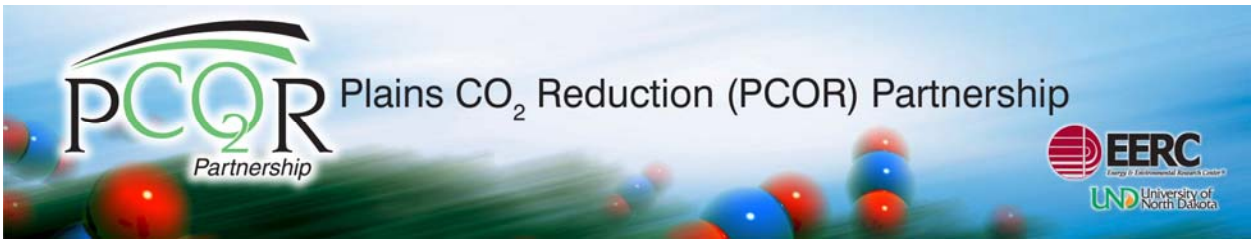

Plains CO_2 Reduction (PCOR) Partnership Monthly Update
July 1–31, 2008

PHASE II ACTIVITIES

Task 1 – Project Management and Reporting (Edward N. Steadman/John A. Harju)

Highlights

- Revisions are being made to the 2nd edition of the PCOR Partnership Atlas, which will be ready for distribution at the 2008 PCOR Partnership Annual Meeting in September.
- The Manitoba Geological Survey has joined the PCOR Partnership. As of July 31, 2008, Phase II of the PCOR Partnership has 77 partners.
- Preparations for the 2008 PCOR Partnership Annual Meeting continue. The dates are September 16–18, 2008, in Minneapolis, Minnesota.
  - Web site registration and the draft agenda are now available.
- The following Phase II Deliverables/Milestones were submitted for July:
  - D3: Task 1 – Quarterly Report
- Upcoming Phase II Deliverables/Milestones for August:
  - M11/D41: Task 2 – Williston Basin Field Validation Test National Environmental Policy Act (NEPA) Compliance Document Completed
  - D40: Task 2 – Williston Basin Field Validation Test Regulatory Permitting Action Plan

Task 2 – Field Validation Test at a Williston Basin Oil Field, North Dakota (James A. Sorensen)

Highlights

- Evaluation continues of oil fields in the Williston Basin that may be suitable candidates to host the Task 2 injection and monitoring, mitigation, and verification (MMV) activities. Efforts are focused on developing baseline characterization data for fields in the Cedar Creek Anticline area, the Billings Anticline–Dickinson area, along the Nesson Anticline, and the Northeast Flank. Specifically, efforts were focused on developing a petrophysical model of the Rival oil field, which has been determined to be a potential host site for the Phase II demonstration.
- Laboratory tests were continued to examine the geochemical interactions between CO_2, saline water, and rocks. Rock examined included carbonate rocks that are representative of reservoir rocks being considered as potential target injection zones for the Williston Basin demonstration. Anhydrites and shales that may act as caprocks have also been examined. Preliminary results indicate that some changes in mineral composition can and do occur. It is anticipated that a series of these tests, using a variety of rock types, will continue to be conducted over the summer and fall of 2008, with the primary purpose being the development of rate of reaction data that can be used to refine geochemical models.

Task 3 – Field Validation Test at Zama, Alberta, Canada (Steven A. Smith)

Highlights

- An in situ caprock stress test was conducted on the Muskeg Formation caprock in the Zama Field on July 30, 2008. This test was run to determine the minimum and maximum horizontal stress in this rock as an indication of the overall rock strength and fracture threshold. This type of test is a direct measurement of stress and is generally only obtained through calculations based on laboratory studies on rock core. Preliminary field results for three test intervals are listed below and will be evaluated with regard to ongoing geomechanical modeling activities:
  - **Anhydrite Test Interval No. 1: 1469.1 – 1470.1 m MD** – the Modular Dynamics Tester on this interval could not induce a fracture in over an hour and with a pressure 3200 psi greater than hydrostatic pressure (approximately 2100 psi) and using the maximum pressure that the pump could attain. This suggests a very competent caprock which is difficult to fracture. This interval had to be fractured hydraulically because 10 m of open hole above the tool is required in order to use the mechanical fracture propogation technique.
  - **Anhydrite Test Interval No. 2: 1456.1 – 1457.1 m MD** – the same as above, although the mechanical fracture propogation technique was used, and still no fracture could be initiated.
  - **Dolomite Test Interval No. 1: 1463.2 – 1464.2 m MD** – fracture was initiated and propogated. Breakdown occurred at 5800 psi (approximately 3700 psi greater than reservoir pressure).

