



Plains CO₂ Reduction (PCOR) Partnership Monthly Update June 1–30, 2011

PHASE III ACTIVITIES

Task 1 – Regional Characterization (Wesley D. Peck)

Highlights

- Continued efforts on the revised atlas (4th edition).
- Continued compilation of advanced programming components for the modifications to the partners-only Decision Support System (DSS, © 2007–2011 EERC Foundation).
- Added geographic information system-(GIS)-mapping layers common to many of the project tasks to the central geodatabase.
- For the Rival Field characterization:
 - Prepared an initial draft of the petrographic analysis report.
 - Continued facies modeling in Petrel using truncated Gaussian simulation with trends.
 - Updated the Rival model with thin-section descriptions, including depositional facies, lithological facies, and petrophysical classes.
 - Presented at the American Association of Petroleum Geologists (AAPG) Rocky Mountain Section (RMS) 2011 Annual Meeting on June 28 in Cheyenne, Wyoming.
 - Prepared a first draft of the thin-section report.
 - Started preparation (cleaning) of the Rival core plug samples.
 - Prepared 55 thin sections for analysis, and analyzed using optical mineralogy.
 - Drilled, cleaned, and performed permeability-to-water measurements using the flexible-wall permeameter on five core plugs.

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

Highlights

- Presented to a group of approximately 50 teachers on June 8 at the North Dakota Petroleum Council (NDPC) Teacher Seminar, and distributed various PCOR Partnership outreach materials to the attendees.
- Participated in the Weyburn–Midale Outreach Panel call on June 7 to continue discussions about the use of focus groups to improve the ability of the project to respond to stakeholder issues.
- Participated in the Regional Carbon Sequestration Partnership (RCSP) Outreach Working Group (OWG) monthly conference call on June 9, and volunteered to develop a matrix of

available video shots for a short video under development by the OWG as requested by the RCSP.

- Participated in a RCSP OWG conference call held June 30, and began preparation of materials for use at the Carbon Sequestration Leadership Forum's (CSLF's) next ministerial meeting.
- Received an invitation to present at the SPE Forum, "CO₂ Geological Storage: Will We Be Ready in Time?," scheduled for October 9–14, 2011, in Algarve, Portugal. (www.spe.org/events/11fse3/pages/about/index.php).
- Presented to a group of approximately 133 teachers on June 21 at the Lignite Energy Council 2011 Lignite Education Seminar: Energy, Economics, and Environment, and distributed various PCOR Partnership outreach materials to the attendees.
- Continued efforts toward an update to the public Web site (D13, due June 2012).
- Continued efforts to develop an outreach-tracking database with an anticipated "go live" date of October 1, 2011.
- Continued to track state-by-state carbon capture and sequestration (CCS) regulations for development of future outreach materials.
- Attended a daylong workshop on media training on June 22 in Houston, Texas, hosted by the Ammerman Experience.
- Submitted D19 – Fort Nelson Test Site PowerPoint Presentation (update) on June 30 for review and approval.
- Continued efforts with Prairie Public Broadcasting's (PPB's) education services on planning the November 2011 teacher training workshop at the Energy & Environmental Research Center (EERC).
- Continued efforts to establish outreach activities in conjunction with Spectra Energy for the Fort Nelson demonstration site.

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

Highlights

- Continued development of the revised/updated Regulatory Roundup document.
- Held the third PCOR Partnership Regulatory Meeting (June 29–30). The meeting followed the IOGCC (Interstate Oil and Gas Compact Commission) Midyear Issues Meeting in Bismarck.
- Provided additional information to the U.S. Department of Energy National Energy Technology Laboratory (NETL) to use in its evaluation of the Bell Creek NEPA questionnaire.
- Attended a workshop entitled "2011 CO₂ Geologic Sequestration and Water Resources Workshop," sponsored by the U.S. Environmental Protection Agency and hosted by Lawrence Berkeley National Laboratory, that focused on research needs related to geologic carbon storage with a specific focus on water resources.

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

Highlights

- Bell Creek test site activities included the following:

