



Plains CO₂ Reduction (PCOR) Partnership Monthly Update October 1–31, 2011

PHASE III ACTIVITIES

Task 1 – Regional Characterization (Wesley D. Peck)

Highlights

- Continued efforts on the revised Atlas (4th edition).
- The updated geographic information systems (GIS) application went “live” on the partners-only Web site (www2.undeerc.org/website/PCORP/DSS/).
- Attended the North Dakota GIS Users Conference 2011 in Grand Forks October 11–13 (www.nd.gov/gis/news/20100203.html).
- Continued efforts on the Rival Field characterization, including the following:
 - Continued work on the petrophysical report.
 - Hosted a meeting on October 20 and 21 to review characterization findings with visitors from TAQA North Ltd (TAQA).
 - Continued drafting Deliverable D5, second target area completed, due March 2012.

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

Highlights

- Attended and presented at the Society of Petroleum Engineers (SPE) Forum Series entitled “CO₂ Geological Storage: Will We Be Ready in Time?” in Algarve, Portugal (www.spe.org/events/11fse3/pages/about/index.php). Presented on the Regional Carbon Sequestration Partnership (RCSP) outreach best practices manual and PCOR Partnership outreach experiences.
- Drafted a filming schedule for the drilling and installation of the monitoring well at Bell Creek based on the revised drilling date range between November 20 and December 1.
- Began preparation of presentations to be given at the upcoming Prairie Public Broadcasting (PPB) Prairie Energy & Carbon Teacher Training Institute November 18 and 19 in Grand Forks, North Dakota.
- Staff attended the Education Minnesota Professional Conference (www.educationminnesota.org/en/events/conference.aspx) in Minneapolis, Minnesota, October 20 and 21 as a basis for assessing future involvement in that venue and prepared a trip report following attendance at the conference.

- Attended PPB's "master" teacher training session to discuss lesson plans to incorporate the PCOR Partnership video materials.
- Attended a presentation on October 14 entitled "Social Change, Culture, and Human Development: The Role of Technology" sponsored by the University of North Dakota College of Education and Human Development.
- Continued revisions to the Fort Nelson poster (D26) based on comments received from Spectra Energy.
- Continued efforts to update the public Web site (D13, due July 2012).
- Continued efforts to develop an outreach tracking database.
- Continued to develop outreach materials to address natural storage of CO₂, gas field chemical composition, unconventional oil and gas resources, and related topics.

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

Highlights

- Attended the Interstate Oil and Gas Compact Commission (IOGCC) annual meeting October 15–17 in Buffalo, New York.
- Hosted a breakfast meeting for PCOR Partnership regulatory members, including representatives from Alberta, Canada; South Dakota; North Dakota; Montana; and the IOGCC, on October 17 during the IOGCC Annual Meeting in Buffalo, New York.
- Presented a PCOR Partnership overview to the Public Lands Committee of the IOGCC.
- Attended the Energy & Environmental Research Center's (EERC's) Air Quality VIII Conference in Arlington, Virginia, and coordinated a session on carbon management and policy.
- Continued efforts on the Lignite Phase II site closure and reclamation, including the following:
 - Rescheduled seeding planned for October 24 to November.

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

Highlights

- Attended the Storage in Saline Formations R&D Workshop October 18 and 19 in Pittsburgh, Pennsylvania.
- Bell Creek test site activities included the following:
 - Held an in-house Bell Creek update meeting on October 3 to discuss the monitoring well; surface and deep monitoring, verification, and accounting (MVA) plans; status of modeling; LIDAR corrections; and upcoming deliverables.
 - Held an in-house Bell Creek update meeting on October 17 to discuss additional work for Bell Creek samples. Potential scope includes permeability, relative permeability, x-ray diffraction, x-ray fluorescence, and scanning electron microscope (SEM).
 - Continued development of the core analysis plan.
- Fort Nelson test site activities included the following:
 - Hosted the monthly Fort Nelson management conference call on October 11. Topics discussed included the 2010 risk assessment report, status of winter drilling and characterization activities, and a review of the action item list.

