



## **PLAINS CO<sub>2</sub> REDUCTION PARTNERSHIP PHASE III**

### **Quarterly Technical Progress Report Task 13 – Deliverable D58/D59**

*(for the period July 1 – September 30, 2012)*

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DOE Project Manager: Andrea T. McNemar  
EERC Principal Investigator: Charles D. Gorecki

*Prepared by:*

Charles D. Gorecki  
John A. Harju  
Edward N. Steadman  
Lucia Romuld  
James A. Sorensen  
Lisa S. Botnen  
Daniel J. Daly  
John A. Hamling  
Melanie D. Jensen  
Wesley D. Peck  
Ryan J. Klapperich  
Katherine K. Anagnost  
Tami J. Votava

Energy & Environmental Research Center  
University of North Dakota  
15 North 23rd Street, Stop 9018  
Grand Forks, ND 58202-9018

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**PLAINS CO<sub>2</sub> REDUCTION PARTNERSHIP PHASE III**  
**Quarterly Technical Progress Report**  
**July 1 – September 30, 2012**

**EXECUTIVE SUMMARY**

The Plains CO<sub>2</sub> Reduction (PCOR) Partnership is one of seven Regional Carbon Sequestration Partnerships (RCSPs) competitively awarded by the U.S. Department of Energy (DOE) National Energy Technology Laboratory (NETL) in 2003 as part of a national plan to mitigate greenhouse gas emissions. The PCOR Partnership is led by the Energy & Environmental Research Center (EERC) at the University of North Dakota and continues to include stakeholders from the public and private sector in Phase III. The PCOR Partnership region includes all or part of nine U.S. states and four Canadian provinces.

Phase III, the development phase, a 10-year effort (2007–2017), is an extension of the characterization (Phase I) and validation (Phase II) phases. The Phase III efforts of the PCOR Partnership include two large-volume demonstration tests—one in Canada and one in the United States—that focus on injecting carbon dioxide (CO<sub>2</sub>) into deep geologic formations for CO<sub>2</sub> storage. Budget Period 4 (Years 3–8 of Phase III) began October 1, 2009.

This progress report presents an update of Phase III PCOR Partnership activities from July 1, 2012, through September 30, 2012.

The PCOR Partnership Annual Meeting was held on September 12 and 13, 2012, in Milwaukee, Wisconsin. The meeting attracted 84 attendees representing 51 organizations from 15 states, the District of Columbia, and two foreign countries (with Canada represented by four provinces). The Core Analysis Basics Workshop was held on September 11, 2012, and included a field trip to the Franklin Quarry located near Milwaukee. The workshop attracted 62 participants.

In conjunction with Prairie Public Broadcasting, and in preparation for upcoming documentary projects, five filming trips were held during this reporting period. They included three trips to the Bell Creek Field and adjacent areas to capture baseline sampling, 3-D seismic acquisition, and pipeline construction activities. Additional Bell Creek project-related activities included fieldwide geologic and geomechanical modeling advancements, as well as laboratory analyses of the monitoring well core samples. A fourth-round baseline soil gas-, surface water-, and groundwater-sampling trip was conducted in early August, and deep surface-monitoring activities continued.

An update on the overall PCOR Partnership Phase III Program, including a poster presentation, was given at the DOE Carbon Storage R&D Project Review Meeting in August in Pittsburgh, Pennsylvania. The presentation is available under the 2012 Conference Proceedings located on the DOE NETL Web site ([www.netl.doe.gov/publications/proceedings/pro\\_toc.html](http://www.netl.doe.gov/publications/proceedings/pro_toc.html)).



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

## **PLAINS CO<sub>2</sub> REDUCTION PARTNERSHIP PHASE III**

### **Quarterly Technical Progress Report**

**July 1 – September 30, 2012**

## **INTRODUCTION**

The Plains CO<sub>2</sub> Reduction (PCOR) Partnership is one of seven regional partnerships operating under the U.S. Department of Energy (DOE) National Energy Technology Laboratory (NETL) Regional Carbon Sequestration Partnership (RCSP) Program. The PCOR Partnership is led by the Energy & Environmental Research Center (EERC) at the University of North Dakota (UND) in Grand Forks, North Dakota, and includes stakeholders from the public and private sector. The membership as of September 30, 2012, is listed in Table 1. The PCOR Partnership region includes all or part of nine states (Iowa, Minnesota, Missouri, Montana, Nebraska, North Dakota, South Dakota, Wisconsin, and Wyoming) and four Canadian provinces (Alberta, British Columbia, Manitoba, and Saskatchewan).

The RCSP Program is part of NETL's Carbon Sequestration Program and is a government–industry effort tasked with determining the most suitable technologies, regulations, and infrastructure needs for carbon capture and storage (CCS) on the North American continent.

The RCSP Program initiative is being implemented in three phases:

- Phase I – Characterization Phase (2003–2005): characterized opportunities for carbon sequestration
- Phase II – Validation Phase (2005–2009): conducted small-scale field validation tests
- Phase III – Development Phase (2007–2017): involves large-volume carbon storage demonstration tests (Figure 1)

Phase III is divided into three budget periods (BPs), running from October 1, 2007, to September 30, 2017:

BP3: October 1, 2007 – September 30, 2009

BP4: October 1, 2009 – September 30, 2015

BP5: October 1, 2015 – September 30, 2017

Note: BP1 and BP2 were effective in Phase II.



**Table 1. PCOR Partnership Membership Phase III (October 1, 2007 – present, inclusive)**

DOE NETL	Great Northern Project Development, LP	North Dakota Industrial Commission
UND EERC	Great River Energy	Oil and Gas Research Council
Abengoa Bioenergy New Technologies	Halliburton	North Dakota Natural Resources Trust
Air Products and Chemicals, Inc.	Hess Corporation	North Dakota Petroleum Council
Alberta Department of Energy	Huntsman Corporation	North Dakota Pipeline Authority
Alberta Department of Environment	Husky Energy Inc.	Otter Tail Power Company
Alberta Innovates – Technology Futures	Interstate Oil and Gas Compact Commission	Oxand Risk & Project Management Solutions
ALLETE	Indian Land Tenure Foundation	Petroleum Technology Research Centre
Ameren Corporation	Iowa Department of Natural Resources	Petroleum Technology Transfer Council
American Coalition for Clean Coal Electricity	Lignite Energy Council	Pinnacle, a Halliburton Service
American Lignite Energy	Manitoba Geological Survey	Prairie Public Broadcasting
Apache Canada Ltd.	Marathon Oil Company	Pratt & Whitney Rocketdyne, Inc.
Aquistore	MEG Energy Corporation	Praxair, Inc.
Baker Hughes Incorporated	Melzer Consulting	Ramgen Power Systems, Inc.
Basin Electric Power Cooperative	Minnesota Power	RPS Energy Canada Ltd.
BillyJack Consulting Inc.	Minnkota Power Cooperative, Inc.	Saskatchewan Ministry of Industry and Resources
Biorecro AB	Missouri Department of Natural Resources	SaskPower
Blue Source, LLC	Missouri River Energy Services	Schlumberger
BNI Coal, Ltd.	Montana–Dakota Utilities Co.	Shell Canada Energy
British Columbia Ministry of Energy, Mines, and Petroleum Resources	Montana Department of Environmental Quality	Spectra Energy
British Columbia Oil and Gas Commission	National Commission on Energy Policy	Suncor Energy Inc.
C12 Energy, Inc.	Natural Resources Canada	TAQA North, Ltd.
Computer Modelling Group, Inc.	Nebraska Public Power District	TGS Geological Products and Services
Dakota Gasification Company	North American Coal Corporation	University of Alberta
Denbury Onshore LLC	North Dakota Department of Commerce	University of Regina
Eagle Operating, Inc.	Division of Community Services	Weatherford Advanced Geotechnology
Eastern Iowa Community College District	North Dakota Department of Health	Western Governors' Association
Enbridge Inc.	North Dakota Geological Survey	Westmoreland Coal Company
Encore Acquisition Company	North Dakota Industrial Commission	WBI Energy, Inc.
Energy Resources Conservation Board/Alberta Geological Survey	Department of Mineral Resources, Oil and Gas Division	Wisconsin Department of Agriculture, Trade and Consumer Protection
Environment Canada	North Dakota Industrial Commission	Wyoming Office of State Lands and Investments
Excelsior Energy Inc.	Lignite Research, Development and Marketing Program	Xcel Energy

The overall mission of the Phase III program is to 1) gather characterization data to verify the ability of the target formations to store carbon dioxide (CO<sub>2</sub>), 2) facilitate the development of the infrastructure required to transport CO<sub>2</sub> from sources to the injection sites, 3) facilitate development of the rapidly evolving North American regulatory and permitting framework, 4) develop opportunities for PCOR Partnership partners to capture and store CO<sub>2</sub>, 5) establish a technical framework by which carbon credits can be monetized for CO<sub>2</sub> stored in geologic formations, 6) continue collaboration with other RCSPs, and 7) provide outreach and education for CO<sub>2</sub> capture and storage stakeholders and the general public.

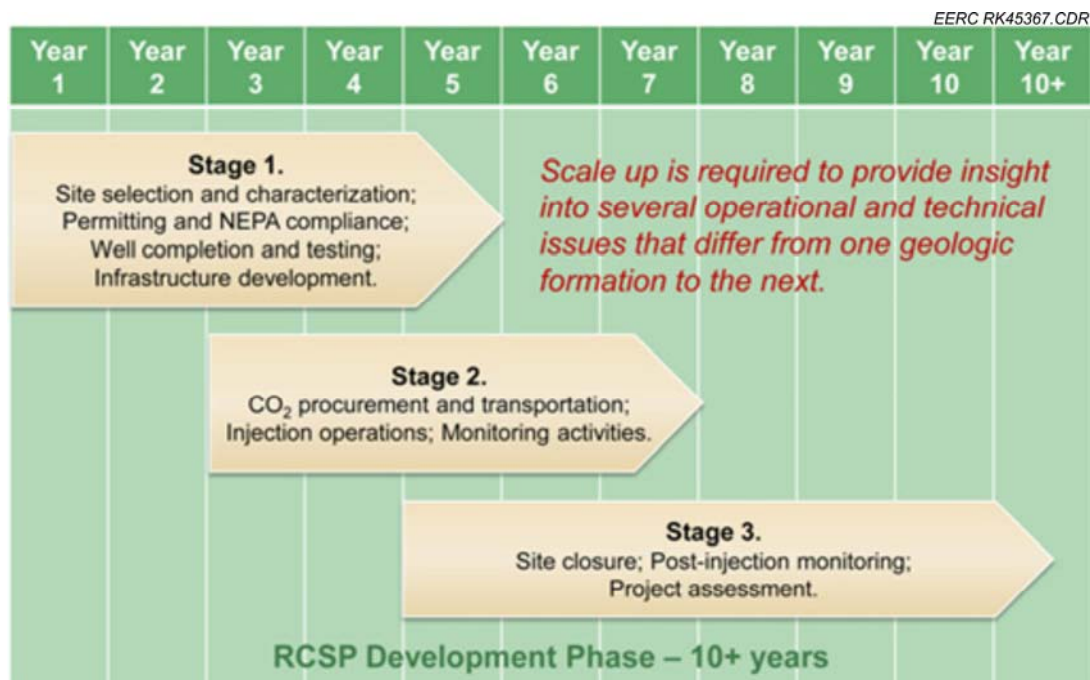


Figure 1. RCSP development phase: scaling up toward commercialization (Source: [www.netl.doe.gov/technologies/carbon\\_seq/infrastructure/rcspiii.html](http://www.netl.doe.gov/technologies/carbon_seq/infrastructure/rcspiii.html) [accessed October 2012]).

In Phase III, the PCOR Partnership is building on the information generated in its characterization (Phase I) and validation (Phase II) phases. The PCOR Partnership plans to fully utilize the infrastructure of its region to maximize CO<sub>2</sub> injection volumes. A programmatic RCSP Phase III goal is the injection of approximately 1 million tons of CO<sub>2</sub> a year into at least one regionally significant geologic formation. Each of the RCSP's large-volume injection tests is designed to demonstrate that CO<sub>2</sub> storage sites have the potential to store regional CO<sub>2</sub> emissions safely, permanently, and economically for hundreds of years.

The PCOR Partnership is working toward the establishment of two demonstration sites. The sites are located 1) in the Bell Creek oil field in Powder River County in southeastern Montana and 2) near Spectra Energy Transmission's (SET's) Fort Nelson gas-processing facility, situated near Fort Nelson, British Columbia, Canada (Figure 2).

The PCOR Partnership's objectives for the demonstration projects are as follows:  
 1) conduct a successful field demonstration to verify that the region's large number of oil fields have the potential to store significant quantities of CO<sub>2</sub> in a safe, economical, and environmentally responsible manner and 2) conduct a successful demonstration to verify the economic feasibility of using the region's carbonate saline formations for safe, long-term CO<sub>2</sub> storage. During Phase III, the PCOR Partnership will continue to refine storage resource estimates and evaluate other factors relevant to regional storage goals.

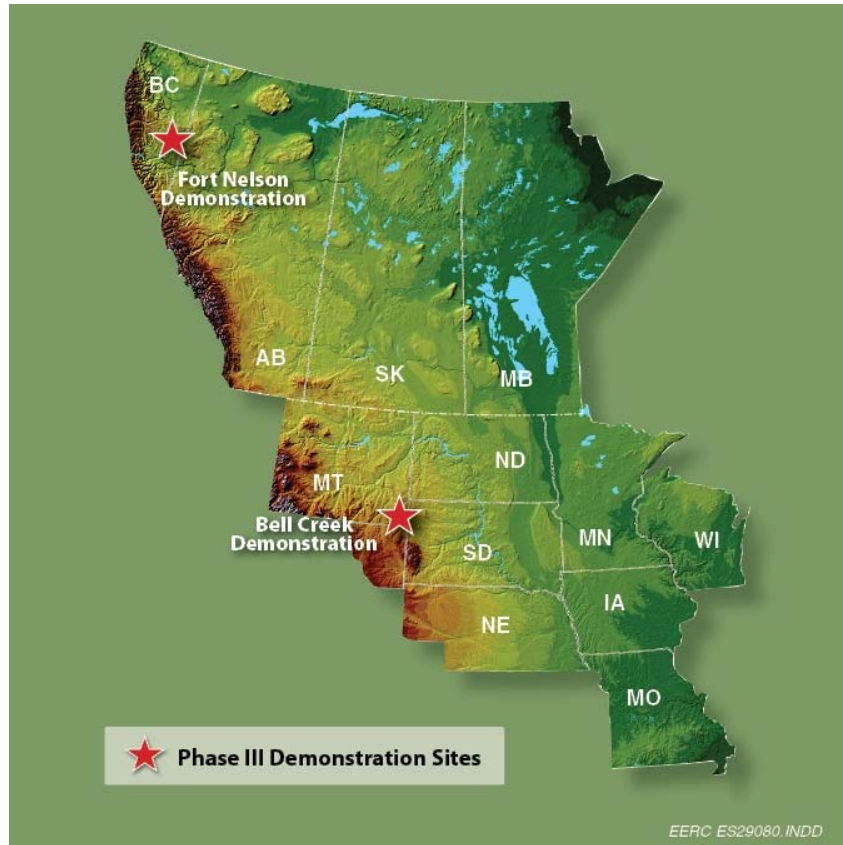


Figure 2. PCOR Partnership Phase III demonstration sites.