Task 4 – Field Validation Test of Lignite Coal in North Dakota (Lisa S. Botnen)

Highlights

- Water analysis results continue to be received from swabbing activities on the various wells. Reviews of the results indicate that we have yet to get a sample of the formation fluid. Work continues to try to obtain an accurate formation fluid sample; however, this may be difficult.
- At this time, well development activities continue on all wells except the injector. Acid jobs have been completed and subsequent swabbing has occurred. Fluid entry remains minimal.
- The work plan for well stimulation continues to be developed and revised based on information that is gathered from each well.
- A nitrogen falloff test was conducted on North Dakota State Well 36-16. The results of this test have shown our target seam to be underpressured and apparently isolated from the surrounding strata. Nitrogen tests will be completed in the same zone on two other wells to verify the results from the first test.
- A meeting was held with state regulators to discuss the status of the project, namely the results of the nitrogen test and lack of formation fluid. A fluid sample is needed from the formation in order for the U.S. Environmental Protection Agency (EPA) to issue an aquifer exemption. This exemption is needed before CO_2 injection can occur. It has been decided to go back to EPA with results from the stimulation activities and nitrogen tests and inform them that the target coal seam is not a producible aquifer; therefore, the quality of the water in it is a moot point. Following the completion of the two additional nitrogen tests, all applicable data will be assembled. Once the information gathering is complete, it will be provided to the North Dakota Industrial Commission (NDIC). They will then put together a package to send to EPA.

- Negotiations are continuing with Praxair to supply and inject CO_2 at the site. A meeting will be held in early August with Praxair and the project team to go over logistics for the injection phase of the project.
- Discussions are ongoing with Pinnacle and Schlumberger with regard to MMV activities.
- Stochastic simulation and deterministic estimation geostatistical methods have been employed to populate the subsurface geologic model with structural, physical, and chemical properties. This model will be used to estimate reservoir capacity with respect to CO_2 storage or sequestration ability. Model development is ongoing.
- Form 4, Sundry Notice has been submitted to NDIC to document work that has been completed on North Dakota State Well 36-16.
- Measurements of water levels and pressure in the wells continue to be taken on a regular basis.

Task 5 – Terrestrial Validation Test (Barry W. Botnen)

Highlights

- Field activities for the 2008 wetland catchment sampling season continue.
  - The Goebel Ranch and the Ipswitch Grasslands areas were sampled two times in July (854 gas samples from 17 wetlands were collected). These samples are being analyzed.
  - Additional information on soil moisture, soil and water temperature, water depth, and vegetative cover were collected.
  - Haying treatments were applied to selected wetland catchments on July 16, 2008.
- Grassland sampling has been completed in Montana and north central North Dakota. Sampling is currently being conducted in Iowa.
- The carbon tracking system (Oracle-based database) is complete and is operational.
- PCOR Partners continue to work towards obtaining ISO 14064-2 verification for grassland carbon credits.
- Ducks Unlimited, Inc. (DU), continues to make progress with respect to its carbon credit program. It has currently secured over 17,000 acres of private grasslands, with an initial goal set at 30,000 acres. Future projects are in process.
- As part of the wetlands study, an in situ experiment on nitrogen amendments on greenhouse gas (GHG) emissions continues.
- Draft topical report "Market Development for Terrestrial Sequestration on Private Lands" is in final review (Energy & Environmental Research Center [EERC]).
- Evaluation of other state and regional GHG or cap-and-trade program rules and policies and the U.S. Department of Energy (DOE) guidelines for aggregators and terrestrial offset providers is under way.
- The DU–PCOR Partnership terrestrial project Web site continues to be updated.
- Work on characterization inputs and the terrestrial portion of the Decision Support System (DSS, ©2007 EERC Foundation) continues.

Task 6 – Continued Characterization of Regional Sequestration Opportunities (Wesley D. Peck /Erin M. O'Leary)

Highlights

- New layout options for the DSS pages were discussed internally.

