



## Plains CO<sub>2</sub> Reduction (PCOR) Partnership Energy & Environmental Research Center (EERC)

### Plains CO<sub>2</sub> Reduction (PCOR) Partnership Monthly Update January 1–31, 2013

#### **PHASE III ACTIVITIES**

##### **Task 1 – Regional Characterization (Wesley D. Peck)**

###### **Highlights**

- Continued review of updates and corrections to the latest edition of the PCOR Partnership Atlas (Deliverable [D] 81, update due August 2013).
- Continued efforts to characterize the third target area (D7, due September 2013), including the following:
  - Continued to move historical water injection and oil production data for the Pine and Pennel oil fields from files collected at the Montana Board of Oil and Gas offices to spreadsheets for incorporation into a new database.
  - Worked on capturing monthly cumulative injection data by well (initially for the first 12 years of the Pine oil field) to create time-lapse bubble maps showing the progression of wells and volumes of injection water.
  - Reviewed production data scans of the first 30+ years.
  - Identified approximately 52 wells with cement bond logs.
  - Calculated cement tops for several wells and disseminated associated methodology.
- Worked on acquiring new data sets for wells in Saskatchewan and North Dakota.
- Continued compiling geologic data with respect to storage potential in the following areas:
  - Minnelusa Formation in the Powder River Basin of Wyoming
  - Broom Creek Formation
  - Nebraska
- Continued updating the databases that ultimately feed the Decision Support System (DSS, © 2007–2013 Energy & Environmental Research Center [EERC] Foundation<sup>®</sup>) with new oil fields, wells, and gas plants.
- Continued to explore opportunities for inclusion in the demonstration project reporting system housed on the partners-only DSS.

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

###### **Highlights**

- Participated in the monthly Regional Carbon Sequestration Partnership Outreach Working Group conference call on January 17, 2013.
- Continued efforts to update the Phase III general fact sheet (D14, due February 2013).
- Continued the update to and revision of the Lignite Field Validation Test fact sheet (value-added).

- Continued efforts to revise the permanent downhole monitoring (PDM) value-added video short.
- Participated in a telephone discussion on January 16, 2013, to discuss ongoing education activities with Prairie Public Broadcasting (PPB).
- Discussed upcoming filming plans for the Bell Creek test site activities, including the installation of geophones.
- Continued efforts to populate, test, and refine the outreach-tracking database.
- Continued efforts to review and improve the public Web site, including identification and prioritization of areas for update, actions to increase Web traffic, and actions to improve tracking and reporting.

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

#### Highlights

- EERC Staff attended the 2013 UIC Conference, sponsored by the Ground Water Protection Council ([www.gwpc.org/events/2013-uic-conference](http://www.gwpc.org/events/2013-uic-conference)), held January 22–24, 2013, in Sarasota, Florida, and met with representatives about risk-based data management system (RBDMS) work.
- Began planning for the 5th Annual Regulatory Roundup to be held this summer.
- Continued activities associated with the Interstate Oil and Gas Compact Commission Carbon Geologic Storage Task Force, including the following:
  - Continued planning for the next subgroup workgroup meeting (tentatively scheduled for February 2013 in Minneapolis, Minnesota).
  - Continued to discuss the report outline and writing assignments.
  - Held discussions with Bliss Consulting regarding upcoming conference calls and meetings of the operational and postoperational liability groups.
  - Continued to discuss the outline for the final report comprising the subgroup findings and recommendations.
- With regard to the Lignite Field Validation Test site (Phase II) closure:
  - Continued efforts to monitor the site during the reclamation phase.
  - Continued to modify a draft value-added report on closure activities.

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

#### Highlights

- Fort Nelson test site activities included the following:
  - Continued efforts to compile a report summarizing the activities and lessons learned at the Fort Nelson test site.
  - Reviewed questions regarding the static model scope of work received from Spectra.
- Bell Creek test site activities included the following:
  - Submitted the geomechanical modeling report (D32) on January 31, 2013.
  - Participated in a conference call on January 8, 2013, with Denbury personnel to discuss vertical seismic profile (VSP) installation.