The PCOR Partnership plans to achieve its Phase III mission through a series of 16 tasks: 1) Regional Characterization; 2) Public Outreach and Education; 3) Permitting and National Environmental Policy Act (NEPA) Compliance; 4) Site Characterization and Modeling; 5) Well Drilling and Completion; 6) Infrastructure Development; 7) CO<sub>2</sub> Procurement; 8) Transportation and Injection Operations; 9) Operational Monitoring and Modeling; 10) Site Closure; 11) Postinjection Monitoring and Modeling; 12) Project Assessment; 13) Project Management; 14) RCSP Water Working Group (WWG) Coordination; 15) Further Characterization of the Zama Acid Gas Enhanced Oil Recovery (EOR), CO<sub>2</sub> Storage, and Monitoring Project; and 16) Characterization of the Basal Cambrian System. Table 2 lists the responsibility matrix for these 16 tasks.

It should be noted that Tasks 10 and 11 will not be initiated until BP5.

**Table 2. Phase III Responsibility Matrix**

Phase III Task Description	Task Leader
Task 1 – Regional Characterization	Wesley D. Peck
Task 2 – Public Outreach and Education	Daniel J. Daly
Task 3 – Permitting and NEPA Compliance	Lisa S. Botnen
Task 4 – Site Characterization and Modeling	James A. Sorensen
Task 5 – Well Drilling and Completion	John A. Hamling
Task 6 – Infrastructure Development	Melanie D. Jensen
Task 7 – CO <sub>2</sub> Procurement	John A. Harju
Task 8 – Transportation and Injection Operations	Melanie D. Jensen
Task 9 – Operational Monitoring and Modeling	Charles D. Gorecki
Task 10 – Site Closure	TBA <sup>1</sup>
Task 11 – Postinjection Monitoring and Modeling	TBA
Task 12 – Project Assessment	Katherine K. Anagnost
Task 13 – Project Management	Charles D. Gorecki
Task 14 – RCSP WWG Coordination	Ryan J. Klapperich
Task 15 – Further Characterization of the Zama Acid Gas EOR, CO <sub>2</sub> Storage, and Monitoring Project	James A. Sorensen
Task 16 – Characterization of the Basal Cambrian System	Wesley D. Peck

<sup>1</sup> To be announced.

## PROGRESS OF WORK

### Task 1 – Regional Characterization

Significant accomplishments for Task 1 for the reporting period included the following:

- Continued to acquire updated cumulative oil production numbers for the fields and pools in the U.S. portion of the PCOR Partnership region. This effort includes gathering reservoir values in Montana, Nebraska, and Wyoming, such as original oil in place, porosity, permeability, and production acres, that will be used to update CO<sub>2</sub> EOR estimates for many fields.
- Contacted the Montana Oil and Gas Commission with a request to obtain a custom data set of formation-level oil, gas, and water production for the oil fields in the PCOR Partnership region.
- Completed acquisition of updated cumulative oil production numbers for the fields and pools in Montana and South Dakota.
- Continued discussing options for the characterization of a third target area (Deliverable [D] 7, due September 2014).
- Continued the collection of data for the Pine oil field (the south unit), and began collection of data for the Pennel oil field along the Cedar Creek Anticline in southeastern Montana.
- Began calculations to determine the CO<sub>2</sub> EOR storage potential, and continued preparation of a report on the findings.

- Began preparations to visit the Billings office of the Montana Board of Oil and Gas to collect well file information on wells in the Pennel oil field.
- Began review of the source data available through the U.S. Environmental Protection Agency (EPA) greenhouse gas reporting system.
- Programming and mapping staff attended the Esri International User Conference on July 23–27, 2012, in San Diego, California.
- Staff participated in a panel discussion called “Is There a Business Case for Widespread CO<sub>2</sub> EOR from CO<sub>2</sub> Captured from Energy and Other Industrial Sources?” on September 5, 2012, as part of the 2012 CCS Binational Conference in Regina, Saskatchewan, Canada.
- Participated in the field trip on September 6 to Estevan, Saskatchewan, and toured the Aquistore and Boundary Dam projects.
- Attended the 2012 PCOR Partnership Annual Meeting (September 12 and 13, 2012), and presented at the Core Analysis Basics Workshop held on September 11, 2012. There were 62 participants (including 25 EERC employees) at the workshop (Figure 3).
- Began plans to update the latest edition of the PCOR Partnership Atlas.
- Performed and completed a detailed quality assurance/quality control review of the CO<sub>2</sub> sources database.
- Submitted the annual update of the source attributes in the PCOR Partnership region, D1, on September 28, 2012.
- Submitted an update to the demonstration project reporting system (D10) located on the Decision Support System (DSS, © 2007–2012 EERC Foundation<sup>®</sup>) on September 28, 2012.



Figure 3. Task Leader Wes Peck gathers rock samples during the Core Analysis Basics Workshop field trip to the Franklin Quarry near Milwaukee, Wisconsin.

- Held several discussions with Petroleum Technology Research Centre (PTRC) staff regarding the Aquistore Project.

Actual or anticipated problems, delays, or changes during the reporting period included the following:

- The period of performance for Statement of Project Objectives (SOPO), Subtask 1.4, Collaboration with PTRC's Aquistore Project, is July 1, 2012 – June 30, 2013. Activities began on July 1, 2012. Discussions have been held with PTRC staff regarding the project, and we are currently awaiting data for geomodeling simulation. As a result, D93, Geological Modeling and Simulation Report, has been extended from March 31, 2013, to June 30, 2013.
- In accordance with a reevaluation of task activities, two additional deliverables have changed:
  - D9, Updated DSS Reports, due September 30 in 2013 and 2015, have been deleted. Updates to the DSS will be reported in quarterly progress reports.
  - D10, Demonstration Project Reporting System (DPRS) Updates, due September 30, 2014 and 2016, have been deleted. Updates to the DPRS on the DSS will be reported in quarterly progress reports.

## **Task 2 – Public Outreach and Education**

Significant accomplishments for Task 2 for the reporting period included the following:

- EERC employees attended 14 conferences/meetings, exposing external participants to the PCOR Partnership name, messaging, and informational materials. Specifically, the PCOR Partnership outreach activities included eight oral presentations and five poster presentations. The following quantities of outreach materials were distributed:
  - PCOR Partnership documentary entitled “Nature in the Balance: CO<sub>2</sub> Sequestration” – 73
  - PCOR Partnership documentary entitled “Reducing Our Carbon Footprint: The Role of Carbon Markets” – 19
  - PCOR Partnership documentary entitled “Out of the Air – Into the Soil” – 22
  - PCOR Partnership documentary entitled “Managing Carbon Dioxide: The Geologic Solution” – 77
  - PCOR Partnership documentary entitled “Global Energy and Carbon: Tracking Our Footprint” – 75
  - PCOR Partnership Atlas 3rd Edition, Revised – 50
  - PCOR Partnership Atlas 4th Edition – 113
- During this reporting period, there were 1347 visits to the public Web site ([www.undeerc.org/pcor](http://www.undeerc.org/pcor)) from 55 countries. Of the 1347 visits, 80% of the Web traffic was domestic, while 20% was international. As depicted in Figure 4, the countries with the highest number of visits included the United States (>1000), Canada (60), India (24), Australia (20), United Kingdom (17), China (11), South Korea (10), and France (9).



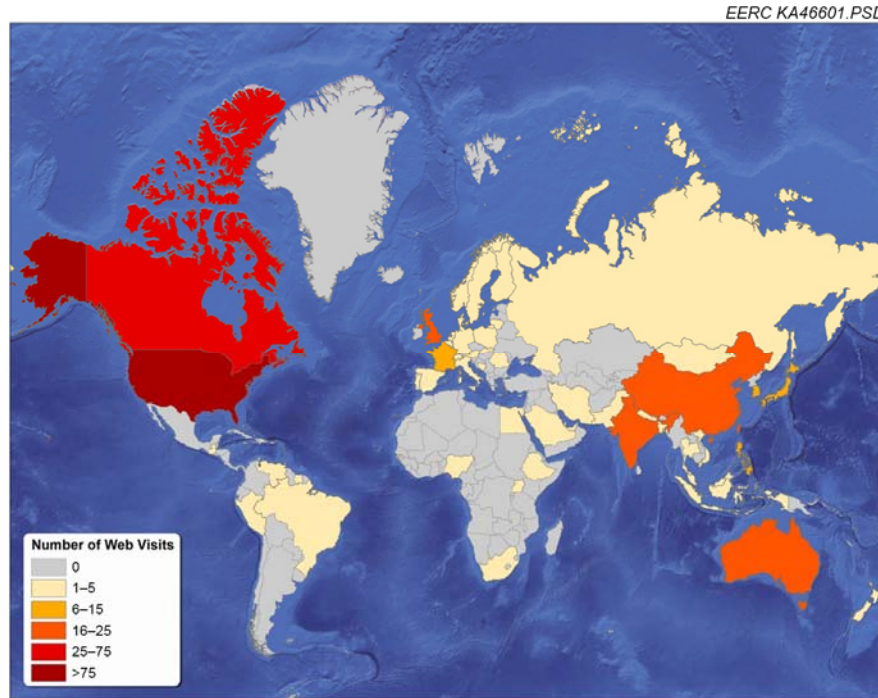


Figure 4. Map of PCOR Partnership global Web traffic (source: Google Analytics).

- During this reporting period, the PCOR Partnership received public television exposure from documentaries broadcast in six states and one Canadian province, as listed in Table 3. A total of 13 broadcasts were aired. The number of telecasts by documentary are as follows: “Global Energy and Carbon: Tracking our Footprint” (11) and “Managing Carbon Dioxide: The Geological Solution” (2).
- Provided PCOR Partnership information and materials to teachers and librarians in the PCOR Partnership region including the following:
  - Gave a presentation (and distributed 50 tote bags containing PCOR Partnership outreach materials) at the Missouri Minerals Education Foundation 13th Annual “Missouri Is a State of Mines – Rocks, Minerals, and Our Environment” workshop held July 15–20, 2012, in Park Hills, Missouri ([www.mmef.org/workshops.htm](http://www.mmef.org/workshops.htm)).

**Table 3. Broadcasts by State or Province**

State/Province	Broadcasts
North Dakota	6
Manitoba <sup>1</sup>	6
Utah	2
Texas	2
Maine	1
Massachusetts	1
Vermont	1

<sup>1</sup> Manitoba coverage was provided by Prairie Public Broadcasting (PPB).

- Hosted an exhibit booth featuring PCOR Partnership outreach materials at the 2012 North Dakota Library Association (NDLA) Annual Conference held September 19–22, 2012, in Fargo, North Dakota.
- Began preparation of presentations and materials for a fall PPB Teacher Training Institute entitled “Teaching About Energy & Our Carbon Footprint: Regional & Global Issues” scheduled for November 9–10, 2012, in Grand Forks.
- Participated in Aquistore Project outreach advisory group conference calls led by PTRC.
- Participated in RCSP Outreach Working Group (OWG) activities, including the following:
  - Participated in the monthly OWG conference calls in July, August, and September.
  - Provided a summary of the goals and objectives for PCOR Partnership outreach to the OWG on July 25.
  - Participated in OWG meeting held August 20, 2012, in Pittsburgh, Pennsylvania.
  - Discussed the OWG paper and poster to be presented on message mapping at the upcoming 11th International Conference on Greenhouse Gas Technologies (GHGT-11) scheduled for November 18–22, 2012, in Kyoto, Japan.
- Continued efforts to develop and populate the outreach-tracking database, including development of a new form to be used for logging data.
- Continued planning for Year 6 activities, including review of scheduled deliverables.
- Presented a poster entitled “Regional and Project-Based Carbon Capture, Utilization, and Storage (CCUS) Outreach – The PCOR Partnership Experience” on August 21, 2012, at the DOE Carbon Storage R&D Project Review Meeting held in Pittsburgh, Pennsylvania.
- Met with PPB staff on August 15, 2012, to review budgets, deliverables, and filming schedules for Program Year 6.
- Continued preparation of a value-added video short, including a script revision and film edit, focused on installation for permanent downhole monitoring (PDM).
- Set up and participated in five filming trips with PPB.
  - Spent 2 days (August 7 and 8, 2012) filming water- and soil-sampling activities with PPB at the Bell Creek site.
  - Spent a day (August 24) filming activities at the EERC laboratories for use in the upcoming Bell Creek documentary (D21, due November 2014).
  - Spent 3 days (August 27–29, 2012) filming with PPB at the Aquistore project near Estevan, Saskatchewan, Canada, and initiated discussions with SaskPower to film at the Boundary Dam project site.
  - Spent 2 days (September 4–6) filming 3-D seismic survey acquisition activities with PPB at the Bell Creek site.
  - Spent 4 days (September 18–21) filming pipeline construction activities with PPB near the Bell Creek site.
- Submitted an update to the public Web site (D13) on July 31, 2012.
- Prepared draft public Web site update pages for “Meet the Partnership.”
- Converted clips from the documentary entitled “Global Energy and Carbon: Tracking Our Footprint” for addition to the public Web site video clip library.



- Added a “Partner News” section to the public Web site, announcing the launch of a National Indian Carbon Coalition (NICC) carbon management Web site for Indian Country. The NICC is a joint project of the Indian Land Tenure Foundation (a member of the PCOR Partnership) and the Intertribal Agriculture Council.
- Began investigating methods to track public Web site traffic using Google Analytics as well as strategies to increase Web traffic.
- Attended the Core Analysis Basics Workshop and 2012 PCOR Partnership Annual Meeting on September 11–13, 2012, in Milwaukee, Wisconsin.
- In response to a request, e-mailed several CCS project-specific slides of the Phase II Lignite field site validation project to Bob Wright of DOE on September 20, 2012.
- Upon request, provided an electronic copy of the Fort Nelson outreach poster (D26) to SET outreach personnel.

Actual or anticipated problems, delays, or changes during the reporting period included the following:

- The 3-D seismic filming trip, originally set for August, was delayed until September based upon film crew schedules.
- SET’s community open house, originally scheduled for May 2012, has not yet been rescheduled.
- D19 – Fort Nelson Test Site PowerPoint Presentation (update) was sent to SET on June 29, 2012, for review and comment. No comments have been received to date.
- Activities related to fact sheet development, SOPO Subtask 2.4, will resume in October 2012.
- D18, Bell Creek Test Site PowerPoint Presentations, due March 31 in 2013–2017, were deleted. We plan to give a variety of presentations related to this project and will report upon the presentations, including any updates, in the quarterly project reports.
- D19, Fort Nelson Test Site PowerPoint Presentations, due June 30 in 2013–2017, were deleted. We plan to give a variety of presentations related to this project and will report upon the presentations, including any updates, in the quarterly project reports.