- Work began on the first steps in the potential migration of the PCOR Partnership DSS data to a formal geodatabase.
- Security issues related to brute force attacks on the PCOR Partnership SQL Server applications on both Helium and Hydrogen servers are being addressed. A method has been found to automatically block IP addresses attempting brute force attacks, but further work needs to be done to implement this procedure on the servers.
- In response to a request from NatCarb, the sources in the PCOR Partnership region were resubmitted with an additional attribute for fuel type. Apparently the total national CO_2 output as determined from the partnerships is quite different from that of EPA's eGrid database and the inclusion of the fuel types from the partnership's data may help explain this difference.
- Iowa Geological Survey agreed to present at the PCOR Partnership Geology Work Group meeting being held the afternoon before the annual meeting.
- Several pipeline-related maps were created for a report being compiled.
- An updated Williston Basin oil field map that is currently used by several members of the PCOR Partnership team was created.

Task 7 – Research, Safety, Regulatory, and Permitting Issues (Lisa S. Botnen)

Highlights

- The group provided additional review of World Resources Institute's (WRI's) Guidelines for Carbon Capture and Sequestration.
- Review of EPA's Advanced Notice of Proposed Rulemaking (ANPR) for regulating GHG emissions under the Clean Air Act (CAA) continued.
- Review of EPA's proposed rules for regulating geological sequestration under the Underground Injection Control (UIC) program began.
- Form 4, Sundry Notice has been submitted to NDIC for the Lignite Field Validation Test to document work that has been completed on State of North Dakota Well 36-16.
- Various state, provincial, and regional GHG reduction and carbon capture and storage (CCS) initiatives are being tracked and analyzed.
- Analysis of carbon market strategies continues.
- Legislative actions occurring in Congress continue to be followed and reviewed for any implications relating to carbon capture and storage.
- Recent publications relating to regulating CO_2 sequestration and MMV issues continue to be reviewed.

Task 8 – Public Outreach and Education (Daniel J. Daly)

Highlights

- D39: Task 8 – Documentary: Terrestrial CO_2 Sequestration and M10: Task 8 – Documentary: Terrestrial CO_2 Sequestration Reported
  - The documentary was reviewed internally at the EERC. Prairie Public Broadcasting (PPB) addressed the EERC's comments and the documentary is now ready for final EERC review (scheduled for August).
  - The documentary will be aired in the PPB area in late September.
  - The documentary will feature an introduction by the EERC; interviews for this piece are being scheduled for August.

- D46: Task 8 – Documentary: Geologic Sequestration
  - On July 18, 2008, DOE approved moving the due date to December 31, 2008.
  - The video from the trip to New Mexico and Texas was reviewed. Film clips were identified, and a list of clips was provided to PPB.
  - Arrangements are being made to obtain interviews and location footage in western North Dakota and in the Washington, D.C., area.
  - An animation list is being developed and discussions were held with 3D Animation.
- Deliverable D51: Documentary: CO_2 Sequestration and Global Warming – Overview of Phase II Results for Regional Partnership
  - DOE approved the postponement for the final documentary on July 18, 2008.
  - Contract modifications were initiated for PPB to cover animation costs for geologic video, travel, and partner features for the documentary.

Task 9 – Identification of Commercially Available Sequestration Techniques Ready for Large-Scale Deployment (Melanie D. Jensen/Michael L. Jones)

Highlights

- Deliverable D44: Task 9 – Best Practice Manual: Regional Sequestration Opportunities was submitted to DOE for review on July 31, 2008.

Task 10 – Regional Partnership Program Integration (Edward N. Steadman)

Highlights

- The PCOR Partnership submitted a proposal to the International Energy Agency (IEA) GHG Programme Storage Capacity Coefficients request. The proposal was chosen by IEA on July 22, 2008.
- The draft of the WRI's Sequestration Guidelines were received on May 13, 2008, for review. Two rounds of comments were sent back in July.
- A poster presentation was completed for Marathon Oil. On July 22, 2008, Marathon showcased initiatives and research results that the PCOR Partnership is conducting in the Williston Basin.
- The PCOR Partnership also continued participation in working group conference calls, including the following:
  - Geographic information system (GIS)
  - Capture and transportation
  - Geologic
  - Outreach

PHASE III ACTIVITIES

Task 1 – Regional Characterization (Wesley D. Peck/Erin M. O'Leary)

Highlights

- Two DVDs from the Missouri Department of Natural Resources (Geological Survey) containing scanned images of their oil/gas/water/coal well e-logs were received.
- Various sequestration capacity maps for inclusion into an IEA proposal were modified.
- Two new geologic block diagrams to represent the Williston Basin and the Fort Nelson areas were created.
- An e-mail invitation was sent out to the PCOR Partnership Geology Working Group members regarding the side meeting to be held the afternoon prior to the 2008 annual meeting in September.
  - Missouri Geological Survey has agreed to present.
- Four images for inclusion into a "baseball card" (which details Phase III Demonstration Projects) were completed.

