



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

PHASE III ACTIVITIES

Task 1 – Regional Characterization (Wesley D. Peck)

Highlights

- Continued efforts on the revised atlas (4th edition).
- Energy & Environmental Research Center (EERC) Web programmers recently attended the Esri International Users Conference as well as a 2-day training session in San Diego. This effort will bolster programming capabilities with respect to online geographic information systems (GIS) and Decision Support System (DSS, © 2007–2011 EERC Foundation) capabilities.
- Held discussions with U.S. Department of Energy (DOE) National Energy Technology Laboratory (NETL) project managers about discrepancies discovered in Canadian GIS data provided to the North American Carbon Atlas Partnership (NACAP).
- Continued efforts on Rival Field characterization, including the following:
 - Held discussions regarding second-round petrophysical analysis.
 - Continued core plug analysis.
 - Worked on the potential conversion of gas permeability data into liquid permeability.
 - Worked on density and porosity testing.
 - Began reviewing Madison Formation structure literature.
 - Held a conference call with TAQA North Ltd (TAQA).
 - Continued adding pressure data and introduced macrofacies/lithology into the Rival Field Petrel model.
 - Completed permeameter and pictometer readings and x-ray diffraction (XRD) samples are ready to run in the EERC's Natural Materials Analytical Research Laboratory.
 - Continued utilizing SPHI (sonic-derived porosity) logs, normalizing or dropping wells with unreliable values because of borehole problems.
 - Began work on the Rival model update report and static geologic model due September 30.

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

Highlights

- Provided information on the demonstration sites for use at the upcoming Carbon Sequestration Leadership Forum (CSLF) ministerial meeting in Beijing, China.

- Participated in preliminary meetings to explore the potential for Web-based games as a communication tool.
- Participated in a conference call regarding potential collaboration on focus group activities to improve public presentations.
- Participated in the Spectra Energy quarterly management meeting in Vancouver, British Columbia, Canada, on July 20 and 21.
- Updated the Bell Creek poster, Deliverable (D) 25, due September 30, 2011.
- Began preparing video shorts excerpted from the documentary entitled “Global Energy and Carbon: Tracking Our Footprint.”
- 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 2011.
- Continued to track state-by-state carbon capture and storage (CCS) regulations for development of future outreach materials.
- Continued efforts with Prairie Public Broadcasting’s (PPB’s) education services on planning the November 2011 teacher training workshop at the EERC.

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

Highlights

- Continued development of the revised/updated Regulatory Roundup document.
- Provided follow-up information to participants attending the third PCOR Partnership Regulatory Meeting (June 29 and 30), and prepared meeting minutes for review and approval.
- Attended the Enhanced Oil Recovery Institute (EORI) Fifth Annual CO₂ Conference on July 13–14, in Casper, Wyoming.
- Received a categorical exclusion signed July 14 on the Bell Creek environmental questionnaire (D28, submitted March 30).

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

Highlights

- Bell Creek test site activities included the following:
 - Traveled to the outcrops of the Muddy Formation in northeastern Wyoming and led a group of Denbury Onshore LLC (Denbury) representatives on a 2-day field trip.
 - Lidar (light detection and ranging) elevation data were collected, and delivery of the final data set is anticipated for early August. These data will be used for increasing geologic model accuracy and will play a key role in the characterization and monitoring program.
 - Continued development of the Petrel geological model.
 - Created a new cross section from the geologic model to assist in the core analysis tests for the monitoring well.
 - Held an in-house meeting to discuss the draft geologic core evaluation program.
 - Initiated work to complete a draft core analysis program and obtain price quotes.
 - Arranged for travel to visit the Bell Creek Field on August 4 and 5.
 - Held an internal Bell Creek update meeting on July 25.