- Continued analysis of pressure gauge response from the 0506 OW well, including construction of a leakage model (including pressure and temperature models) and a simplified geomechanical model.
- Continued building a depofacies object model using historic and recently acquired core data.
- Continued work on the 3-D mechanical earth model.
- Continued work on the fieldwide model.
- Continued efforts to modify the mineralogy report on 12 core samples and participated in in-house meetings to discuss progress on the report.
- Worked on a poster entitled “Subsurface Core and Analogous Outcrop Characterization for the Muddy/Newcastle Formation of the Bell Creek Oil Field, Power River County, Montana” for the American Association of Petroleum Geologists (AAPG) Annual Convention & Exhibition 2013 (<https://www.aapg.org/pittsburgh2013/>).
- Completed baseline pulsed-neutron log (PNL) activities on 27 of 27 wells during the initial campaign.
- Began planning a PNL review meeting to review quality and interpretations prior to final baseline logs.
- Began work on multimineral petrophysical analysis with 0506 OW monitoring well x-ray diffraction, x-ray fluorescence, and grain-size data.
- Continued to discuss special core analysis (SCAL) work with Core Labs, including the following:
  - ◆ Continued to work on the SCAL scope of work and budget.
  - ◆ Authorized SCAL work to be done by Core Labs.

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

### Highlights

- Completed installation of surface casing for two Fox Hills groundwater-monitoring wells, collected cutting samples during the surface casing installation, and began planning for water sampling. Completed full installation of one well (Figure 1).
- Continued work on a sampling and analysis plan for the two groundwater-monitoring wells.
- Continued planning for the geophone installation.
- Prepared water chemistry landowner packages based on August and November 2012 sampling trips.
- Continued download of 0506 OW monitoring well PDM data.
- Completed draft working outline entitled “Evaluation of Continuous Downhole Pressure and Temperature Response in the Muddy and Niobrara Formations in Bell Creek Oil Field 0506 OW Well from April 2012 through January 2013 During Water Injection” for discussion purposes.
- Participated in an in-house update meeting on January 15, 2013. Topics discussed included upcoming activities; core analysis update; surface and near-surface monitoring, verification, and accounting (MVA) activities; status of reports; PNL; seismic activities; modeling updates; and upcoming deliverables.
- Continued work on the baseline MVA report.



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Figure 1. Groundwater-monitoring well drilling at Well Pad #3312, Bell Creek, Montana.

## **Task 6 – Infrastructure Development (Melanie D. Jensen)**

### Highlights

- Continued collecting information for and began writing the report entitled “Opportunities and Challenges Associated with CO<sub>2</sub> Compression and Transport During CCUS Activities.” This is an update of D85, which the Statement of Project Objectives requires to occur biennially.
- Continued investigating potential peer-reviewed journals for submittal of an article regarding CO<sub>2</sub> capture and associated infrastructure requirements. Began revisions to the draft manuscript.
- Reviewed an *Energy & Fuels* manuscript entitled “Initial Results from a New CO<sub>2</sub> Storage Cost Model: FE/NETL CTS-Saline Cost Model.”

## **Task 7 – CO<sub>2</sub> Procurement (John A. Harju)**

### Highlights

- Participated in ongoing project discussions with Denbury.

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

### Highlights

- Participated in the Bell Creek project update meeting on January 15, 2013.

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

### Highlights

- Continued Bell Creek site activities, including the following:
  - Participated in a conference call with The CETER Group, Inc., to discuss Bell Creek MVA and risk management.
  - Continued efforts to integrate the risk assessment activities and the MVA plan.
  - Set up CMOST for the numerical tuning process.
  - Reviewed and discussed ongoing dynamic modeling work.
  - Worked on history-matching the simulation model.
  - Digitized the new PVT (pressure–volume–temperature) data and started modeling.
  - Performed a literature review on PVT modeling.
  - Attended biweekly project update meeting on January 16, 2013.
- Continued Fort Nelson site activities, including the following:
  - Continued working with Spectra on a scope of work for the next stage of dynamic modeling.