- Held conference call with Spectra Energy to discuss an integrated project schedule and continued development of MVA plans and revisions.
- Distributed minutes from the October 11 conference call on October 26.
- Sent a draft of the “Monitoring, Verification, and Accounting Plan – Surface and Shallow Subsurface” report to Spectra Energy for review on October 14.
- Continued work on the geomechanical model.
- Continued work on updating the 2011 static geological model.
- Continued finalization of a draft report presenting the results of geochemical experiments conducted over the course of 2009–2011.
- Continued the process of reconciling the various data packages that are associated with the 2009 Fort Nelson wellbore characterization and core analyses to ensure the quality and accuracy of data relative to the specific rock formation intervals being evaluated.
- Continued preparation of the site characterization report (D65, due December 2011).

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

Highlights

- Continued preparations for the first surface water, soil gas, and groundwater monitoring baseline sampling trip scheduled to begin on November 1.
- Continued planning for the core analysis plan.
- Continued work in material procurement and design of permanent downhole monitoring equipment for the monitoring well in conjunction with Sandia Technologies and Denbury.
- The gas chromatograph for soil gas sampling arrived on October 7, and setup is complete.
- Participated in in-house training on the gas chromatograph.
- Continued training for MVA field sampling personnel in-house.
- Continued work on selecting a company to provide casing-conveyed perforating services and associated activities.
- Held weekly conference calls with Denbury to discuss well drilling and completion operations.

Task 6 – Infrastructure Development (Melanie D. Jensen)

Highlights

- Continued adapting information from the capture technologies table (included as an appendix in the value-added capture technologies overview report) as an interactive technology tree on the PCOR Partnership Decision Support System (DSS, © 2007–2011 EERC Foundation®).
- Began preliminary plans to attend Nebraska Public Power District’s Power Summit (www.nppd.com/our_community/environment/additional_files/power_summit.asp) on November 16 in Lincoln, Nebraska.
- Performed various runs of the Integrated Environmental Control Model as part of information gathering to answer a PCOR Partnership partner’s question.

Task 7 – CO₂ Procurement (John A. Harju)

Highlights

- Participated in ongoing project discussions with Denbury Onshore LLC.

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

Highlights

- Staff attended the PetroSkills “CO₂ Surface Facilities” training course (www.petroskills.com/courseDetails.aspx?courseID=532) held October 3–6, 2011, in Midland, Texas.
- Labeled approximately 120 photographs taken during the field trip to the Whiting CO₂ Recovery Plant near Wickett, Texas, during attendance at the PetroSkills “CO₂ Surface Facilities” training course. The photos will be made available to the PCOR Partnership for use in presentations and reports.
- Prepared a preliminary list of questions for Denbury facility engineers for the Bell Creek site. Communication with the engineers will enable Task 8 staff to better contribute to the project in a way that is the most useful to Denbury.

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

Highlights

- Began review of course materials from “Practical Reservoir Simulation” to help connect the geologic side of modeling with simulation and history matching.
- Held in-house discussion on building experimental capabilities for PVT (pressure-volume-temperature) and MMP (minimum miscibility pressure) measurements.
- Reviewed recent advances in geomechanical modeling for CO₂ sequestration.
- Modeling staff attended an “Introduction to CMOST” training course October 6 and 7 in Houston, Texas.
- Modeling staff attended a “CO₂ Sequestration with GEM” training course October 12 and 13 in Houston, Texas.
- Modeling staff attended a “Petrel Fracture Modeling” training course October 17 and 18 in Houston, Texas.
- Participated in the RCSP Sim/Risk monthly conference call on October 25.
- Continued Bell Creek site activities, including the following:
 - Updated project graphics using the geologic model.
 - Worked on revisions to the report on subnormal pressure mechanism in Bell Creek Field.
 - Continued work on history matching.
 - Continued efforts on the Bell Creek simulation report.
- Continued Fort Nelson site activities, including the following:
 - Held conference call with Spectra Energy to discuss Monte Carlo analysis conducted for the risk assessment report.
 - Finalized the confidential “2010 Subsurface Technical Risk Assessment” and transmitted the same on October 14 to Spectra Energy.