- Fort Nelson test site activities included the following:
 - Prepared a brief project update for the CSLF July 2011 Strategic Plan Implementation Report (SPIR).
 - Continued work on the cap rock petrography report.
 - Continued work on the geomechanical model.
 - Reviewed the geomechanical testing and modeling program.
 - Held the EERC and Spectra Energy quarterly meeting on July 20 and 21 in Vancouver, British Columbia, Canada. Topics discussed included the following:
 - ♦ Outreach activities
 - ♦ 2010 Risk Assessment document
 - ♦ Kickoff and due dates for the next-round risk assessment
 - ♦ Modeling update
 - ♦ Monitoring, verification, and accounting (MVA) plan
 - ♦ PCOR Partnership annual meeting
 - ♦ Weatherford core analytical results
 - ♦ The roles of the Canadian federal government, British Columbia government and DOE in the project.
 - Modeling staff traveled to Calgary from July 24–30 to work with Spectra Energy personnel on the model.

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

Highlights

- Situated the EERC mobile office trailer at the Bell Creek site.
- Initiated efforts to gain landowner permissions for the surface soil gas and groundwater sampling program.
- Continued updating the joint Denbury–EERC MVA plan as a “living document.”
- Continued work related to the evaluation of wells within the Phase 1 area.
- Initiated work evaluating wells within a 1-mile buffer around the Phase 1 area.
- Continued incorporating database well information into a GIS format for spatial risk and/or monitoring assessments.
- Continued investigation pricing and operational logistics related to drilling, completions, and MVA technologies to be deployed at the Bell Creek Phase 1 monitoring well.
- Finalized the monitoring well design.
- Identified and documented the specialty wellhead required for the MVA program and permanent downhole monitoring (PDM) technologies and initiated wellhead design.
- Contracted with Sandia Technologies to consult in the design and deployment of the PDM system in the monitoring well.
- Estimated the monitoring well spud date for October 2011.
- Initiated weekly conference calls with Denbury to discuss monitoring well design, planning, and progress.
- Participated in an outcrop field trip with Denbury personnel in order to gain a better understanding of reservoir conditions through examining analogous rock, and discussed overall project progress and plans with Denbury personnel.
- Held a Bell Creek update meeting in Plano, Texas, on July 27, 2011, and discussed the following:

- Progress on ongoing work and the path forward.
- Authorization for expenditure (AFE) for the monitoring well.
- Use of 3-D and 4-D seismic.
- Reentry of selected plugged and abandoned wells in the Bell Creek Field.
- Initiated work on wells in Phases 3 and 7 for potential reentry for deployment of additional monitoring technologies and collection of additional data.
- Initiated efforts to establish phone and Internet connection with Denbury and Range Communications.
- Ordered the gas chromatograph on July 18, and also ordered a handheld gas analyzer for field sampling.

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, including the following:
 - Identification of the public information sources that best describe each of the technologies listed.
 - Completion of short summaries of each of the technologies.
- 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, including the July 25 meeting in Plano, Texas.
- Attended the EORI Fifth Annual CO₂ Conference on July 13–14 in Casper, Wyoming.

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

Highlights

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

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

Highlights

- Continued Bell Creek site activities, including the following:
 - Continued preparation of D66 – Simulation Report due August 31, 2011.
 - Began preliminary modeling to determine response and sensitivity of thermal perturbation and its potential as a PDM technology.
 - Continued work on the model on heating temperature variations.

- Studied the NIPER (National Institute for Petroleum and Energy Research) report (NIPER-713) for insight into Muddy Formation outcrop characteristics.
- Worked on collecting relevant literature for overpressurization of sandstone reservoirs.
- Presented Denbury with PowerPoint presentations on modeling efforts and on the potential cause and implications of the initial subnormal pressure regime in the Bell Creek Field.
- Worked on creating graphics regarding core analysis for the MVA monitoring well.
- Continued Fort Nelson site activities, including the following:
 - Continued preparation of D67 – Simulation Report.
 - Worked on finalizing the subnormal pressure report, including the implications of subnormal pressure and repressurization to recharge and leaking potential.
 - Continued work on prediction simulation (CO₂ plume size and bottomhole pressure).
 - Reviewed new prediction simulations and suggested a few more scenarios.
 - Continued work on MVA plan.