### **Task 3 – Permitting and NEPA Compliance**

Significant accomplishments for Task 3 for the reporting period included the following:

- On September 18, 2012, the North Dakota Department of Mineral Resources, Oil and Gas Division, filed a “Full Notice of Intent to Adopt and Amend Administrative Rules” and announced a public hearing on October 22, 2012, to address the proposed amendments to the North Dakota Administrative Code relating to the geologic storage of carbon dioxide ([www.dmr.nd.gov/oilgas/FullNoticeC02.pdf](http://www.dmr.nd.gov/oilgas/FullNoticeC02.pdf)).
- Attended the Enhanced Oil Recovery Institute (EORI) 6th Annual Wyoming CO<sub>2</sub> Conference held July 11 and 12, 2012, in Casper, Wyoming.
- Held the 4th Annual Regulatory Roundup meeting July 31 – August 1, 2012, in Deadwood, South Dakota.
  - 13 people attended, including three representatives from the EERC and regulators from North Dakota, Montana, and Alberta, Canada. Also present were

representatives from the Interstate Oil and Gas Compact Commission (IOGCC); Melzer Consulting; CETER Group; Bliss Consulting; and Premier Oil Recovery, LLC (Figure 5).

- Presentations were given on the following:
  - ◆ Recap of 2011 Regulatory Roundup
  - ◆ Discussion of relevant federal activity
  - ◆ IOGCC update
  - ◆ Provincial/state CCS updates
  - ◆ National Enhanced Oil Recovery Initiative
- Posted the presentations to a secure FTP site for the meeting participants to review and download.
- Began preparation of a meeting summary.
- Continued activities associated with the IOGCC Carbon Geologic Storage (CGS) Task Force, including the following:
  - Held discussions with IOGCC personnel and Kevin Bliss Consulting.
  - Received commitments from task force participants and experts.
  - Finalized subagreements for IOGCC support of the CGS Task Force.
  - Began planning for a task force kickoff meeting scheduled for October 4, 2012, in Denver, Colorado.
- With regard to the Lignite site (Phase II) closure:
  - Visited the site on July 19, 2012, and determined that Canadian thistle is present, triggering the need for weed spraying.



Figure 5. Attendees at the 4th Annual Regulatory Roundup held July 31 – August 1, 2012, in Deadwood, South Dakota.

- Continued to review a draft value-added report on closure activities.
- Visited the site on September 7 and 27, 2012, to monitor the reclamation phase.
- Hosted Praxair (partner) at the EERC and provided a tour of the facilities on August 21, 2012.
- Attended the Core Analysis Basics Workshop and 2012 PCOR Partnership Annual Meeting held September 11–13, 2012, in Milwaukee, Wisconsin.
- Held discussions with the North Dakota Industrial Commission (NDIC) regarding the status of the state’s rules and primacy application for Class VI wells.
- Began conducting an analysis of the Bell Creek monitoring, verification, and accounting (MVA) program in association with the reporting requirements under the EPA Mandatory Greenhouse Gas Reporting Rule, Subpart RR – Geologic Sequestration of Carbon Dioxide.
- Began plans to attend the MVA Knowledge-Sharing Workshop at Denbury headquarters in Plano, Texas.

Actual or anticipated problems, delays, or changes during the reporting period included the following:

- The period of performance for the IOGCC CGS Task Force is July 1, 2012, to September 30, 2013. In accordance with the delay experienced between proposal and award, several milestones have been extended. They include:
  - M37, IOGCC Task Force Subgroup Meeting 1 Held, extended from June 30, 2012, to December 31, 2012.
  - M37, IOGCC Task Force Subgroup Meeting 2 Held, extended from December 31, 2012, to June 30, 2013.
  - M38, IOGCC Task Force Wrap-Up Meeting Held, extended from December 31, 2012, to September 30, 2013.
  - M39, IOGCC Task Force Editing Subgroup Meeting Held, extended from December 31, 2012, to September 30, 2013.
- D76, Best Practices Manual (BPM) – Permitting, was moved from Subtask 3.4, “Development of a Permitting Action Plan” to Subtask 3.3, “General Permitting Assistance.”

#### **Task 4 – Site Characterization and Modeling**

Significant accomplishments for Task 4 for the reporting period included the following:

- Attended the Core Analysis Basics Workshop and 2012 PCOR Partnership Annual Meeting on September 11–13, 2012, in Milwaukee, Wisconsin.
- **Bell Creek** test site activities included the following:
  - Continued work on the fieldwide 3-D geologic model, including the following:
    - ◆ Explored water saturation techniques.
    - ◆ Corrected gamma ray curves.
    - ◆ Continued integration of various core analyses data.
    - ◆ Computed the pressure gradient.
    - ◆ Continued petrophysics.

- ◆ Analyzed wireline logs from monitoring well.
  - ◆ Continued lithofacies modeling to determine effective and total porosity values.
  - ◆ Began picking tops for the geologic model, including quality assurance/quality control of the well locations, adding all Phase 9 boundaries, completing the porosity, and continuing the permeability.
- Continued work on the geomechanical model, including the following:
  - ◆ Finalized the 1-D model.
  - ◆ Initiated the 3-D model by incorporating the 1-D model results.
- Continued work on the facies model, including the following:
  - ◆ Prepared digital core descriptions.
- Updated the PETRA database with new bottomhole pressure (BHP) data and core permeability logs.
- Completed clay typing and mineral mapping of four sidewall core samples and prepared a short report currently undergoing in-house review.
- Began compiling data for five U.S. Geological Survey (USGS) core samples for clay typing and mineral mapping.
- Received thin sections from Wagner Petrographic and have retaken all the photomicrographs.
- Discussed special core analysis (SCAL) work with Core Labs.
- Continued work on proposed SCAL work plan.
- Submitted four sidewall core and five USGS core samples for clay typing and mineral mapping through x-ray diffraction, x-ray fluorescence, and scanning electron microscopy analyses.
- Continued sample selection for a CO<sub>2</sub> exposure study of 14 samples within the Mowry and Muddy Formations.
- Continued well log interpretation on the log suite from monitoring well 0506OW.
- Began mining reservoir property and lab analysis data for use in further characterization and geologic modeling efforts.
- **Fort Nelson** test site activities included the following:
  - Continued building a 1-D mechanical earth model (MEM), and began preparation of a summary and report.
  - Began planning for the 3-D MEM.
  - Created several plume maps.
  - Provided technical assistance to SET on its presentations to the British Columbia Oil and Gas Commission and SET upper management.
  - Continued work on improving the latest iteration of the static geologic model, particularly with respect to well log analysis and lithofacies distribution.
  - Continued the multimineral analysis of well logs for the updated static geologic model.
  - Submitted on September 6, 2012, a brief project update for use in the next Carbon Sequestration Leadership Forum (CSLF) Strategic Plan Implementation Report (SPIR).
  - Prepared a draft paper entitled “Overview, Status, and Future of the Fort Nelson CCS Project” for the upcoming GHGT-11.
  - Began preparation of a draft poster for GHGT-11.

- Participated in a conference call with DOE regarding the lack of planned winter (2012–2013) activities for the Fort Nelson site.

Actual or anticipated problems, delays, or changes during the reporting period included the following:

- D65, Fort Nelson Test Site – Site Characterization Report, was provided to SET in April 2012 for its review and comment. No comments have been received to date.
- D41/M32, Fort Nelson Test Site – Geochemical Report, was given to SET on September 12, 2012, for review and comment. No comments have been received to date.
- After reevaluation of scheduled activities associated with the Bell Creek test site, several deliverables and a milestone have been changed. They include the following:
  - D33, Geochemical Final Report, has been renamed to Preinjection Geochemical Report and remains due March 31, 2013.
  - M12, Geochemical Work Completed, has been renamed to Preinjection Geochemical Work Completed and remains due March 31, 2013.
  - D64, Site Characterization Report, has been extended from September 30, 2012, to August 31, 2013.
  - D96, 3-D Seismic Acquisition and Characterization Report, remains due June 30, 2013.

## **Task 5 – Well Drilling and Completion**

Significant accomplishments for Task 5 for the reporting period included the following:

- Staff attended the IEA Greenhouse Gas R&D Programme (IEAGHG) Environmental Impacts of CO<sub>2</sub> Storage Workshop held over 3 days in Bozeman, Montana.
- Continued preparation of a technical presentation about the Bell Creek surface water, groundwater, and soil gas baseline sampling program to be given to the PCOR Partnership Technical Advisory Board (TAB).
- Continued work on a value-added preinjection surface water, groundwater, and soil gas baseline MVA sampling and analysis report including results.
- Continued incorporating the June–August sampling event data, which will provide a comparison between cool- and warm-weather samples.
- Continued planning and preparations for the November soil gas- and water-sampling event at Bell Creek.
- Completed Event 4 (August 5–10, 2012) of baseline soil gas and water sampling MVA activities.
- Finalized and distributed the Event 2 (April 23–29, 2012) landowner packages that included water analysis baseline MVA activities.
- Completed review of nearly 600 well files for wells located in and surrounding the Bell Creek oil field, and compiled completions and reservoir property data into a database.
- Continued preparation of a mitigation plan under probable scenarios of vertical CO<sub>2</sub> migration.

- Continued deep surface-monitoring activities including an evaluation as to the feasibility of installing two deep groundwater-monitoring wells and planning preinjection baseline logging and seismic acquisitions.
- Downloaded and cleared data archived on the Qorex fiber optic distributed temperature system and Promore pressure temperature gauge systems installed in the 0506OW well.
- Continued planning for baseline MVA acquisitions, including seismic and pulsed-neutron well log campaign.
- Presented an “Overview of the Bell Creek Combined CO<sub>2</sub> Storage and CO<sub>2</sub> EOR Project” at the 34th International Geological Congress held August 5–10, 2012, in Brisbane, Australia.
- Participated in a pulsed neutron and tracer flood knowledge-sharing meeting with Denbury, Schlumberger, and ProTechnics held August 20, 2012, in Plano, Texas.
- Prepared a draft paper and presentation on the Bell Creek project for the upcoming GHGT-11.
- Attended the Core Analysis Basics Workshop and 2012 PCOR Partnership Annual Meeting on September 11–13, 2012, in Milwaukee, Wisconsin.
- Began evaluation of a tracer flood study at Bell Creek as an MVA technique.
- Sent a formal request to Denbury to install ten soil gas profile stations at Bell Creek to supplement the MVA program and continued cost and logistics planning.
- Planned Year 6 activities.
- Prepared for participation in a MVA Knowledge-Sharing Workshop in Plano, Texas, hosted by Denbury.

Actual or anticipated problems, delays, or changes during the reporting period included the following:

- After reevaluation of scheduled activities associated with the Bell Creek test site, a deliverable and a milestone have been changed. They include the following:
  - D42, Injection Experimental Design Package, has been extended from September 30, 2012, to October 31, 2013.
  - M27, MVA Equipment Installation and Baseline MVA Activities Completed, has been rescheduled from September 30, 2013, to May 31, 2013.

## **Task 6 – Infrastructure Development**

Significant accomplishments for Task 6 for the reporting period included the following:

- Participated in an EERC-wide discussion of CO<sub>2</sub> capture activities that have been performed or are currently under way in-house. A summary of the PCOR Partnership Task 6 activities was presented.
- Hosted partner Nebraska Public Power District (NPPD) at a meeting on July 25, 2012. The discussion encompassed all projects performed at the EERC for NPPD as well as updates of PCOR Partnership activities, the PCOR Partnership Annual Meeting, and this task.

- Attended the NETL CO<sub>2</sub> Capture Technology Meeting held July 9–13, 2012, in Pittsburgh, Pennsylvania. Progress on development and testing of 67 capture technology projects was presented at the conference.
- Attended advanced Integrated Environmental Control Model (IECM) training to learn techniques that can be used to perform “what-if” scenarios with the model. In addition, learned that the booster station calculator within the pipeline module will be included in the next update of the model, which is expected to be available within the next 6 months.
- Discussed pertinent information required to design compressors for use during in-field compression with Ramgen Power Systems personnel.
- Began study of a document from Det Norske Veritas entitled “Design and Operation of CO<sub>2</sub> Pipelines.”
- Attended the Core Analysis Basics Workshop and 2012 PCOR Partnership Annual Meeting on September 11–13, 2012, in Milwaukee, Wisconsin.
- Completed review of the interactive capture technology tree on the partners-only DSS test Web site. The programming team fixed typographical errors and broken links.
- Demonstrated the interactive capture technology tree on the partners-only DSS test Web site at the PCOR Partnership Annual Meeting in the “New for 2012” PCOR Partnership exhibit booth (Figure 6).
- Prepared a paper and presentation on a phased approach to building a hypothetical pipeline network for CO<sub>2</sub> transportation during CCUS for the upcoming American Institute of Chemical Engineers National Meeting scheduled for October 30 – November 2, 2012, in Pittsburgh, Pennsylvania.
- Prepared a draft paper for the upcoming GHGT-11 on the phased approach to building a hypothetical CO<sub>2</sub> pipeline network.
- Began design of a poster for presentation at GHGT-11 based on the draft paper on the phased approach to building a hypothetical CO<sub>2</sub> pipeline network.
- Began the biennial update to the report entitled “Opportunities and Challenges Associated with CO<sub>2</sub> Compression and Transport During CCS Activities” (D85). The first version was submitted in March 2011.

Actual or anticipated problems, delays, or changes during the reporting period included the following:

- In accordance with a reevaluation of task activities, a deliverable and a milestone have been changed. They include the following:
  - D82, Report – Issues Associated with Integration of Advanced Compression Technology into a CO<sub>2</sub> Storage Project, due September 30, 2012, has been deleted.



Figure 6. “New for 2012” exhibit booth at the PCOR Partnership Annual Meeting, featuring a demonstration of the capture technology tree.

- M41, Decision to Incorporate Ramgen Compression Technology into the Bell Creek Project, replaces D82, and is due January 31, 2014.

### **Task 7 – CO<sub>2</sub> Procurement**

Significant accomplishments for Task 7 for the reporting period included the following:

- Attended the Core Analysis Basics Workshop and 2012 PCOR Partnership Annual Meeting on September 11–13, 2012, in Milwaukee, Wisconsin.
- Participated in ongoing project discussions with Denbury.

Actual or anticipated problems or delays during the reporting period included the following:

- All activities are on schedule, and there were no problems or delays during the reporting period.

### **Task 8 – Transportation and Injection Operations**

Significant accomplishments for Task 8 for the reporting period included the following:

- Continued reviewing information about EOR injection site surface facilities.
- Initiated a short document summarizing the CO<sub>2</sub> processing at EOR surface facilities.



- Continued to survey availability of Task 8 team members for a tour of the surface facilities at a Denbury EOR injection site.

Actual or anticipated problems, delays, or changes during the reporting period included the following:

- All activities are on schedule, and there were no problems or delays during the reporting period.