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

Highlights

- D12: Task 2 – Demonstration Web Pages on the Public Site were submitted to DOE for review on July 31, 2008.
- D21: Task 2 – Williston Basin Test Site 15-minute Documentary and D22: Task 2 – Fort Nelson Test Site 15-minute documentary
  - Based on a recommendation in a June 24, 2008, meeting with PPB and further discussion, the EERC will be seeking approval from DOE to change the 15-minute documentaries to 30-minute documentaries that will be broadcast on PPB.
- Received notification that the following deliverables were approved by DOE:
  - D11 – Outreach Plan
  - D14 – General Phase III Fact Sheet
  - D17 – General Phase III Information PowerPoint Presentation
- Efforts continued on developing the Outreach Information System and educational materials.
- Outreach Working Group
  - The "baseball card" (which details Phase III Demonstration Projects) for the 9th International Conference on Greenhouse Gas Technology Conference (GHGT-9) meeting was completed.

Task 3 – Permitting and NEPA Modeling (Lisa S. Botnen)

Highlights

- Various state, provincial, and regional GHG reduction and CCS initiatives are being tracked and analyzed.
- An update to the regulatory section of the DSS is under development.
- Work continues on the NEPA questionnaire for the Williston Basin Test.
- Additional review of WRI Guidelines for Carbon Capture and Sequestration was provided.
- Review of EPA's ANPR for regulating GHG emissions under the CAA continued.
- Review of EPA's proposed rules for regulating geological sequestration under the UIC program began.
- Legislative actions occurring in Congress continue to be followed and reviewed for any implications relating to carbon capture and storage.
- Recent publications relating to regulating CO_2 sequestration and MMV issues continue to be reviewed.
- Analysis of carbon market strategies continues.

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

Highlights

- The EERC met with Spectra Energy, Natural Resources Canada, and Schlumberger in Calgary, Alberta, July 8–11, 2008, to discuss the key elements of the MMV plan for the Fort Nelson Demonstration.
- Spectra Energy has stated that it has tentatively scheduled a start date of September 15, 2008, for drilling the exploration well at the Fort Nelson site.
- Development of Baseline Characterization Experimental Design Package for the Williston Basin site continued.
- Regional Characterization Activities
  - Continued development of a petrophysical model of saline formation systems in the Washburn Study Area.
  - Updating the oil field data in the DSS continued. Information for the state of North Dakota has been completely updated. Working with relevant agencies in other states and provinces to facilitate the updating process.

Task 5 – Well Drilling and Completion (TBA)

This task has not begun (Quarter 1 – Budget Period 3; Year 2). Once activities are initiated, the information will be communicated and detailed in the quarterly progress report.

Task 6 – Infrastructure Development (Melanie D. Jensen)

Highlights

- Efforts to verify the source locations using a variety of techniques, particularly Google Earth, were completed.
  - Work was done to combine the various files into an Excel file that contains all of the point source emission data for the PCOR Partnership region, including the verified

location coordinates. This was completed and reviewed by the task leader. The file was submitted for downloading to the PCOR Partnership DSS.

- Efforts to identify and confirm speakers for the capture workshop that will be held in conjunction with the 2008 PCOR Partnership Annual Meeting continued. Two more speakers were confirmed.
- Ramgen personnel submitted a report covering their efforts on this task during May and June 2008. This report was included with the April–June 2008 Quarterly Report for this task.
- A PowerPoint presentation of capture technologies was prepared for visitors from Israel who have an interest in carbon sequestration.
- PowerPoint slides summarizing the capture of CO_2 from the PCOR Partnership region's ethanol plants (as detailed in the Phase II Deliverable D44) were prepared for presentation at the PCOR Partnership Annual Meeting.
- There was participation in a conference call with WRI regarding the newest version of the draft CCS document it has prepared.
- Information regarding the preliminary regional CO_2 pipeline routing that was performed for a Phase II, Task 9 topical report (Deliverable 44) was submitted to the task leader responsible for the DSS.
- An updated table of CO_2 capture technologies was submitted to the task leader responsible for the DSS. This will replace the table that had been submitted approximately a year ago and was found to have broken Web links. It contains updated information on the technologies of interest at that time as well as information about technologies that have been developed since.