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.
- Participated in a project facilitation and planning meeting on July 19 and 20 with Spectra Energy on the Fort Nelson project in Vancouver, British Columbia.
- Prepared draft responses to the IEA Greenhouse Gas R&D Programme (IEAGHG) Expert Review Panel's comments and recommendations.
- Discussed reclamation activities required for the Phase II lignite field validation test site.
- Submitted several abstracts for the 2012 Carbon Management Technology Conference scheduled for February 2012.
- Attended the EORI Fifth Annual CO₂ Conference on July 13–14 in Casper, Wyoming.
- Participated in a conference call with PTRC regarding the Aquistore project.

- Continued planning the PCOR Partnership Annual Meeting and Foundations of CCS Geology Workshop to be held September 12–14 in Denver, Colorado.
- Deliverables and milestones completed in July:
 - June monthly update
 - Task 13: D58/D59 – Quarterly Progress Report/Milestone Quarterly Report
 - Task 14: M23 – Monthly WWG Conference Call Held

Task 14 – Regional Carbon Sequestration Partnership (RCSP) Water Working Group (WWG) Coordination (Ryan J. Klapperich)

Highlights

- Updated the WWG overview presentation for a group member to use at the Mountain West Water Institute “Waters of the West Workshop” on July 19 in Salt Lake City, Utah.
- Distributed minutes from the June 23 meeting.
- Held the monthly conference call on July 26 and discussed the following:
 - Development of topical survey for distribution among identified stakeholder groups and items to assist the National Carbon Sequestration Database and Geographic Information System (NATCARB) project.
 - Began brainstorming survey questions.
 - Began identification of key database items for the NATCARB database request forum and identifying potential ranges of values.
- Reviewed changes to the Technology Gaps document.
- Contacted West Virginia University to discuss the WWG’s feedback to NATCARB.

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

Highlights

- Prepared a brief project update for the CSLF July 2011 SPIR.
- Held an in-house discussion on the initial geological model and use of Computer Modelling Group (CMG) software for flow modeling.
- Worked on preparation of data and construction of CMG simulation model for the “F” Pool using unconditional Petrel realizations.

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

Highlights

- Continued acquisition of digital well logs.
- Continued efforts toward core calibration and revisions to the study area extent in southwestern and southern Montana.

Travel/Meetings

- July 5–8, 2011: Situated two mobile trailers (field offices) at the Bell Creek Field in southeastern Montana.

- July 5–9, 2011: Traveled to begin soliciting landowner permissions for the baseline monitoring work in the Bell Creek Field area.
- July 8–15, 2011: Attended the Esri International User Conference and a preconference course entitled “Building Web Applications Using ArcGIS API for Flex” (www.esri.com/events/user-conference/agenda/index.html) in San Diego, California.
- July 10–13, 2011: Led an outcrop field trip near Hulett, Wyoming.
- July 12–14, 2011: Attended the EORI Fifth Annual CO₂ Conference in Casper, Wyoming.
- July 18–22, 2011: Participated in the facilitation and quarterly management meetings with Spectra Energy regarding the Fort Nelson CCS Project in Vancouver, British Columbia, Canada.
- July 20–27, 2011: Participated in meetings with oil and gas producers and the National Petroleum Council’s Committee on Resource Development in Houston and The Woodlands, Texas.
- July 24–30, 2011: Traveled to continue construction of the Fort Nelson geological model to Calgary, Alberta, Canada.
- July 26–27, 2011: Participated in a meeting with Denbury at its headquarters in Plano, Texas.
- July 26–31, 2011: Attended the Esri training course entitled “Introduction to Geoprocessing Scripts Using Python (9.3)” (http://training.esri.com/gateway/index.cfm?fa=catalog.courseDetail&CourseID=50089911_9.X) in Vienna, Virginia.

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.