## **Task 9 – Operational Monitoring and Modeling**

Significant accomplishments for Task 9 for the reporting period included the following:

- Attended the Core Analysis Basics Workshop and 2012 PCOR Partnership Annual Meeting on September 11–13, 2012, in Milwaukee, Wisconsin.
- Prepared and gave a presentation on FLAC3D™ at the in-house monthly modeling and simulation meeting.
- Modeling staff participated in Schlumberger OFM (Oil Field Manager) Fundamentals training on July 30 and 31, 2012, in Houston, Texas.
- Modeling staff participated in Computer Modelling Group (CMG) simulation software training for PVT (pressure, volume, temperature) (WINPROP) modeling on August 22 and for CO<sub>2</sub> EOR modeling on August 23–24, 2012, in Houston, Texas.
- Modeling staff participated in various training courses at the 2012 TOUGH Symposium held September 17–22, 2012, at Lawrence Berkeley National Laboratory (LBNL) in Berkeley, California. The TOUGH family of codes is a suite of computer programs for the simulation of multiphase fluid and heat flows in porous and fractured media.
- Continued **Bell Creek** site activities, including the following:
  - Continued work on the Phase 1 model prediction.
  - Submitted the executive summary for the Bell Creek Test Site – Simulation Report, Update 1 (D66) on August 31, 2012.
  - Participated in an in-house static modeling update meeting.
  - Participated in an in-house meeting to discuss various predictive simulation scenarios.
  - Discussed and reviewed water saturation calculations.
  - Continued modeling water saturation determination using new approaches.
  - Worked on the water saturation model.
  - Continued work on prediction of new CO<sub>2</sub> injection scenarios.
  - Generated the average pressure with BHP tests.
  - Worked on the simulation scenario with hysteresis.
  - Continued work on the tracer injection pattern design.
  - Continued work on the simulation case with CO<sub>2</sub> solubility in brine.
  - Held a monthly modeling and simulation meeting in-house on September 21, 2012.
  - Received notification on September 14, that a modeling staff member has been accepted to attend the Society of Petroleum Engineers (SPE) Forum Series entitled

- “Novel Techniques for Reservoir Modeling” scheduled for November 4–9, 2012, in Santa Fe, New Mexico.
- Drafted information on the Bell Creek modeling efforts for the DSS.
- Received notification on September 18 that the abstract entitled “Mechanism of Subnormal Pressure Generation in the Bell Creek Oil Field and the Implications to CO<sub>2</sub> Storage” was selected for a knowledge-sharing electronic poster at the 6th International Petroleum Technology Conference (IPTC) scheduled for March 26–28, 2013, in Beijing, China. A decision to accept or decline this opportunity is under review.
- Continued **Fort Nelson** site activities, including the following:
  - Continued incorporating SET’s feedback into the development of the deep geologic system MVA plan.
  - Continued revisions to the MVA plan for surface and shallow subsurface based on recent discussions with SET.
  - Submitted a brief status update on simulation activities (D67) on July 31, 2012.
  - Held a conference call with SET on August 16, 2012. Topics discussed included the following:
    - ◆ SET status update
    - ◆ Outstanding deliverables (D67 [2011], D65/M29, D41/M32, D19)
    - ◆ PCOR Partnership Annual Meeting
    - ◆ Modeling update
  - Presented a poster entitled “Overview of the Fort Nelson CCS Project” at the 34th International Geological Congress held August 5–10, 2012, in Brisbane, Australia.
  - Addressed questions raised by SET regarding the risk assessment simulations and provided additional data.
  - Worked on a draft paper entitled “The Role of Static and Dynamic Modeling in the Fort Nelson CCS Project” for the upcoming GHGT-11.
  - Began work on a poster for the upcoming GHGT-11.

Actual or anticipated problems, delays, or changes during the reporting period included the following:

- D67, Fort Nelson Test Site – Simulation Report, was provided to SET in September 2011 for review and comment. No comments have been received to date.
- After reevaluation, the following deliverables were deleted and will now be reported on in the quarterly progress reports:
  - D71, Bell Creek Test Site – Quarterly Summary of Operations, due October 31, 2013 – July 31, 2017.
  - D72, Fort Nelson Test Site – Quarterly Summary of Operations, due July 31, 2014 – July 31, 2017.

## **Task 10 – Site Closure**

This task is anticipated to be initiated in Quarter 1, BP5, Year 9 (October 2015).

### **Task 11 – Postinjection Monitoring and Modeling**

This task is anticipated to be initiated in Quarter 1, BP5, Year 9 (October 2015).

### **Task 12 – Project Assessment**

Significant accomplishments for Task 13 for the reporting period included the following:

- Submitted D57 Project Assessment Annual Report for the period October 1, 2010 – September 30, 2011, on December 30, 2011.

### **Task 13 – Project Management**

Significant accomplishments for Task 13 for the reporting period included the following:

- Welcomed Air Products and Chemicals, Inc., back as a PCOR Partnership partner.
- Held a task leader meeting on July 26, 2012. Topics discussed included the upcoming annual meeting and workshop, a Regulatory Roundup recap, upcoming conferences, key Bell Creek project dates, and upcoming deliverables.
- Participated on July 17 and 18, 2012, in the Geologic CO<sub>2</sub> Sequestration: Reevaluating Storage Efficiency Estimates Workshop in Austin, Texas.
- Presented on the PCOR Partnership Program, including a poster on the Fort Nelson CCS Project, at the 34th International Geological Congress held August 5–10, 2012, in Brisbane, Australia.
- Reviewed a draft DOE Techline on the latest version of the PCOR Partnership Atlas.
- Submitted four abstracts and subsequently presented four posters at the DOE Carbon Storage R&D Review Meeting, including the following:
  - “PCOR Partnership Phase III”
  - “Regional and Project-Based CCS Outreach – The PCOR Partnership Experience”
  - “CO<sub>2</sub> Storage Resource Potential of the Cambro–Ordovician Saline System in the Western Interior of North America”
  - “A Simulation Study of Simultaneous Acid Gas EOR Storage at Apache’s Zama F Pool”
- Upon DOE request, provided suggestions for a key milestone for each quarter for Program Year 6 (October 1, 2012 – September 30, 2013).
- Participated in several conference calls with consultant BillyJack Consulting.
- Prepared for the PCOR Partnership Annual Meeting and Workshop scheduled for September 11–13, 2012, in Milwaukee, Wisconsin. Activities included the following:
  - Held an in-house annual meeting run-through on August 27, 2012.
  - Continued preparation of booth backdrops.
  - Continued preparation of a program time line running from 2003–2012 (9 years).
  - Continued development of the presentations and handouts for the Core Analysis Basics Workshop.
  - Sent an e-mail blast to the partnership on August 21, 2012, with information about the hotel room block at the InterContinental Hotel.

- Sent an e-mail to all annual meeting participants on August 31, 2012, with “Everything You Need to Know” about the upcoming annual meeting and workshop.
- Held a short PCOR Partnership TAB breakfast meeting on September 12, 2012, in conjunction with the annual meeting in Milwaukee, Wisconsin. Topics discussed included an overview of the presentation to be given at the annual meeting, confidentiality agreements, upcoming WebEx topics, and plans for the next meeting.
- Hosted the 2012 PCOR Partnership Annual Meeting and Workshop on September 11–13, 2012, in Milwaukee, Wisconsin. The workshop had 62 participants. The annual meeting attracted 84 attendees representing 51 organizations from 15 states, the District of Columbia, and two foreign countries (with Canada represented by four provinces) (Figure 7). Evaluations are currently being summarized.
- Received notification on September 18 that the abstract entitled “The Plains CO<sub>2</sub> Reduction (PCOR) Partnership: CO<sub>2</sub> Sequestration Demonstration Projects Adding Value to the Oil and Gas Industry” was selected for a knowledge-sharing electronic poster at the 6th IPTC scheduled for March 26–28, 2013, in Beijing, China. A decision to accept or decline this opportunity is under review.
- Reviewed a journal article for the International Journal of Greenhouse Gas Control entitled “Estimating CO<sub>2</sub> Plume Size: A Correlation for Site Screening.”
- Provided requested information about the Phase II McGregor huff ‘n’ puff test to DOE.
- Continued planning for an interim financial closeout of the Phase II award in order to comply with UND’s records retention policy.
- Deliverables and milestones completed in July:
  - June monthly update
  - Task 2: D13 – Public Site Updates
  - Task 9: D67 – Fort Nelson Test Site – Simulation Report (Update)
  - Task 13: D58/D59 – Quarterly Progress Report/Milestone Quarterly Report
  - Task 14: M23 – Monthly WWG Conference Call Held
- Deliverables and milestones completed in August:
  - July monthly update



Figure 7. Attendees at the 2012 PCOR Partnership Annual Meeting held September 12 and 13 in Milwaukee, Wisconsin.

- Task 9: D66 – Bell Creek Test Site – Simulation Report (Update)
- Task 14: M23 – Monthly WWG Conference Call Held
- Deliverables and milestones completed in September:
  - August monthly update
  - Task 1: D1 – Review of Source Attributes
  - Task 1: D10 – Demonstration Project Reporting System Update
  - Task 14: M23 – Monthly WWG Conference Call Held

Actual or anticipated problems, delays, or changes during the reporting period included the following:

- Received an e-mail on September 13, 2012, from SET indicating that it will not be conducting 2012–2013 winter activities, i.e., exploratory well-drilling or 3-D seismic activities. This will further delay CO<sub>2</sub> injection at the Fort Nelson test site. On September 21, notified DOE and provided several possible options for a path forward. Participated in a conference call with DOE on September 26 to discuss a path forward.
- On September 28, 2012, a letter requesting changes to the program deliverables and milestones was sent to the DOE project manager. The changes were approved and have been described herein under the appropriate tasks.

#### **Task 14 – RCSP WWG Coordination**

Significant accomplishments for Task 14 for the reporting period included the following:

- Distributed notes from the June 28, 2012, conference call.
- Distributed a listing of potential research projects and a listing of completed and ongoing water and energy research projects in preparation for the July monthly conference call.
- Held the monthly conference call on July 24, 2012. There were 11 participants on this call, including three EERC personnel. Topics discussed included:
  - Development of data tables related to the research agenda.
  - A fact sheet to be developed by the WWG.
- Discussed options for additional fact sheet development.
- Distributed two tables describing ongoing or recently completed water and CCS-related research projects to the WWG members on August 15, 2012.
- Distributed the notes from the July conference call on August 17, 2012.
- Held the monthly conference call on August 30, 2012. There were 11 participants on this call, including three EERC personnel. Topics discussed included:
  - Development of data tables related to the research agenda.
  - A fact sheet to be developed by the WWG.
- Began development of a new WWG fact sheet for discussion during the September conference call.
- Distributed information for the September conference call, including information supporting the effort to develop a formal research agenda.
- Held the monthly conference call on September 27, 2012. There were eight participants on this call, including three EERC personnel. Topics discussed included:

- Review of the cover letter and research agenda tables prior to peer review.
- A fact sheet relating to water resource use and protection.
- Began assessment for water and CCS methodologies document.

Actual or anticipated problems, delays, or changes during the reporting period included the following:

- After reevaluation, several changes were made to reporting requirements for this task. They include the following:
  - Create a new deliverable, D99, Water/CCS Nexus-Related Fact Sheet, due March 31, 2013; October 31, 2013; and October 31, 2014.
  - Adjust period of performance for Subtask 14.4 to be continuous from July 1, 2012, through May 31, 2017.
  - Delete D79, Water Resource Estimation Methodology Documents, due November 30, 2012, and 2015.
  - Adjust period of performance for Subtask 14.5 to be continuous from October 1, 2014, through November 30, 2016.
  - Delete interim BPM due June 30, 2013.

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

Significant accomplishments for Task 15 for the reporting period included the following:

- Compiled data from Apache Canada, Ltd., for updated injection and production volumes.
- Worked on running history-matching simulations for the model using updated production and injection data (current through May 2012).
- Continued work on the dynamic model for the F Pool pinnacle.
- Staff presented a poster entitled “A Simulation Study of Simultaneous Acid Gas EOR and CO<sub>2</sub> Storage at Apache’s Zama F Pool” on August 21, 2012, at the DOE Carbon Storage R&D Project Review Meeting held in Pittsburgh, Pennsylvania.
- Worked on running several predictive simulation scenarios (EOR and water extraction).
- Submitted on September 6, 2012, a brief project update for use in the next CSLF SPIR.
- Modified the draft paper for GHGT-11 on the Zama F Pool simulation study, and began preparation of a poster.
- Obtained reservoir operational data and geologic characterization data for four additional pinnacles from Apache Canada.
- Beginning on September 1, 2012, started data compilation for building the static and dynamic models for additional pinnacles.

Actual or anticipated problems, delays, or changes during the reporting period included the following:

- Based on data acquisition delays, D86, Updated Regional Technology Implementation Plan, has been extended from April 30, 2013, to September 30, 2013.
- Created a new milestone, M40, Further Characterization Completed, due September 30, 2013.

### **Task 16 – Characterization of the Basal Cambrian System**

Significant accomplishments for Task 16 for the reporting period included the following:

- Attended the Core Analysis Basics Workshop and 2012 PCOR Partnership Annual Meeting on September 11–13, 2012, in Milwaukee, Wisconsin.
- Continued the multimineral analysis of the wells used in the development of the 3-D geologic model of the Cambro–Ordovician system.
- Began the geostatistical analysis of the wells with multimineral analysis. The effort will distribute the lithologic properties throughout the Cambro–Ordovician study area.
- Continued work on the 3-D model of the Cambro–Ordovician saline system.
- Performed mineralogical analysis on 55 wells.
- Acquired missing resistivity logs.
- Staff presented a poster entitled “CO<sub>2</sub> Storage of the Cambro–Ordovician Saline System in the Northern Great Plains–Prairie Region of North America” on August 21, 2012, at the DOE Carbon Storage R&D Project Review Meeting held in Pittsburgh, Pennsylvania.
- Prepared a draft paper for the upcoming GHGT-11.
- Began development of a report outline for the wellbore integrity investigation.
- Began development of a report outline for the geochemical characterization of the system.
- Began writing a portion of the report that describes the development of the 3-D model.
- Continued work on the geochemical analysis of the basal Cambro–Ordovician saline system with respect to potential chemical reactions that might be expected with the injection of CO<sub>2</sub>.
- Hosted a meeting of the Basal Aquifer Technical Committee on September 13, 2012, in Milwaukee, Wisconsin. Topics included updates on well integrity, the 3-D model, and injection scenarios.
- Presented a preliminary 3-D model of the full extent of the Cambro–Ordovician saline system in Milwaukee. Revisions to the model are under way.
- With regard to the geochemical investigation of potential interactions of injected CO<sub>2</sub> with rocks in the saline system, the following decisions were made:
  - The Lawrence Livermore database will be used for the PHREEQC modeling calculations. A request has been made to the Canadian Nuclear Waste Management Organization (NWMO) for the database that Bachu et al. used for their calculations. Calculations will move forward with the Lawrence Livermore database as it is not expected that the NWMO will share the database.
  - FactSage will be used to handle pressure variations as PHREEQC does not have this functionality.

- The porosity input for the modeling will be determined based on experimental results obtained in the EERC’s Applied Geology Laboratory.
- Fifteen samples (13 Deadwood and two Black Island) have been submitted for x-ray mineral mapping prior to CO<sub>2</sub> exposure. The CO<sub>2</sub> exposure experiments will take place for 30 days, immediately followed by a mapping analysis.
- Gas data for the Deadwood Black Island may be available. The gas may be low-Btu, high-CO<sub>2</sub>-containing gas that will be important conditions to consider for the modeling effort.
- Modified the draft GHGT-11 paper with input from Alberta Innovates – Technology Futures (AITF).