- Reviewed relevant literature for determining possible mechanisms of subpressure generation in the Bell Creek Field.
- Continued data collection for performing calculations to estimate the pressure drop because of uplift and erosion.
- Prepared information on the possible mechanisms responsible for generating subnormal pressure in the Bell Creek Field.
- Continued efforts with Denbury on creation of the Phase 1 geologic model.
- Continued planning for an outcrop field trip in Wyoming. A scouting trip was held June 20–23, and the actual field trip is scheduled for July 11–12.
- Made arrangements for the collection of LIDAR (light detection and ranging) elevation data for the Bell Creek Field.
- Fort Nelson test site activities included the following:
 - Participated in weekly conference calls with Spectra Energy to discuss various issues related to the project.
 - Held the monthly project management conference call on June 13 between the EERC and the Spectra Energy team.
 - Continued planning for the next EERC and Spectra Energy quarterly meeting scheduled for July 21 in Vancouver, British Columbia, Canada.
 - Weatherford Labs completed its analytical activities on the core collected from the exploratory well.
 - RPS Energy continued preparation of a report on the results of a wellbore integrity study.
 - Continued interpretation of data from analysis of cuttings using x-ray diffraction (XRD).
 - Continued analysis of thin sections of the cap rock samples.
 - Participated in the IEA Greenhouse Gas R&D Programme (IEAGHG) Monitoring Network Meetings in Potsdam, Germany. Specific topics of discussion with direct relevance to the Fort Nelson project included presentations on innovative approaches to soil gas monitoring and the use of remote sensing technologies, such as INSAR, for monitoring isolated areas such as are found in northeastern British Columbia.

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

Highlights

- Received approval from Denbury to move forward with a surface and near-surface monitoring, verification, and accounting (MVA) program and a deep subsurface MVA program.
- Continued efforts to purchase a portable gas chromatograph for use in the surface MVA baseline program.
- Modified the monitoring well design to account for additional requirements necessary to deploy permanent downhole monitoring (PDM) pressure, temperature, and acoustic sensors.
- Attended the IEAGHG 7th Monitoring Network Meeting in Potsdam, Germany, to remain apprised of current and planned CCS monitoring activities performed around the world.
- Toured the Ketzin injection site and examined wellhead completions which incorporated multiple monitoring systems similar to proposed Bell Creek monitoring technologies.
- Continued to investigate and price MVA services and characterization services and technologies that will be employed during Bell Creek monitoring well drilling and completions.

- Continued preparation of detailed sampling maps and an explanatory handout to accompany the landowner permission form.
- Continued planning a site visit to meet with landowners and Denbury field office staff.
- Submitted comments on June 24 to NETL regarding its draft “Best Practices for: Drilling, Well Installation, Permitting, Operations, Mitigation, and Closure for CO₂ Storage in Deep Geologic Formations” document.
- Continued reviewing all well files in the Phase 1 area to assess risk and completions designs.

Task 6 – Infrastructure Development (Melanie D. Jensen)

Highlights

- Continued work on adapting the capture technologies table (included as an appendix in the value-added capture technologies overview report submitted in March 2011) for the DSS.
- Distributed hard copies of the capture report to partnership members.
- Continued the annual update and quality assessment/quality control of the CO₂ emission sources master data spreadsheet.
- Continued revision of a draft CO₂ Pipelines technical brief.

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

- Began collecting information about CO₂ stream generation and infrastructure needs for the Bell Creek demonstration.

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

Highlights

- Participated in a Sim/Risk Working Group conference call on June 21.
- Participated in the IEAGHG 6th Risk Assessment Network Meeting in Pau, France, including a site visit to the Lacq project.
- Modeling staff participated in a Subsurface CO₂ Modeling Short Course in Minneapolis, Minnesota.
- Continued Bell Creek site activities, including the following:
 - Reviewed relevant literature on CO₂ enhanced oil recovery (EOR) and sequestration.
 - Continued training on Computer Modelling Group simulation software.
 - Studied the NIPER (National Institute for Petroleum and Energy Research) report on reservoir characterization of the Bell Creek Field.
 - Worked on latest Petrel geological model by assigning different reservoir properties to the static model and its export to CMG Builder software.
- Continued Fort Nelson site activities, including the following:

- Continued preparation of D67 – Simulation Report due July 31, 2011.
- Continued work on history matching (pressure in injection and transient regions).
- Continued work on the history-matching report.
- Continued work on prediction simulation (gas production rate control and water recycle).
- Continued second-round risk assessment review.

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)

- The project assessment report (D57) for the period October 1, 2010 – September 30, 2011, will be submitted by 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

- Continued efforts toward populating and updating the partners database which was programmed in-house.
- Continued organizing a project facilitation and planning meeting with Spectra Energy on the Fort Nelson project in July 2011.
- Welcomed visitors from C12 Energy and provided an overview of the PCOR Partnership Program on June 7.
- Began preparation of responses to the IEAGHG Expert Review Panel’s comments and recommendations.
- Continued planning the PCOR Partnership Annual Meeting and premeeting workshop to be held September 12–14 in Denver, Colorado.
 - Continued plans for the workshop to be held at the U.S. Geological Survey’s Core Research Center (<http://geology.cr.usgs.gov/crc/>), followed by a visit to the I-70 road cut through the Dakota Hogback, which exposes about 50 million years of geology.
 - Continued efforts to secure a media consultant to speak during the annual meeting.
- Held an in-house Bell Creek project update meeting on June 27.
- Completed the following deliverables and milestones in June:
 - May monthly update
 - Task 2: D19 – Fort Nelson Test Site PowerPoint Presentation (Update)
 - Task 14: M23 – Monthly WWG Conference Call Held
- Deliverables and milestones due in July:
 - June monthly update

