.

Task 16 – Characterization of the Basal Cambrian System (Wesley D. Peck)

Highlights

- Continued the multimineral analysis of the wells used in the development of the 3-D geologic model of the Cambro-Ordovician system.
- Began the geostatistical analysis of the wells with multimineral analysis. The effort will distribute the lithologic properties throughout the Cambro-Ordovician study area.
- Began development of a poster on the Cambro-Ordovician project for the DOE Carbon Storage R&D Project Review Meeting and GHGT-11.
- Continued work on the 3-D model of the Cambro-Ordovician saline system.
- Performed mineralogical analysis on 55 wells.
- Acquired missing resistivity logs.

Travel/Meetings

- July 8–12, 2012: Attended the NETL 2012 CO₂ Capture Technology Meeting in Pittsburgh, Pennsylvania.
- July 10–13, 2012: Attended the EORI 6th Annual Wyoming CO₂ Conference in Casper, Wyoming.
- July 16–18, 2012: Participated in the Geologic CO₂ Sequestration: Reevaluating Storage Efficiency Estimates Workshop in Austin, Texas.
- July 16–19, 2012: Participated in the IEAGHG Environmental Impacts of CO₂ Storage Workshop in Bozeman, Montana.
- July 19, 2012: Traveled to the Phase II Lignite site near Kenmare, North Dakota.
- July 19–21, 2012: Presented at the Missouri Mineral Education Foundation Teacher Workshop in Park Hills, Missouri.
- July 22–27, 2012: Attended the Esri International User Conference in San Diego, California.
- July 26 – August 1, 2012: Attended Schlumberger OFM Fundamentals Training in Houston, Texas.
- July 29 – August 1, 2012: Hosted the 4th Annual Regulatory Roundup in Deadwood, South Dakota.

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