Actual or anticipated problems, delays, or changes during the reporting period included the following:

- Work on the 3-D model fell behind schedule in August. Additional resources have now been focused in this area, and modeling efforts are back on track to meet the required deliverables.
- Because of end-of-year holidays, D92, Report – Storage Capacity and Regional Implications for Large-Scale Storage in the Basal Cambrian System, has been extended from December 31, 2013, to March 31, 2014.

### **PHASE III COST STATUS**

The approved BP4 (Modification No. 23) budget along with actual costs incurred and in-kind cost share reported are shown in Table 3. A spending plan for BP4 and actual incurred cost by quarter of cash funds for BP4 are provided in Figure 8 and Table 4.

### **PHASE III SCHEDULE STATUS**

Table 5 lists all deliverables and milestones by quarter, with completion dates, through the end of the reporting period (see Table 6 for the Gantt chart for BP4, Years 5 and 6).

**Table 4. Phase III Budget – BP4**

Organization	Approved Budget, \$	Actual Costs Incurred, \$
DOE Share – Cash	58,400,697	24,386,383
Nonfederal Share – Cash	2,411,971	1,918,073
Nonfederal Share – In-Kind	27,034,759	23,729,890
Total	87,847,427	50,034,346



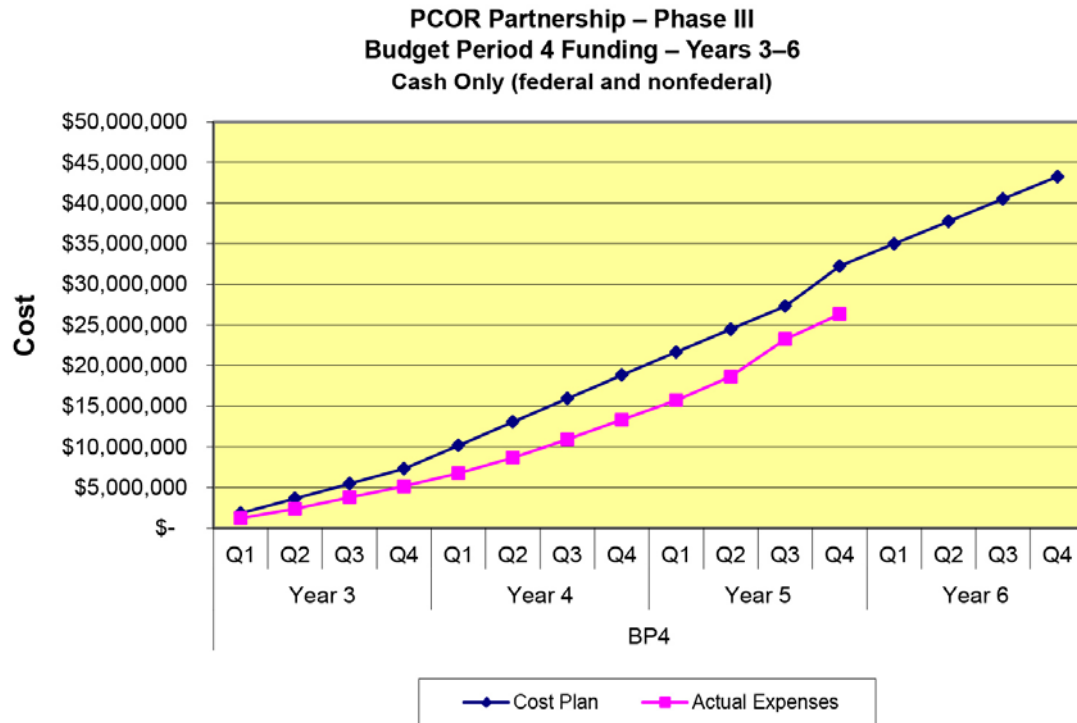


Figure 8. PCOR Partnership Phase III, BP4, Years 3–6 funding (cash only).

**Table 5. BP4 – Years 3–6 Spending Plan**

Budget Period 4

Baseline Reporting Quarter	Year 3								Year 4							
	Q1		Q2		Q3		Q4		Q1		Q2		Q3		Q4	
	Q1	Cum. BP Total	Q2	Cum. BP Total	Q3	Cum. BP Total	Q4	Cum. BP Total	Q1	Cum. BP Total	Q2	Cum. BP Total	Q3	Cum. BP Total	Q4	Cum. BP Total
<b>Baseline Cost Plan</b>																
Federal Share	\$1,692,969	\$ 1,692,969	\$ 1,692,969	\$ 3,385,938	\$ 1,692,969	\$ 5,078,906	\$1,692,969	\$ 6,771,875	\$2,707,624	\$ 9,479,499	\$2,707,624	\$12,187,123	\$2,707,624	\$14,894,747	\$2,707,624	\$17,602,371
Nonfederal Share	\$ 127,735	\$ 127,735	\$ 127,735	\$ 255,470	\$ 127,735	\$ 383,204	\$ 127,735	\$ 510,939	\$ 177,644	\$ 688,583	\$ 177,644	\$ 866,227	\$ 177,644	\$ 1,043,871	\$ 177,644	\$ 1,221,515
Total Planned	\$1,820,704	\$ 1,820,704	\$ 1,820,704	\$ 3,641,407	\$ 1,820,704	\$ 5,462,111	\$1,820,704	\$ 7,282,814	\$2,885,268	\$10,168,082	\$2,885,268	\$13,053,350	\$2,885,268	\$15,938,618	\$2,885,268	\$18,823,886
<b>Actual Incurred Cost</b>																
Federal Share	\$1,025,953	\$ 1,025,953	\$ 983,104	\$ 2,009,057	\$ 1,352,281	\$ 3,361,338	\$1,347,660	\$ 4,708,998	\$1,531,401	\$ 6,240,399	\$1,864,304	\$ 8,104,703	\$1,982,465	\$10,087,168	\$2,163,678	\$12,250,846
Nonfederal Share	\$ 171,873	\$ 171,873	\$ 164,935	\$ 336,808	\$ 74,929	\$ 411,737	\$ 4,563	\$ 416,300	\$ 80,246	\$ 496,546	\$ 56,614	\$ 553,160	\$ 257,142	\$ 810,302	\$ 251,531	\$ 1,061,833
Total Incurred Cost	\$1,197,826	\$ 1,197,826	\$ 1,148,039	\$ 2,345,865	\$ 1,427,210	\$ 3,773,075	\$1,352,223	\$ 5,125,298	\$1,611,647	\$ 6,736,945	\$1,920,918	\$ 8,657,863	\$2,239,607	\$10,897,470	\$2,415,209	\$13,312,679
<b>Variance</b>																
Federal Share	\$ 667,016	\$ 667,016	\$ 709,865	\$ 1,376,881	\$ 340,688	\$ 1,717,568	\$ 345,309	\$ 2,062,877	\$1,176,223	\$ 3,239,100	\$ 843,320	\$ 4,082,420	\$ 725,159	\$ 4,807,579	\$ 543,946	\$ 5,351,525
Nonfederal Share	\$ (44,138)	\$ (44,138)	\$ (37,200)	\$ (81,339)	\$ 52,806	\$ (28,533)	\$ 123,172	\$ 94,639	\$ 97,398	\$ 192,037	\$ 121,030	\$ 313,067	\$ (79,498)	\$ 233,569	\$ (73,887)	\$ 159,682
Total Variance	\$ 622,878	\$ 622,878	\$ 672,665	\$ 1,295,542	\$ 393,494	\$ 1,689,036	\$ 468,481	\$ 2,157,516	\$1,273,621	\$ 3,431,137	\$ 964,350	\$ 4,395,487	\$ 645,661	\$ 5,041,148	\$ 470,059	\$ 5,511,207

Baseline Reporting Quarter	Year 5								Year 6							
	Q1		Q2		Q3		Q4		Q1		Q2		Q3		Q4	
	Q1	Cum. BP Total	Q2	Cum. BP Total	Q3	Cum. BP Total	Q4	Cum. BP Total	Q1	Cum. BP Total	Q2	Cum. BP Total	Q3	Cum. BP Total	Q4	Cum. BP Total
<b>Baseline Cost Plan</b>																
Federal Share	\$2,671,493	\$20,273,864	\$ 2,671,493	\$22,945,356	\$ 2,671,493	\$25,616,849	\$4,771,676	\$30,388,524	\$2,612,701	\$33,001,225	\$2,612,701	\$35,613,925	\$2,612,701	\$38,226,626	\$2,612,701	\$40,839,326
Nonfederal Share	\$ 152,429	\$ 1,373,944	\$ 152,429	\$ 1,526,373	\$ 152,429	\$ 1,678,802	\$ 152,429	\$ 1,831,231	\$ 145,185	\$ 1,976,416	\$ 145,185	\$ 2,121,601	\$ 145,185	\$ 2,266,786	\$ 145,185	\$ 2,411,971
Total Planned	\$2,823,922	\$21,647,808	\$ 2,823,922	\$24,471,729	\$ 2,823,922	\$27,295,651	\$4,924,105	\$32,219,755	\$2,757,886	\$34,977,641	\$2,757,886	\$37,735,526	\$2,757,886	\$40,493,412	\$2,757,886	\$43,251,297
<b>Actual Incurred Cost</b>																
Federal Share	\$2,255,269	\$14,506,115	\$ 2,762,335	\$17,268,450	\$ 4,349,081	\$21,617,531	\$2,768,852	\$24,386,383								
Nonfederal Share	\$ 160,751	\$ 1,222,584	\$ 134,138	\$ 1,356,722	\$ 264,409	\$ 1,621,131	\$ 296,942	\$ 1,918,073								
Total Incurred Cost	\$2,416,020	\$15,728,699	\$ 2,896,473	\$18,625,172	\$ 4,613,490	\$23,238,662	\$3,065,794	\$26,304,456								
<b>Variance</b>																
Federal Share	\$ 416,224	\$ 5,767,749	\$ (90,843)	\$ 5,676,906	\$ (1,677,589)	\$ 3,999,318	\$2,002,824	\$ 6,002,141								
Nonfederal Share	\$ (8,322)	\$ 151,360	\$ 18,291	\$ 169,651	\$ (111,980)	\$ 57,671	\$ (144,513)	\$ (86,842)								
Total Variance	\$ 407,902	\$ 5,919,109	\$ (72,552)	\$ 5,846,557	\$ (1,789,569)	\$ 4,056,989	\$1,858,311	\$ 5,915,299								

**Table 6. Phase III Milestones and Deliverables**

<b>Title/Description</b>	<b>Due Date</b>	<b>Actual Completion Date</b>
<b>Year 1 – Quarter 1 (October–December 2007)</b>		
D37: Task 4 – Fort Nelson Test Site – Geological Characterization Experimental Design Package	12/31/07	12/28/07
D63: Task 13 – Project Management Plan	12/31/07	12/28/07
M17: Task 4 – Fort Nelson Test Site Selected	12/31/07	12/28/07
<b>Year 1 – Quarter 2 (January–March 2008)</b>		
D38: Task 4 – Fort Nelson Test Site – Geomechanical Experimental Design Package	1/31/08	1/31/08
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	1/31/08	1/31/08
D11: Task 2 – Outreach Plan	3/31/08	3/31/08
D27: Task 3 – Environmental Questionnaire – Fort Nelson Test Site	3/31/08	4/02/08
D30: Task 4 – Williston Basin Test Site – Geomechanical Experimental Design Package	3/31/08	3/31/08
M1: Task 1 – Three Target Areas Selected for Detailed Characterization	3/31/08	3/20/08
M18: Task 4 – Fort Nelson Test Site Geochemical Work Initiated	3/31/08	3/19/08
<b>Year 1 – Quarter 3 (April–June 2008)</b>		
D14: Task 2 – General Phase III Fact Sheet	4/30/08	4/30/08
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	4/30/08	4/30/08
D17: Task 2 – General Phase III Information PowerPoint Presentation	5/30/08	5/30/08
M3: Task 3 – Start Environmental Questionnaire for Williston Basin Test Site	6/30/08	6/27/08
M6: Task 4 – Williston Basin Test Site Geochemical Work Initiated	6/30/08	6/30/08
M7: Task 4 – Williston Basin Test Site Geological Characterization Data Collection Initiated	6/30/08	6/30/08
<b>Year 1 – Quarter 4 (July–September 2008)</b>		
D12: Task 2 – Demonstration Web Pages on the Public Site	7/31/08	7/31/08
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	7/31/08	7/31/08
D1: Task 1 – Review of Source Attributes	9/30/08	9/26/08
M2: Task 1 – Demonstration Project Reporting System (DPRS) Prototype Completed	9/30/08	9/26/08
<b>Year 2 – Quarter 1 (October–December 2008)</b>		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	10/31/08	10/31/08
D20: Task 2 – Documentary Support to PowerPoint and Web Site	12/31/08	12/31/08
D57: Task 12 – Project Assessment Annual Report	12/31/08	12/31/08

Continued . . .

**Table 6. Phase III Milestones and Deliverables (continued)**

<b>Title/Description</b>	<b>Due Date</b>	<b>Actual Completion Date</b>
<b>Year 2 – Quarter 2 (January–March 2009)</b>		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	1/31/09	1/30/09
M21: Task 14 – Outline of White Paper on Nexus of CO <sub>2</sub> CCS and Water, Part Subtask 14.2 – White Paper on Nexus of CCS and Water	2/28/09	2/27/09
D24: Task 2 – PCOR Partnership Region Sequestration General Poster	3/31/09	3/31/09
<b>Year 2 – Quarter 3 (April–June 2009)</b>		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	4/30/09	4/30/09
M23: Task 14 – Monthly WWG Conference Call Held	4/30/09	4/15/09
D2: Task 1 – First Target Area Completed	5/29/09	5/29/09
M23: Task 14 – Monthly WWG Conference Call Held	5/29/09	5/29/09
D16: Task 2 – Fort Nelson Test Site Fact Sheet	5/29/09	5/29/09
M24: Task 14 – WWG Annual Meeting Held	5/31/09	5/07/09
M23: Task 14 – Monthly WWG Conference Call Held	6/30/09	6/25/09
<b>Year 2 – Quarter 4 (July–September 2009)</b>		
M23: Task 14 – Monthly WWG Conference Call Held	N/A	Not required
D19: Task 2 – Fort Nelson Test Site PowerPoint Presentation	7/31/09	7/31/09
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	7/31/09	7/31/09
M22: Task 14 – Draft White Paper – Nexus of CCS and Water Available for Comments	8/17/09	8/18/09 (DOE) 8/21/09 (WWG)
M23: Task 14 – Monthly WWG Conference Call Held	8/31/09	8/25/09
D1: Task 1 – Review of Source Attributes	9/30/09	9/25/09
D3: Task 1 – Permitting Review – One State and One Province	9/30/09	9/30/09
D9: Task 1 – Updated DSS	9/30/09	9/29/09
D47: Task 6 – Report on the Preliminary Design of Advanced Compression Technology	9/30/09	9/30/09
D77: Task 13 – Risk Management Plan Outline	9/30/09	9/18/09
M4: Task 4 – Bell Creek Test Site Selected	9/30/09	9/30/09
M5: Task 4 – Bell Creek Test Site – Data Collection Initiated	9/30/09	9/30/09
M23: Task 14 – Monthly WWG Conference Call Held	9/30/09	9/22/09

Continued . . .