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

- Began work on the project assessment report (D57) for the period October 1, 2010 – September 30, 2011, due December 31, 2011. The report for the previous program year is available on the partners-only Web site (www2.undeerc.org/website/pcorp/Products/DB/pdfs/ENS_D57_Task12_Dec10.pdf).

Task 13 – Project Management (Charles D. Gorecki)

Highlights

- Staff presented at the New Horizons Oil and Gas Conference at the South Dakota School of Mines, including the following:
 - Participated in a panel discussion on CO₂.
 - Gave a presentation entitled “PCOR Partnership: Investigating Carbon Management Options in North America's Interior Plains.”
- Hosted Bill Jackson, BillyJack Consulting, at the EERC on October 7.
- Coordinated and presented at the EERC’s Air Quality VIII preconference workshop on carbon management on October 23.
- Attended, presented, and coordinated two sessions at the EERC’s Air Quality VIII Conference in Arlington, Virginia, held October 24–27, 2011 (<http://undeerc.org/aq8/eventschedule.aspx>).
- Held in-house Bell Creek update meetings on October 3 and 17.
- Held an in-house group update on October 5.
- Attended and presented at the “Storage in Saline Formations R&D Workshop” October 19–20, in Pittsburgh, Pennsylvania.
- Reviewed and submitted comments on a manuscript entitled “Impacts of Fluvial Sedimentary Heterogeneity on the Connectivity: Implications for Capacity Estimate of CO₂ Geological Storage” for the International Journal of Greenhouse Gas Control.
- Held an in-house meeting to discuss Year 5 budgets for the project.
- Held an in-house meeting to discuss the new technical advisory board.
- Held a monthly task leader meeting on October 17. Topics discussed included feedback from the annual meeting and plans for the 2012 meeting, the creation of an advisory board, upcoming visitors, budgets, proposals, deliverables, and updates from each task leader.
- Continued efforts toward populating and updating the partners’ database, which was programmed in-house.
- Continued the site and date selection process for the 2012 annual meeting. Preliminary plans are to hold it in September.
- Continued preparation of a presentation on the PCOR Partnership to be presented on November 17 at the Carbon Storage Program Infrastructure Annual Review Meeting in Pittsburgh, Pennsylvania.

- Continued preparation of papers due by November 21 for the 2012 Carbon Management Technology Conference (CMTc), including the following:
 - (CMTc-151349-PP) “A Risk-Based Monitoring Plan for the Fort Nelson Feasibility Project”
 - (CMTc-151476-PP) “Integrating CO₂ EOR (enhanced oil recovery) and CO₂ Storage in the Bell Creek Oil Field”
 - (CMTc-151566-PP) “PCOR Partnership”
- Deliverables and milestones completed in October:
 - September monthly update
 - Task 13: D58/D59 – Quarterly Progress Report/Milestone Quarterly Report
 - Task 14: M23 – Monthly WWG Conference Call Held

Task 14 – RCSP Water Working Group (WWG) Coordination (Ryan J. Klapperich)

Highlights

- Discussed progress of NatCarb activities with Maneesh Sharma.
- Continued review of a list of WWG outreach survey questions.
- Began discussions on a WWG outreach survey with in-house staff.
- Distributed minutes from the September conference call.
- Held the October conference call on October 26.
- Officially announced change of WWG administrative support staff from Heather Altepeter to Nola Pithey.
- Held conference call to discuss the needs and goals of the NatCarb brine database project.

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

Highlights

- Continued work on the modification of the dynamic model and ran several simulations for obtaining an initial history match.