- Task 9: D67 – Fort Nelson Test Site – Simulation Report
- 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

- Provided feedback on the brine database.
- Began incorporating WWG comments into the Nexus of Water and CCS – Technology Gaps document.
- Distributed minutes from the May 5 meeting.
- Held the monthly conference call on June 23.
- Compiled a list of potential stakeholder groups for an outreach document.
- Scheduled travel to attend the 2011 Ground Water Protection Council Annual Forum on September 24–28, 2011, in Atlanta, Georgia.

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

Highlights

- Reviewed relevant literature on relative permeability and capillary pressure data for heterogeneous carbonate rocks.
- Discussed the inclusion of different reservoir properties into the static geological model.
- Performed extraction of historical perforation history from the RPS Energy report.
- Reviewed published literature on the generation of relative permeability curves using vuggy carbonate cores.
- Met with representatives of Apache Canada in Calgary on June 22 to discuss the status of the PCOR Partnership’s work at Zama.
- Continued efforts in the EERC’s Applied Geology Lab, including the following:
 - Used two sets of steel coupons to determine the net change that may occur as these samples were exposed to combinations of acid gas and straight CO₂.
 - Used conditions analogous to Zama for pressure, temperature, acid gas composition, and brine salinity.
 - Utilized steels in this evaluation that are analogous to typical oil field casing materials.
- Studied different numerical methods for computing capillary pressure and relative permeability curves using log data.
- Evaluated the utility of different numerical methods for generating capillary pressure and relative permeability curves for the “F pool” using available data.
- Continued discussion of information to be included in D86 – an update to the regional technology implementation plan, including this summer’s reservoir simulation work and documentation for the monetization of carbon credits.

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

Highlights

- Continued work on data organization and guidance.
- Worked on a Deadwood Formation relative permeability report.
- Held a meeting on June 22 in Calgary with the science and engineering technical team to discuss geologic data availability and needs. Geological data regarding the Basal Cambrian (Deadwood) Formation and other formations being evaluated by the Basal Cambrian project were shared from both the PCOR Partnership and Aquistore characterization activities.
- Continued efforts to collect data on previous work, including specifics on local geology and hydrogeochemistry.
- Finished a second draft of the relative permeability report.
- Continued work on the development of the Basal Cambrian geologic model.
- Hosted a meeting with AITF and Saskatchewan Ministry of Energy and Resources staff on June 27–28, 2011, at the EERC.

Travel/Meetings

- May 31 – June 2, 2011: Attended the 2011 CO₂ Geologic Sequestration & Water Resources Workshop in Berkeley, California.
- June 3–10, 2011: Attended the IEAGHG 7th Monitoring Network Meeting held June 7–9 in Potsdam, Germany.
- June 7–8, 2011: Presented at the NDPC Teacher Education Seminar on June 8 in Bismarck, North Dakota.
- June 13–15, 2011: Participated in the NDPC board meeting and social in Denver, Colorado.
- June 14–24, 2011: Attended the IEAGHG 6th Risk Assessment Network Meeting held June 21–23 in Pau, France.
- June 15–16, 2011: Visited the U.S. Geological Survey's Core Research Center and the I-70 road cut to prepare for the annual meeting workshop in Denver, Colorado.
- June 19–23, 2011: Participated in the Subsurface CO₂ Modeling course held in Minneapolis, Minnesota.
- June 20–21, 2011: Presented at the 2011 Lignite Education Seminar: Energy, Economics and Environment on June 21 in Bismarck, North Dakota.
- June 20–23, 2011: Traveled in preparation for a July outcrop field trip visit to and around Hulett, Wyoming.
- June 21–23, 2011: Participated in the Ammerman Experience Effective Media Communications Seminar in Sugar Land, Texas.
- June 21–24, 2011: Participated in partner discussion with Husky Energy, Apache Canada, and PTRC in Calgary, Alberta, Canada.
- June 24–30, 2011: Presented at the AAPG–RMS 2011 Annual Meeting in Cheyenne, Wyoming.
- June 26–30, 2011: Participated in the IOGCC 2011 Midyear Issues Summit in Bismarck, North Dakota.
- June 29–30, 2011: Held the PCOR Partnership Regulatory Roundup in Bismarck, North Dakota.

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