**Table 6. Phase III Milestones and Deliverables (continued)**

<b>Title/Description</b>	<b>Due Date</b>	<b>Actual Completion Date</b>
<b>Year 3 – Quarter 1 (October–December 2009)</b>		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	10/30/09	11/02/09
D78: Task 14 – Final White Paper on the Nexus of CCS and Water	10/30/09	10/28/09
M23: Task 14 – Monthly WWG Conference Call Held	10/31/09	10/26/09
M23: Task 14 – Monthly WWG Conference Call Held	11/30/09	11/16/09
D57: Task 12 – Project Assessment Annual Report	12/31/09	12/31/09
M23: Task 14 – Monthly WWG Conference Call Held	12/31/09	Waived by DOE
<b>Year 3 – Quarter 2 (January–March 2010)</b>		
D13: Task 2 – Public Site Updates	1/15/10	1/15/10
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	1/31/10	1/29/10
M23: Task 14 – Monthly WWG Conference Call Held	1/31/10	1/6/10
D79: Task 14 – Water Resource Estimation Methodology Document	2/28/10	Waived by DOE
M23: Task 14 – Monthly WWG Conference Call Held	2/28/10	2/25/10
D11: Task 2 – Outreach Plan	3/31/10	3/31/10
M23: Task 14 – Monthly WWG Conference Call Held	3/31/10	3/23/10
<b>Year 3 – Quarter 3 (April–June 2010)</b>		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	4/30/10	4/30/10
M23: Task 14 – Monthly WWG Conference Call Held	4/30/10	4/28/10
M23: Task 14 – Monthly WWG Conference Call Held	5/31/10	5/13/10
D17: Task 2 – General Phase III Information PowerPoint Presentation (update)	6/30/10	6/30/10
D19: Task 2 – Fort Nelson Test Site PowerPoint Presentation (update)	6/30/10	6/29/10
M23: Task 14 – Monthly WWG Conference Call Held	6/30/10	6/23/10
M24: Task 14 – WWG Annual Meeting Held	6/30/10	5/13/10
<b>Year 3 – Quarter 4 (July–September 2010)</b>		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	7/31/10	7/29/10
M23: Task 14 – Monthly WWG Conference Call Held	7/31/10	7/28/10
M23: Task 14 – Monthly WWG Conference Call Held	8/31/10	8/31/10
D1: Task 1 – Review of Source Attributes	9/30/10	9/20/10
D52: Task 9 – Fort Nelson Test Site – Site Characterization, Modeling, and Monitoring Plan	9/30/10	9/30/10
M9: Task 4 – Bell Creek Test Site Geological Model Development Initiated	9/30/10	9/30/10
M23: Task 14 – Monthly WWG Conference Call Held	9/30/10	Waived by DOE

Continued . . .

**Table 6. Phase III Milestones and Deliverables (continued)**

<b>Title/Description</b>	<b>Due Date</b>	<b>Actual Completion Date</b>
<b>Year 4 – Quarter 1 (October–December 2010)</b>		
D87: Task 4 – Bell Creek Test Site – Geomechanical Experimental Design Package	10/30/10	10/29/10
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	10/31/10	10/29/10
M23: Task 14 – Monthly WWG Conference Call Held	10/31/10	10/26/10
M23: Task 14 – Monthly WWG Conference Call Held	11/30/10	Waived by DOE
D57: Task 12 – Project Assessment Annual Report	12/31/10	12/23/10
M23: Task 14 – Monthly WWG Conference Call Held	12/31/10	12/13/10
<b>Year 4 – Quarter 2 (January–March 2011)</b>		
M8: Task 4 – Bell Creek Test Site Wellbore Leakage Data Collection Initiated	1/15/11	1/14/11
D31: Task 4 – Bell Creek Test Site – Geological Characterization Experimental Design Package	1/31/11	1/27/11
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	1/31/11	1/31/11
M23: Task 14 – Monthly WWG Conference Call Held	1/31/11	1/19/11
M28: Task 4 – Bell Creek Geological Experimental Design Package Completed	1/31/11	1/27/11
D15: Task 2 – Bell Creek Test Site Fact Sheet	2/28/11	2/28/11
M23: Task 14 – Monthly WWG Conference Call Held	2/28/11	Waived by DOE
D10: Task 1 – Demonstration Project Reporting System Update	3/31/11	3/25/11
D18: Task 2 – Bell Creek Test Site PowerPoint Presentation (Update)	3/31/11	3/31/11
D26: Task 2 – Fort Nelson Test Site Poster	3/31/11	3/31/11
D28: Task 3 – Environmental Questionnaire – Bell Creek Test Site	3/31/11	3/30/11
D85: Task 6 – Report – Opportunities and Challenges Associated with CO <sub>2</sub> Compression and Transportation During CCS Activities	3/31/11	3/31/11
M23: Task 14 – Monthly WWG Conference Call Held	3/31/11	3/22/11
<b>Year 4 – Quarter 3 (April–June 2011)</b>		
M30: Task 5 – Bell Creek Test Site Baseline MVA Initiated	4/01/11	3/24/11
M23: Task 14 – Monthly WWG Conference Call Held	4/30/11	4/21/11
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	4/30/11	4/29/11
D88: Task 13 – Programmatic Risk Management Plan	4/30/11	4/29/11
D17: Task 2 – General Phase III Information PowerPoint Presentation (Update)	5/31/11	5/31/11
D34: Task 4 – Bell Creek Test Site – Baseline Hydrogeological Final Report	5/31/11	5/31/11

Continued . . .

**Table 6. Phase III Milestones and Deliverables (continued)**

<b>Title/Description</b>	<b>Due Date</b>	<b>Actual Completion Date</b>
<b>Year 4 – Quarter 3 (April–June 2011) (continued)</b>		
M23: Task 14 – Monthly WWG Conference Call Held	5/31/11	5/5/11
D19: Task 2 – Fort Nelson Test Site PowerPoint Presentation (Update)	6/30/11	6/30/11
M23: Task 14 – Monthly WWG Conference Call Held	6/30/11	6/23/11
M24: Task 14 – WWG Annual Meeting Held	6/30/11	5/5/11
<b>Year 4 – Quarter 4 (July–September 2011)</b>		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	7/31/11	7/28/11
M23: Task 14 – Monthly WWG Conference Call Held	7/31/11	7/26/11
D29: Task 3 – Permitting Action Plan	8/31/11	8/31/11
D66: Task 9 – Bell Creek Test Site – Simulation Report	8/31/11	8/31/11
D67: Task 9 – Fort Nelson Test Site – Simulation Report	7/31/11	8/31/11
M23: Task 14 – Monthly WWG Conference Call Held	8/31/11	8/24/11
D1: Task 1 – Review of Source Attributes	9/30/11	9/21/11
D4: Task 1 – Permitting Review – Basic EPA Requirements <sup>+</sup>	9/30/11	9/30/11
D9: Task 1 – Updated DSS	9/30/11	9/23/11
D25: Task 2 – Bell Creek Test Site Poster	9/30/11	9/30/11
D50: Task 9 – Bell Creek Test Site – Site Characterization, Modeling, and Monitoring Plan	9/30/11	9/30/11
M23: Task 14 – Monthly WWG Conference Call Held	9/30/11	Waived by DOE
M31: Task 9 – Bell Creek Test Site – Site Characterization, Modeling, and Monitoring Plan Completed	9/30/11	9/30/11
M33: Task 16 – Basal Cambrian Baseline Geological Characterization Completed	9/30/11	9/29/11
<b>Year 5 – Quarter 1 (October–December 2011)</b>		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	10/31/11	10/31/11
M23: Task 14 – Monthly WWG Conference Call Held	10/31/11	10/26/11
M23: Task 14 – Monthly WWG Conference Call Held	11/30/11	11/30/11
D57: Task 12 – Project Assessment Annual Report	12/31/11	12/30/11
M23: Task 14 – Monthly WWG Conference Call Held	12/31/11	Waived by DOE
M34: Task 16 – Basal Cambrian Static Geological Model Completed	12/31/11	12/21/11

<sup>+</sup> Name change requested September 28, 2011, and approved October 3, 2011.

Continued . . .

**Table 6. Phase III Milestones and Deliverables (continued)**

<b>Title/Description</b>	<b>Due Date</b>	<b>Actual Completion Date</b>
<b>Year 5 – Quarter 2 (January–March 2012)</b>		
M16: Task 4 – Bell Creek Test Site – Initiation of Production and Injection Simulation	1/13/12	12/29/11
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	1/31/12	1/31/12
D65: Task 4 – Fort Nelson Test Site – Site Characterization Report	1/31/12	1/31/12
D81: Task 1 – Regional Carbon Sequestration Atlas (Update)	1/31/12	1/31/12
M23: Task 14 – Monthly WWG Conference Call Held	1/31/12	1/19/12
M29: Task 4 – Fort Nelson Site Characterization Report Completed	1/31/12	1/31/12
D91: Task 16 – Report – Geological Characterization of the Basal Cambrian System in the Williston Basin	2/29/12	2/29/12
M23: Task 14 – Monthly WWG Conference Call Held	2/29/12	2/28/12
D5: Task 1 – Second Target Area Completed	3/31/12	3/30/12
D18: Task 2 – Bell Creek Test Site PowerPoint Presentation (Update)	3/31/12	3/30/12
M10: Task 4 – Bell Creek Test Site Wellbore Leakage Data Collection Completed	3/31/12	3/12/12
M36: Task 13 – Annual Advisory Board Scheduled	3/31/12	3/28/12
M23: Task 14 – Monthly WWG Conference Call Held	3/31/12	3/27/12
<b>Year 5 – Quarter 3 (April–June 2012)</b>		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	4/30/12	4/30/12
M23: Task 14 – Monthly WWG Conference Call Held	4/30/12	Waived by DOE
D17: Task 2 – General Phase III Information PowerPoint Presentation (Update)	5/31/12	5/31/12
M23: Task 14 – Monthly WWG Conference Call Held	5/31/12	5/31/12
D19: Task 2 – Fort Nelson Test Site PowerPoint Presentation (Update)	6/30/12	6/29/12
D41: Task 4 – Fort Nelson Test Site – Geochemical Report	6/30/12	6/29/12
D84: Task 6 – Report – A Phased Approach to Building Pipeline Network for CO <sub>2</sub> Transportation During CCS	6/30/12	6/29/12
M23: Task 14 – Monthly WWG Conference Call Held	6/30/12	6/28/12
M24: Task 14 – WWG Annual Meeting Held	6/30/12	5/3/12
M32: Task 4 – Fort Nelson Geochemical Report Completed	6/30/12	6/29/12

Continued . . .



**Table 6. Phase III Milestones and Deliverables (continued)**

<b>Title/Description</b>	<b>Due Date</b>	<b>Actual Completion Date</b>
<b>Year 5 – Quarter 4 (July–September 2012)</b>		
D13: Task 2 – Public Site Updates	7/31/12	7/31/12
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	7/31/12	7/31/12
D67: Task 9 – Fort Nelson Test Site – Simulation Report	7/31/12	7/31/12
M23: Task 14 – Monthly WWG Conference Call Held	7/31/12	7/24/12
D66: Task 9 – Bell Creek Test Site – Simulation Report	8/31/12	8/31/12
M23: Task 14 – Monthly WWG Conference Call Held	8/31/12	8/30/12
D1: Task 1 – Review of Source Attributes	9/30/12	9/28/12
D10: Task 1 – DPRS Update	9/30/12	9/28/12
M23: Task 14 – Monthly WWG Conference Call Held	9/30/12	9/27/12
<b>Year 6 – Quarter 1 (October–December 2012)</b>		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	10/31/12	
M23: Task 14 – Monthly WWG Conference Call Held	10/31/12	
M23: Task 14 – Monthly WWG Conference Call Held	11/30/12	
D57: Task 12 – Project Assessment Annual Report	12/31/12	
M23: Task 14 – Monthly WWG Conference Call Held	12/31/12	
M37: Task 3 – IOGCC Task Force Subgroup Meeting 1 Held	12/31/12	
<b>Year 6 – Quarter 2 (January–March 2013)</b>		
D32: Task 4 – Bell Creek Test Site – Geomechanical Final Report	1/31/13	
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	1/31/13	
D94: Task 2 – Aquistore Project Fact Sheet	1/31/13	
M23: Task 14 – Monthly WWG Conference Call Held	1/31/13	
D14: Task 2 – General Phase III Fact Sheet (Update)	2/28/13	
M23: Task 14 – Monthly WWG Conference Call Held	2/28/13	
D33: Task 4 – Bell Creek Test Site – Geochemical Final Report	3/31/13	
D85: Task 6 – Report – Opportunities and Challenges Associated with CO <sub>2</sub> Compression and Transportation During CCS Activities	3/31/13	
D89: Task 16 – Report – Geochemical Evaluation of the Basal Cambrian System	3/31/13	
D99: Task 14 – Water/CCS Nexus-Related Fact Sheet	3/31/13	
M12: Task 4 – Bell Creek Test Site Geochemical Work Completed	3/31/13	

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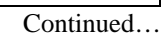
**Table 6. Phase III Milestones and Deliverables (continued)**

<b>Title/Description</b>	<b>Due Date</b>	<b>Actual Completion Date</b>
<b>Year 6 – Quarter 2 (January–March 2013) (continued)</b>		
M23: Task 14 – Monthly WWG Conference Call Held	3/31/13	
M36: Annual Advisory Board Meeting Scheduled	3/31/13	
<b>Year 6 – Quarter 3 (April–June 2013)</b>		
D15: Task 2 – Bell Creek Test Site Fact Sheet (Update)	4/15/13	
D16: Task 2 – Fort Nelson Test Site Fact Sheet (Update)	4/30/13	
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	4/30/13	
M14: Task 4 – Bell Creek Test Site Geological Characterization Data Collection Completed	4/30/13	
M23: Task 14 – Monthly WWG Conference Call Held	4/30/13	
M35: Task 16 – Basal Cambrian Dynamic Capacity Estimation Completed	4/30/13	
D17: Task 2 – General Phase III Information PowerPoint Presentation (Update)	5/31/13	
D43: Task 5 – Bell Creek Test Site – Monitoring Experimental Design Package	5/31/13	
M23: Task 14 – Monthly WWG Conference Call Held	5/31/13	
M27: Task 5 – Bell Creek Test Site – MVA Equipment Installation and Baseline MVA Activities Completed	5/31/13	
D40: Task 4 – Fort Nelson Test Site – Geomechanical Final Report	6/30/13	
D93: Task 1 – Geological Modeling and Simulation Report for the Aquistore Project	6/30/13	
D96: Task 4 – Bell Creek Test Site – 3-D Seismic and Characterization Report	6/30/13	
D97: Task 3 – Report – Findings and Recommendations of CGS Subgroups	6/30/13	
M23: Task 14 – Monthly WWG Conference Call Held	6/30/13	
M24: Task 14 – WWG Annual Meeting Held	6/30/13	
M26: Task 8 – Bell Creek Test Site – CO <sub>2</sub> Injection Initiated	6/30/13	
M37: Task 3 – IOGCC Task Force Subgroup Meeting 2 Held	6/30/13	
<b>Year 6 – Quarter 4 (July–September 2013)</b>		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	7/31/13	
D67: Task 9 – Fort Nelson Test Site – Simulation Report	7/31/13	
M23: Task 14 – Monthly WWG Conference Call Held	7/31/13	
D64: Task 4 – Bell Creek Test Site – Site Characterization Report	8/31/13	
D66: Task 9 – Bell Creek Test Site – Simulation Report	8/31/13	
D81: Task 1 – Regional Carbon Sequestration Atlas (Update)	8/31/13	
M23: Task 14 – Monthly WWG Conference Call Held	8/31/13	

Continued . . .