## **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

- Submitted D57, the annual assessment report, on December 28, 2012.

### **Task 13 – Project Management (Charles D. Gorecki)**

#### Highlights

- Prepared an e-poster presentation for the 2013 International Petroleum and Technology Conference to be held March 26–28, 2013, in Beijing, China.
- Attended and presented at the 2013 Energy, Utility, & Environmental Conference (EUEC) on January 30, 2013, in Phoenix, Arizona.
- Prepared an updated project management plan on January 22, 2013.
- Hosted a Webinar and presented on the Bell Creek surface and near-surface soil gas and water-monitoring program to the PCOR Partnership Technical Advisory Board (TAB) on January 3, 2013.
- Hosted visitor Bill Jackson of BillyJack Consulting, Inc., TAB Chair, at the EERC on January 3, 2013.
- Held the task leader meeting on January 8, 2013. Topics discussed included drilling of Bell Creek groundwater-monitoring wells; planned installation of geophones for the 3-D VSP surveys; filling of the Greencore Pipeline (will begin in February); TAB Webinar held January 3, which was a success; and upcoming conferences, deliverables, and updates from each task leader present.
- Continued planning and discussed presentations for the TAB meeting to be held March 5–6, 2013, in Orlando, Florida.
- Participated in the RCSP enhanced oil recovery working group conference call on January 10, 2013.
- Deliverables and milestones completed in January:
  - December monthly update
  - Task 4: D32 – Bell Creek Test Site – Geomechanical Report
  - Task 13: D58/D59 – Quarterly Progress Report/Milestone Quarterly Progress Report
  - Task 14: M23 – Monthly Water Working Group (WWG) conference call held

### **Task 14 – RCSP WWG Coordination (Ryan J. Klapperich)**

#### Highlights

- Continued efforts on the WWG review of the water–CCS nexus-related fact sheet (D99) and distributed a draft to the WWG for review and comment.
- Held the monthly conference call on January 16, 2013. Topics discussed included the U.S. Environmental Protection Agency progress report on hydraulic fracturing, the IEA Greenhouse Gas R&D Programme extracted water report, and the draft fact sheet.
- Began preparations for the February conference call.

- Continued reviewing the WWG white paper in preparation for journal article submission.

### **Task 15 – Further Characterization of the Zama Acid Gas EOR, CO<sub>2</sub> Storage, and Monitoring Project (Dayanand Saini)**

#### Highlights

- Worked on production data analysis for the G2G Pool and PVT modeling for the RRR Pool.
- Participated in discussions with Apache Canada's Zama team and presented Task 15 progress to date during the visit to the EERC on January 24–25, 2013.
- Built porosity and permeability logs and performed calibration using the core data.
- Analyzed routine core analysis data for identification of rock types and generated porosity, permeability, and saturation logs in Techlog for the wells with core data.
- Continued building static geologic models for the G2G Pool.
- Held biweekly in-house Zama project update meetings on January 2, 16, and 30, 2013.

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

#### Highlights

- The 3-D geomodel has been successfully integrated into the simulation software and the injection simulation effort has begun.
- Continued literature review for the geochemical report (D89, due March 2013) to ensure that data generated are valid.
- Continued drafting the geochemical evaluation report (D89).
- Began preparing for the U.S.–Canada joint project meeting to be held February 22, 2013, in Berkeley, California.
- Continued work on the report describing the wellbore integrity issues (D90, due September 2013) for wells in the Cambro–Ordovician Saline System in the United States.

#### **Travel/Meetings**

- January 7–18, 2013: Traveled to the Bell Creek oil field for site activities in southeastern Montana.
- January 16, 2013: Attended a meeting at PPB headquarters in Fargo, North Dakota.
- January 20–25, 2013: Attended the 2013 UIC Conference in Sarasota, Florida.
- January 26 – February 1, 2013: Participated in 2013 EUEC in Phoenix, Arizona.
- January 10 and 24, 2012: Traveled to the Lignite Field validation site near Kenmare, North Dakota, to inspect the site.



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