Task 7 – CO_2 Procurement (John A. Harju)

Highlights

- Numerous discussions with potential CO_2 suppliers have taken place. Because of the sensitive nature of negotiations, specifics cannot be shared at the present time.

Task 8 – Transportation and Injection Operations (TBA)

This task has not begun (Quarter 1 – Budget Period 4; Year 3). Once activities are initiated, the information will be communicated and detailed in the quarterly progress report.

Task 9 – Operational Monitoring and Modeling (TBA)

This task has not begun (Quarter 1 – Budget Period 4; Year 3). Once activities are initiated, the information will be communicated and detailed in the quarterly progress report.

Task 10 – Site Closure (TBA)

This task has not begun (Quarter 1 – Budget Period 5; Year 9). Once activities are initiated, the information will be communicated and detailed in the quarterly progress report.

Task 11 – Postinjection Monitoring and Modeling (TBA)

This task has not begun (Quarter 1 – Budget Period 5; Year 9). Once activities are initiated, the information will be communicated and detailed in the quarterly progress report.

Task 12 – Project Assessment (Stephanie L. Wolfe)

- This task has not begun (Quarter 1 – Budget Period 3; Year 2). Once activities are initiated, the information will be communicated and detailed in the quarterly and annual progress reports.
- Future activities include the Project Assessment Annual Report due December 31, 2008.

Task 13 – Project Management (Edward N. Steadman)

Highlights

- A Risk Management Plan (RMP) outline is due within Budget Period 3. An initial draft of the RMP has been started.
  - The risk management database research has also begun; initial contact has been made with consulting services.
- The Project Management Plan (PMP) (Deliverable D63) is currently being revised to include updates on deliverable/milestone submissions and planned risk management activities. The PMP was originally submitted to DOE in December 2007.
- Current and pending CO_2-related projects within the PCOR Partnership region are continuously changing. To better inform our partners, a Web site is presently being developed to exhibit CO_2 projects by location, parties involved, and Web site links to learn more about them.
- Work is under way to provide our partners with a topical report on past, present, and future carbon market activities.
- The following deliverables/milestones were completed in July:
  - D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report
  - D12: Task 2 – Demonstration Web Pages on the Public Site
- Upcoming Phase III Deliverables/Milestones for August:
  - D31: Task 4 – Williston Basin Test Site – Geological Characterization Experimental Design Package

Travel/Meetings for Phase II and III

- July 5–8, 2008: Meeting with PCOR Partnership partners on the Fort Nelson and Zama Projects in Calgary, Alberta
- July 7–11, 2008: Meeting with partners to discuss Phase III demo and Zama project in Calgary, Alberta
- July 8–11, 2008: Computer Modeling Group Ltd. Technical Symposium in Calgary, Alberta
- July 8–11, 2008: Met with Spectra Energy, Natural Resources Canada, and Schlumberger in Calgary , Alberta
- August 4–8, 2008: Attend the Environmental Systems Research Institute International User Conference GIS: Geography in Action meeting in San Diego, California
- August 5, 2008: Project meeting with Praxair in Minot, North Dakota

- August 13–15, 2008: Coal-Gen in Louisville, Kentucky
- August 25–28, 2008: Attend the Power Plant Air Pollutant Control “Mega” Symposium in Baltimore, Maryland
- September 16–18, 2008: PCOR Partnership Annual Meeting in Minneapolis, Minnesota
- September 29 – October 2, 2008: Pittsburgh Coal Conference in Pittsburgh, Pennsylvania
- October 6–8, 2008: Regional Partnerships Annual Review Meeting in Pittsburgh, Pennsylvania
- November 16–20, 2008: GHGT-9 in Washington, D.C.
- February 1–4, 2008: Electric Utilities Environmental Conference 2009 – Clean Air, Mercury, Global Warming & Renewable Energy in Phoenix, Arizona