**Table 6. Phase III Milestones and Deliverables (continued)**

<b>Title/Description</b>	<b>Due Date</b>	<b>Actual Completion Date</b>
<b>Year 6 – Quarter 4 (July–September 2013) (continued)</b>		
D1: Task 1 – Review of Source Attributes	9/30/13	
D6: Task 3 – Permitting Review – Update 1	9/30/13	
D48: Task 7 – Bell Creek Test Site – Procurement Plan and Agreement Report	9/30/13	
D86: Task 15 – Updated Regional Implementation Plan for Zama (Ext. from 4/30/12)	9/30/13	
D90: Task 16 – Report – Wellbore Evaluation of the Basal Cambrian System	9/30/13	
D98: Task 3 – Report – Findings, Recommendations, and Guidance of CGS Task Force	9/30/13	
M23: Task 14 – Monthly WWG Conference Call Held	9/30/13	
M38: Task 3 – IOGCC Task Force Wrap-Up Meeting Held	9/30/13	
M39: Task 3 – IOGCC Task Force Editing Subgroup Meeting Held	9/30/13	
M40: Task 15 – Further Characterization of the Zama Acid Gas EOR, CO <sub>2</sub> Storage, and Monitoring Project Completed	9/30/13	
<b>Year 7 – Quarter 1 (October–December 2013)</b>		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	10/31/13	
D42: Task 5 – Bell Creek Test Site – Injection Experimental Design Package	10/31/13	
D99: Task 14 – Water/CCS Nexus-Related Fact Sheet	10/31/13	
M23: Task 14 – Monthly WWG Conference Call Held	10/31/13	
M23: Task 14 – Monthly WWG Conference Call Held	11/30/13	
D41: Fort Nelson Test Site – Geochemical Report (Update 1)	12/15/13	
D57: Task 12 – Project Assessment Annual Report	12/31/13	
M23: Task 14 – Monthly WWG Conference Call Held	12/31/13	



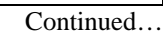
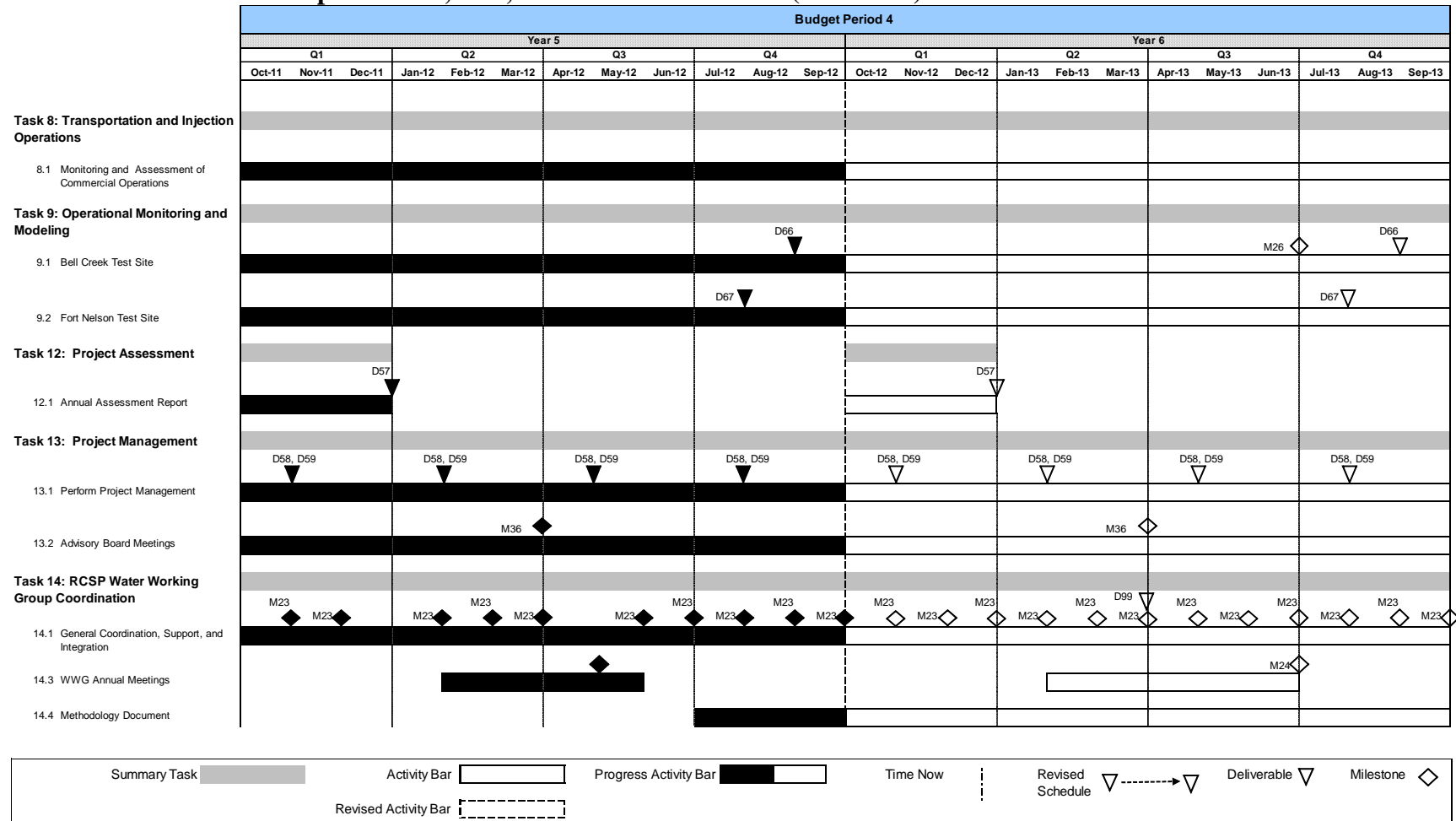
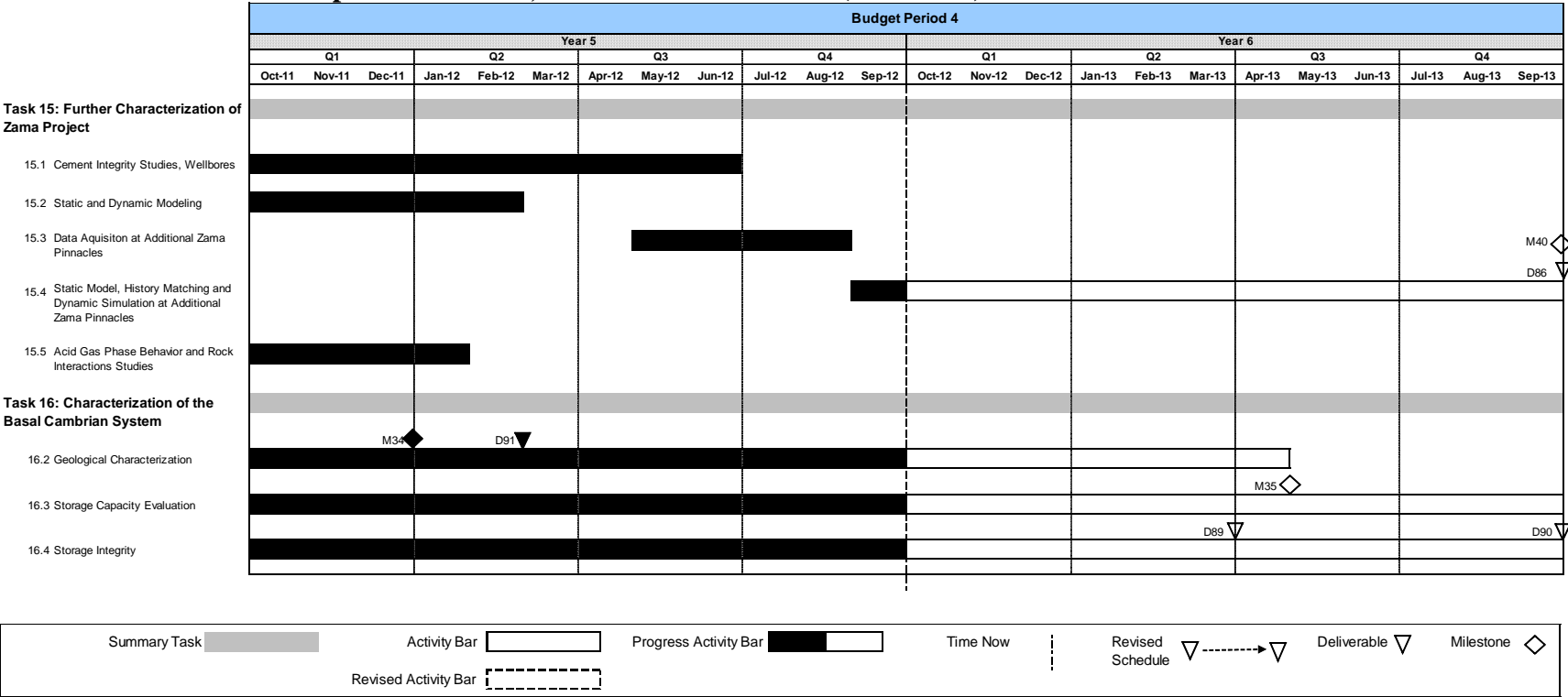


Table 7. PCOR Partnership Phase III, BP4, Years 5–6 Gantt Chart (continued)



Continued...

Table 7. PCOR Partnership Phase III BP4, Years 5–6 Gantt Chart (continued)



Continued...

**Table 7. PCOR Partnership Phase III BP4, Years 5–6 Gantt Chart (continued)**

Key for Deliverables (D) ▼		Key for Milestones (M) ◆
D1 Review of Source Attributes	D66 BC Test Site – Simulation Report	M10 BC Test Site – Wellbore Leakage Data Collection Completed
D5 Second Target Area Completed	D67 FN Test Site – Simulation Report	M12 BC Test Site – Preinjection Geochemical Work Completed
D6 Permitting Review – Update	D81 Regional Carbon Sequestration Atlas	M14 BC Test Site – Geological Characterization Data Collection Completed
D10 DPRS Update	D84 Report – A Phased Approach to Building Pipeline Network for CO <sub>2</sub> Transportation During CCS	M16 BC Test Site – Initiation of Production and Injection Simulations
D13 Public Site Updates	D85 Report – Opportunities and Challenges Associated with CO <sub>2</sub> Compression and Transportation During CCS Activities	M23 Monthly WWG Conference Call Held
D14 General Phase III Fact Sheet	D86 Updated Regional Technology Implementation Plan for Zama	M24 WWG Annual Meeting Held
D15 BC Test Site Fact Sheet	D89 Report – Geochemical Evaluation of the Basal Cambrian System	M26 BC Test Site – CO <sub>2</sub> Injection Initiated
D16 Fort Nelson Test Site Fact Sheet	D90 Report – Wellbore Evaluation of the Basal Cambrian System	M27 BC Test Site – MVA Equipment Installation and Baseline MVA Activities Completed
D17 General Phase III Information PowerPoint Presentation	D91 Report – Geological Characterization of the Basal Cambrian System in the Williston Basin	M29 FN Test Site – Site Characterization Report Completed
D18 BC Test Site PowerPoint Presentation	D93 Geological Modeling and Simulation Report for the Aquistore Project	M32 FN Test Site – Geochemical Report Completed
D19 FN Test Site PowerPoint Presentation	D94 Aquistore Project Fact Sheet	M34 Basal Cambrian Static Geological Model Completed
D32 BC Test Site – Geomechanical Final Report	D95 Aquistore Project Poster	M35 Basal Cambrian Dynamic Capacity Estimation Completed
D33 BC Test Site – Preinjection Geochemical Report	D96 BC Test Site – 3-D Seismic Acquisition and Characterization Report	M36 Annual Advisory Board Meeting Scheduled
D40 FN Test Site – Geomechanical Report	D97 Report – Findings and Recommendations – GCS Task Force's Operational and Postoperational Liability Subgroups	M37 Subgroup Meetings Held
D41 FN Test Site – Geochemical Report	D98 Report – Findings, Recommendations and Guidance of the GCS Task Force on Operational and Postoperational Liability	M38 Task Force Wrap-Up Meeting Held
D43 BC Test Site – Monitoring Experimental Design Package	D99 Water/CCS Nexus Related Fact Sheet	M39 Editing Subgroup Meeting Held
D48 BC Test Site – Procurement Plan and Agreement Report		M40 Further Characterization of the Zama Acid Gas EOR, CO <sub>2</sub> Storage, and Monitoring Project Completed
D57 Project Assessment Annual Report		
D58 Quarterly Progress Report		
D59 Milestone Quarterly Report		
D64 BC Test Site – Site Characterization Report		
D65 FN Test Site – Site Characterization Report		



## PHASE III PRODUCTS OR TECHNOLOGY TRANSFER ACTIVITIES

During the reporting period, there were five abstracts (three poster and two e-poster) accepted for presentation and 13 presentations (eight oral and five poster) given at 14 different meetings/conferences. In addition, a quarterly progress report, five deliverables, and three milestones were completed.

### **Abstracts**

#### ***Submitted***

Steadman, E.N., Harju, J.A., Gorecki, C.D., Botnen, L.S., Daly, D.J., Jensen, M.D., Peck, W.D., Sorensen, J.A., Smith, S.A., Hamling, J.A., Klapperich, R.J., and Anagnost, K.K., 2012, The Plains CO<sub>2</sub> Reduction (PCOR) Partnership—a Regional Carbon Sequestration Partnership in the interior plains of North America [abs.]: EUEC 2013: Energy, Utility & Environment Conference, Phoenix, Arizona, January 28–30, 2013.

#### ***Submitted and Accepted for Presentation***

Daly, D.J., 2012, Regional Project-Based CCS Outreach – The PCOR Partnership Experience [abs.]: Developing the Technologies and Building the Infrastructure for CCUS Carbon Storage R&D Project Review Meeting, Pittsburgh, Pennsylvania, August 21–23, 2012.

Gorecki, C.D., Steadman, E.N., and Harju, J.A., 2012, PCOR Partnership Phase III [abs.]: Developing the Technologies and Building the Infrastructure for CCUS Carbon Storage R&D Project Review Meeting, Pittsburgh, Pennsylvania, August 21–23, 2012.

Peck, W.D., Knudsen, D.J., Sorensen, J.A., Gorecki, C.D., Steadman, E.N., Bachu, S., and Peterson, J., 2012, CO<sub>2</sub> storage potential of the Cambro–Ordovician saline system in the western interior of North America [abs.]: Developing the Technologies and Building the Infrastructure for CCUS Carbon Storage R&D Project Review Meeting, Pittsburgh, Pennsylvania, August 21–23, 2012.