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

Highlights

- Continued preparation of a poster entitled “CO₂ Storage Characterization of the Basal Aquifer System in the Northern Plains – Prairie Region of North American” for presentation at the U.S. Department of Energy (DOE) Carbon Storage Program Infrastructure Annual Review Meeting on November 16 in Pittsburgh, Pennsylvania.
- Work continues on the final preparation of the 2-D model of the basal aquifer system. The latest step involves integration of geothermal data to accurately estimate the density of CO₂ at the varying target depths across the study region.
- Hosted visitors from Alberta Innovates – Technology Futures October 18 and 19 to discuss data integration concepts and work flow logistics. Visited the Wilson M. Laird Core Library on the campus of the University of North Dakota.

- Obtained six plug samples and two additional chunks of the Deadwood Formation on October 13.
- Examined Deadwood Formation core from three wells. Resulting discussion focused on the similarities and differences between the basal sedimentary units in the central portion of the Williston Basin to those in the Alberta Basin and northern portions of the Williston Basin.
- Work began on SEM and baseline permeability measurements for the characterization activities occurring on the formation.
- Held an in-house working group meeting on October 5.
- Held an in-house project update meeting on October 31.

Travel/Meetings

- October 2–7, 2011: Participated in a PetroSkills course titled “CO₂ Surface Facilities” in Midland, Texas.
- October 5–13, 2011: Attended Computer Modelling Group training courses (2 days each) titled “CMOST” and “CO₂ Sequestration with GEM” in Houston, Texas.
- October 7, 2011: Presented at the New Horizons Oil and Gas Conference at the South Dakota School of Mines in Rapid City, South Dakota.
- October 7–15, 2011: Presented at the SPE Forum “CO₂ Geological Storage: Will We Be Ready in Time?” held in The Algarve, Portugal.
- October 10, 2011: Participated in the PPB master teacher training group in Fargo, North Dakota.
- October 11–13, 2011: Attended the 2011 North Dakota GIS Users Conference in Grand Forks, North Dakota.
- October 15–18, 2011: Attended the IOGCC Annual Meeting and the PCOR Partnership Regulatory Group breakfast meeting in Buffalo, New York.
- October 16–19, 2011: Attended Schlumberger’s training course entitled “Petrel Fracture Modeling” in Houston, Texas.
- October 18–20, 2011: Presented at the Storage in Saline Formations R&D Workshop in Pittsburgh, Pennsylvania.
- October 20–21, 2011: Attended the Education Minnesota Professional Conference in Minneapolis, Minnesota.
- October 22–27, 2011: Participated in the Air Quality VIII Conference: An International Conference on Carbon Management, Mercury, Trace Substances, SO_x, NO_x, and Particulate Matter, and the preconference Carbon Management Workshop in Arlington, Virginia.
- October 28 – November 13, 2011: Traveled to perform baseline sampling in the Bell Creek oil field, Montana.

DOE DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government, nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

NDIC DISCLAIMER

This report was prepared by the Energy & Environmental Research Center (EERC) pursuant to an agreement partially funded by the Industrial Commission of North Dakota, and neither the EERC nor any of its subcontractors nor the North Dakota Industrial Commission nor any person acting on behalf of either:

- (A) Makes any warranty or representation, express or implied, with respect to the accuracy, completeness, or usefulness of the information contained in this report or that the use of any information, apparatus, method, or process disclosed in this report may not infringe privately owned rights; or
- (B) Assumes any liabilities with respect to the use of, or for damages resulting from the use of, any information, apparatus, method, or process disclosed in this report.

Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the North Dakota Industrial Commission. The views and opinions of authors expressed herein do not necessarily state or reflect those of the North Dakota Industrial Commission

EERC DISCLAIMER

LEGAL NOTICE: This research report was prepared by the EERC, an agency of the University of North Dakota, as an account of work sponsored by the U.S. Department of Energy. Because of the research nature of the work performed, neither the EERC nor any of its employees makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement or recommendation by the EERC.