#### ***Submitted and Rejected for Presentation***

Liu, G., Gorecki, C.D., Braunberger, J.R., Bailey, T.P., Sorensen, J.A., Steadman, E.N., and Harju, J.A., 2012, Method and case demonstration for integrated reservoir modeling and simulation optimization [abs.]: Society of Petroleum Engineers Reservoir Simulation Symposium, The Woodlands, Texas, February 18–20, 2013.

#### ***Withdrawn***

Bremer, J.M., Knudsen, D.J., Miller, D.J., Hawthorne, S.B., Gorecki, C.D., and Peck, W.D., 2012, Relative permeability of supercritical carbon dioxide to water for rocks of the Cambro–Ordovician saline system, North Dakota [abs.]: 11th International Conference on Greenhouse Gas Control Technologies (GHGT-11), Kyoto, Japan, November 18–22, 2012.

Smith, S.A., Holubnyak, Y.I., Hawthorne, S.B., Miller, D.J., Bremer, J.M., and Sorensen, J.A., 2012, Laboratory evaluation of wellbore casing steel and cements for the Zama acid gas EOR, CO<sub>2</sub> storage, and monitoring project [abs.]: 11th International Conference on Greenhouse Gas Control Technologies (GHGT-11), Kyoto, Japan, November 18–22, 2012.

***Accepted for Presentation***

Gorecki, C.D., Steadman, E.N., Harju, J.A., Sorensen, J.A., Hamling, J.A., Botnen, L.S., Peck, W.D., and Anagnost, K.K., 2012, The Plains CO<sub>2</sub> Reduction (PCOR) Partnership—CO<sub>2</sub> sequestration demonstration projects adding value to the oil and gas industry [abs.]: International Petroleum Technology Conference, Beijing, China, March 26–28, 2013.

Saini, D., Gorecki, C.D., Hamling, J.A., Bailey, T.P., and Sorensen, J.A., 2012, Mechanism of subnormal pressure generation in the Bell Creek oil field and the implications to CO<sub>2</sub> storage [abs.]: International Petroleum Technology Conference, Beijing, China, March 26–28, 2013.

***Rejected for Presentation***

Liu, G., Gorecki, C.D., Braunberger, J.R., Bailey, T.P., Sorensen, J.A., Steadman, E.N., and Harju, J.A., 2012, An integrated optimization for reservoir modeling and simulation—method and case demonstration [abs.]: International Petroleum Technology Conference, Beijing, China, March 26–28, 2013.

Hamling, J.A., Gorecki, C.D., Braunberger, J.R., Botnen, B.W., Hu, H., Klapperich, R.J., Steadman, E.N., and Harju, J.A., 2012, Integrated monitoring program for a combined CO<sub>2</sub> enhanced oil recovery and CO<sub>2</sub> storage project in the Bell Creek oil field [abs.]: International Petroleum Technology Conference, Beijing, China, March 26–28, 2013.

**Presentations**

Botnen, L.S., 2012, PCOR Partnership overview and review of relevant federal activity: Presented at the Plains CO<sub>2</sub> Reduction (PCOR) Partnership Regulatory Roundup, Deadwood, South Dakota, July 31 – August 1, 2012.

Gorecki, C.D., 2012, The Plains CO<sub>2</sub> Reduction (PCOR) Partnership—carbon capture, utilization, and storage demonstration activities: Presented at the 34th International Geological Congress, Brisbane, Australia, August 5–10, 2012.

Gorecki, C.D., 2012, The Plains CO<sub>2</sub> Reduction (PCOR) Partnership carbon capture, utilization, and storage demonstration activities: Presented at the Plains CO<sub>2</sub> Reduction (PCOR) Partnership Annual Meeting, Milwaukee, Wisconsin, September 11–13, 2012.

Gorecki, C.D., 2012, Plains CO<sub>2</sub> Reduction (PCOR) Partnership Phase III: Presented at the U.S. Department of Energy National Energy Technology Laboratory Research & Development Project Review Meeting, Pittsburgh, Pennsylvania, August 21–23, 2012.

Hamling, J.A., 2012, Overview of the Bell Creek combined CO<sub>2</sub> storage and CO<sub>2</sub> EOR project: Presented at the 34th International Geological Congress, Brisbane, Australia, August 5–10, 2012.

Peck, W.D., 2012, Geologic concepts and CCS: Presented at the Plains CO<sub>2</sub> Reduction (PCOR) Partnership Annual Meeting Core Analysis Basics Workshop, Milwaukee, Wisconsin, September 11, 2012.

Peck, W.D., 2012, Plains CO<sub>2</sub> Reduction (PCOR) Partnership update on the Basal Cambrian Saline System Project: Presented at the Technical Committee Meeting for the Basal Aquifer Project, Plains CO<sub>2</sub> Reduction (PCOR) Partnership Annual Meeting, Milwaukee, Wisconsin, September 11–13, 2012.

Smith, S.A., 2012, Core analysis basics workshop – an integrated approach to core characterization: Presented at the Plains CO<sub>2</sub> Reduction (PCOR) Partnership Annual Meeting Core Analysis Basics Workshop, Milwaukee, WI, Sept 11, 2012.

### **Poster Presentations**

Daly, D.J., Crocker, C.R., Crossland, J.L., Gorecki, C.D., Steadman, E.N., and Harju, J.A., 2012, Regional and project-based CCUS outreach – the PCOR Partnership experience: Poster presented at Developing the Technologies and Building the Infrastructure for CCUS Carbon Storage R&D Project Review Meeting, Pittsburgh, Pennsylvania, August 21–23, 2012.

Gorecki, C.D., Peck, W.D., Daly, D.J., Steadman, E.N., and Harju, J.A., 2012, PCOR Partnership Phase III: Poster presented at Developing the Technologies and Building the Infrastructure for CCUS Carbon Storage R&D Project Review Meeting, Pittsburgh, Pennsylvania, August 21–23, 2012.

Gorecki, C.D., Sorensen, J.A., Botnen, L.A., Steadman, E.N., and Harju, J.A., 2012, Overview of the Fort Nelson CCS project: Poster presented at the 34th International Geological Congress, Brisbane, Australia, August 5–10, 2012.

Peck, W.D., Knudsen, D.J., Bachu, S., Peterson, J., Sorensen, J.A., Gorecki, C.D., Steadman, E.N., and Harju, J.A., 2012, CO<sub>2</sub> storage of the Cambro-Ordovician saline system in the northern Great Plains–Prairie region of North America: Poster presented at Developing the Technologies and Building the Infrastructure for CCUS Carbon Storage R&D Project Review Meeting, Pittsburgh, Pennsylvania, August 21–23, 2012.

Saini, D., Knudsen, D.J., Sorensen, J.A., Gorecki, C.D., Steadman, E.N., and Harju, J.A., 2012, A simulation study of simultaneous acid gas EOR and CO<sub>2</sub> storage at Apache's Zama F Pool: Poster presented at Developing the Technologies and Building the Infrastructure for CCUS Carbon Storage R&D Project Review Meeting, Pittsburgh, Pennsylvania, August 21–23, 2012.

## **Deliverables/Milestones**

### ***Draft***

Crocker, C.R., Daly, D.J., Anagnost, K.K., Gorecki, C.D., Steadman, E.N., and Harju, J.A., 2012, Public site updates: Plains CO<sub>2</sub> Reduction (PCOR) Partnership Phase III draft Task 2 Deliverable D13 for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592, Grand Forks, North Dakota, Energy & Environmental Research Center, July.

Jensen, M.D., Pei, P., Letvin, P.A., Peck, W.D., Gorecki, C.D., Steadman, E.N., and Harju, J.A., 2012, Review of source attributes: Plains CO<sub>2</sub> Reduction (PCOR) Partnership Phase III draft Task 1 Deliverable D1 for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05BT42592, Grand Forks, North Dakota, Energy & Environmental Research Center, September.

Saini, D., Braunberger, J.R., Pu, H., Bailey, T.P., Ge, J., Crotty, C.M., Liu, G., Hamling, J.A., Gorecki, C.D., Steadman, E.N., and Harju, J.A., 2012, Bell Creek test site – simulation report: Plains CO<sub>2</sub> Reduction (PCOR) Partnership Phase III draft Task 9 Deliverable D66 executive summary for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592, Grand Forks, North Dakota, Energy & Environmental Research Center, August.

Sorensen, J.A.; Anagnost, K.K., Gorecki, C.D., and Steadman, E.N., 2012, Fort Nelson test site – simulation report: Plains CO<sub>2</sub> Reduction (PCOR) Partnership Phase III draft Task 9 Deliverable D67 Update 1 for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592, Grand Forks, North Dakota, Energy & Environmental Research Center, July.

Stevens, B.G., Peck, W.D., Gorecki, C.D., Steadman, E.N., and Harju, J.A., 2012, Demonstration project reporting system (DPRS) update: Plains CO<sub>2</sub> Reduction Partnership Phase III draft Task 1 Deliverable D10 for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592, Grand Forks, North Dakota, Energy & Environmental Research Center, September.

## **Progress Reports**

### ***Monthlies***

Gorecki, C.D., Steadman, E.N., Peck, W.D., Daly, D.J., Botnen, L.S., Sorensen, J.A., Hamling, J.A., Jensen, M.D., Harju, J.A., Anagnost, K.K., and Klapperich, R.J., 2012, Plains CO<sub>2</sub> Reduction (PCOR) Partnership: Phase III monthly report (June 1–30, 2012) for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592, Grand Forks, North Dakota, Energy & Environmental Research Center, July.

Gorecki, C.D., Steadman, E.N., Peck, W.D., Daly, D.J., Botnen, L.S., Sorensen, J.A., Hamling, J.A., Jensen, M.D., Harju, J.A., Anagnost, K.K., and Klapperich, R.J., 2012, Plains CO<sub>2</sub> Reduction (PCOR) Partnership: Phase III monthly report (July 1–31, 2012) for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592, Grand Forks, North Dakota, Energy & Environmental Research Center, August.

Gorecki, C.D., Steadman, E.N., Peck, W.D., Daly, D.J., Botnen, L.S., Sorensen, J.A., Hamling, J.A., Jensen, M.D., Harju, J.A., Anagnost, K.K., and Klapperich, R.J., 2012, Plains CO<sub>2</sub> Reduction (PCOR) Partnership: Phase III monthly report (August 1–31, 2012) for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592, Grand Forks, North Dakota, Energy & Environmental Research Center, September.

### ***Quarterlies***

Gorecki, C.D., Harju, J.A., Steadman, E.N., Romuld, L., Sorensen, J.A., Botnen, L.S., Daly, D.J., Hamling, J.A., Jensen, M.D., Peck, W.D., Klapperich, R.J., Anagnost, K.K., and Votava, T.J., 2012, Plains CO<sub>2</sub> Reduction Partnership Phase III: Task 13 Deliverable D58/59 quarterly technical progress report (April 1 – June 30, 2012) for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592 and North Dakota Industrial Commission Contract Nos. FY08-LX111-162 and G-015-030, Grand Forks, North Dakota, Energy & Environmental Research Center, July.

### **Meeting Minutes**

Klapperich, R.J., 2012, Minutes—Regional Carbon Sequestration Partnership Water Working Group conference call: July 24.

Klapperich, R.J., 2012, Minutes—Regional Carbon Sequestration Partnership Water Working Group conference call: August 30.

### **MEETINGS/TRAVEL**

Representatives from the PCOR Partnership attended and/or participated in the following 14 meetings/conferences, four training opportunities, and 12 project management site trips in this reporting period:

- July 8–12, 2012: Attended the NETL 2012 CO<sub>2</sub> Capture Technology Meeting in Pittsburgh, Pennsylvania.
- July 10–13, 2012: Attended the EORI 6th Annual Wyoming CO<sub>2</sub> Conference in Casper, Wyoming.
- July 16–18, 2012: Participated in the Geologic CO<sub>2</sub> Sequestration: Reevaluating Storage Efficiency Estimates Workshop in Austin, Texas.

- July 16–19, 2012: Participated in the IEAGHG Environmental Impacts of CO<sub>2</sub> Storage Workshop in Bozeman, Montana.
- July 19, 2012: Traveled to the Phase II Lignite site near Kenmare, North Dakota.
- July 19–21, 2012: Presented at the Missouri Mineral Education Foundation Teacher Workshop in Park Hills, Missouri.
- July 22–27, 2012: Attended the Esri International User Conference in San Diego, California.
- July 26 – August 1, 2012: Attended Schlumberger OFM Fundamentals Training in Houston, Texas.
- July 29 – August 1, 2012: Hosted the 4th Annual Regulatory Roundup in Deadwood, South Dakota.
- August 1, 2012: Visited the (Phase II) Lignite site near Kenmare, North Dakota.
- August 1–3, 2012: Presented before the North Dakota Association of Rural Electric Cooperatives members services summer meeting in Hankinson, North Dakota.
- August 1–10, 2012: Presented at the 34th International Geological Congress in Brisbane, Australia.
- August 4–10, 2012: Traveled to the Bell Creek Field with PPB to film water and soil gas baseline sampling activities.
- August 6–17, 2012: Sampling team traveled to the Bell Creek Field for fourth-round baseline sampling.
- August 19–21, 2012: Participated in a log review meeting at Denbury’s headquarters in Plano, Texas.
- August 19–24, 2012: Presented at the DOE Carbon Storage R&D Project Review meeting in Pittsburgh, Pennsylvania.
- August 21–25, 2012: Attended CMG simulation software training in Houston, Texas.
- August 22–25, 2012: Traveled to the Bell Creek Field to download temperature and pressure data at the monitoring well site near Broadus, Montana.
- August 27–31, 2012: Traveled to the Bell Creek Field to attend a seismic acquisition kickoff meeting that Denbury hosted near Broadus, Montana.
- September 4–6, 2012: Traveled to the Bell Creek oil field to film 3-D seismic acquisition activities with PPB in southeastern Montana.
- September 4–6, 2012: Presented at the 2012 CCS Binational Conference: Building a Business Case for CCS: Maintaining the Momentum for Large-Scale Demonstration Projects held September 5 in Regina, Saskatchewan, and participated in the field trip on September 6, to Estevan, Saskatchewan, to tour Aquistore and the Boundary Dam projects.
- September 7, 2012: Visited the (Phase II) Lignite site near Kenmare, North Dakota.
- September 9–13, 2012: Hosted the Core Analysis Basics Workshop and 2012 PCOR Partnership Annual Meeting at the InterContinental Hotel in Milwaukee, Wisconsin.
- September 11–15, 2012: Participated in TOUGH2 Training Course for Scientists and Engineers held at LBNL in Berkeley, California.
- September 11–22, 2012: Participated in the TOUGH 2012 Symposium and short courses held at LBNL in Berkeley, California.
- September 17–20, 2012: Traveled to the Bell Creek oil field with PPB to film pipeline construction activities.

- September 18–19, 2012: Traveled to the Bell Creek oil field for a site visit and to retrieve a vehicle previously damaged in a collision with a deer.
- September 20, 2012: Hosted an exhibit booth at the 2012 NDLA Annual Conference in Fargo, North Dakota.
- September 27, 2012: Visited the (Phase II) Lignite site near Kenmare, North Dakota.

Materials presented at these meetings are available to partners on the PCOR Partnership DSS Web site ([www2.undeerc.org/website/pcorp/](http://www2.undeerc.org/website/pcorp/)).

## **REFERENCES**

None.