



Plains CO₂ Reduction (PCOR) Partnership
Energy & Environmental Research Center (EERC)

PLAINS CO₂ REDUCTION PARTNERSHIP PHASE III

Quarterly Technical Progress Report Task 13 – Deliverable D58/D59

(for the period April 1 – June 30, 2015)

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PLAINS CO₂ REDUCTION PARTNERSHIP PHASE III

Quarterly Technical Progress Report

April 1 – June 30, 2015

EXECUTIVE SUMMARY

The Plains CO₂ Reduction (PCOR) Partnership is one of seven Regional Carbon Sequestration Partnerships (RCSPs) competitively awarded by the U.S. Department of Energy National Energy Technology Laboratory in 2003 as part of a national plan to mitigate greenhouse gas emissions. The PCOR Partnership is led by the Energy & Environmental Research Center 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 (CO₂) into deep geologic formations for CO₂ 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 April 1, 2015, through June 30, 2015.

Of significant importance, over 2.5 million metric tons of CO₂ has been stored at the Bell Creek test site! Denbury Resources Inc. has cumulatively injected (May 2013 – April 2015) over 2,539,042 metric tons of total gas (composition >95% CO₂). Efforts were initiated to prepare the scope of work, budgets, and deliverables and milestones for the 6-month, \$4.5M extension to BP4. PCOR Partnership activities were focused on laboratory, modeling, and simulation activities. Two Bell Creek surface and near-surface sampling events were conducted. Several training sessions were held in support of modeling and simulation activities.

Initiation of Aquistore injection began on April 15, 2015. PCOR Partnership representatives attended and filmed the Aquistore ribbon-cutting ceremony in Estevan, Saskatchewan, Canada. A project update meeting with Denbury was held April 13, 2015, in Plano, Texas. Topic areas included updates regarding Bell Creek geologic interpretation, seismic, near-surface monitoring, and pressure and temperature monitoring. A formal announcement of the Special Issue of the *International Journal of Greenhouse Gas Control* (IJGGC) on the “Nexus of Water and Carbon Capture and Storage” was released.

Ten tasks continued. In addition to the foregoing, the milestone for 1.5 million metric tons of CO₂ injected at the Bell Creek test site was completed; the draft compression and transportation

during carbon capture and storage activities report was submitted; RCSP Water Working Group conference calls were held; and the general Phase III PowerPoint presentation update was submitted.



PLAINS CO₂ REDUCTION PARTNERSHIP PHASE III
Quarterly Technical Progress Report
April 1 – June 30, 2015

INTRODUCTION

The Plains CO₂ 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 Partnerships (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 sectors. The membership, as of June 30, 2015, 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 Storage Program (Figure 1) 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 PCOR Partnership Program 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

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

BP1 and BP2 were effective in Phase II.

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

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

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 (CO₂), 2) facilitate the development of the infrastructure required to transport CO₂ from sources to the injection sites, 3) facilitate sensible development of the rapidly evolving North American regulatory and permitting framework, 4) develop opportunities for PCOR Partnership partners to capture and store CO₂, 5) facilitate establishment of a technical framework by which carbon credits can be monetized for CO₂ stored in geologic formations, 6) continue collaboration with other RCSPs, and 7) provide outreach and education for CO₂ capture and storage stakeholders and the general public.

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 CO₂ injection volumes. A programmatic

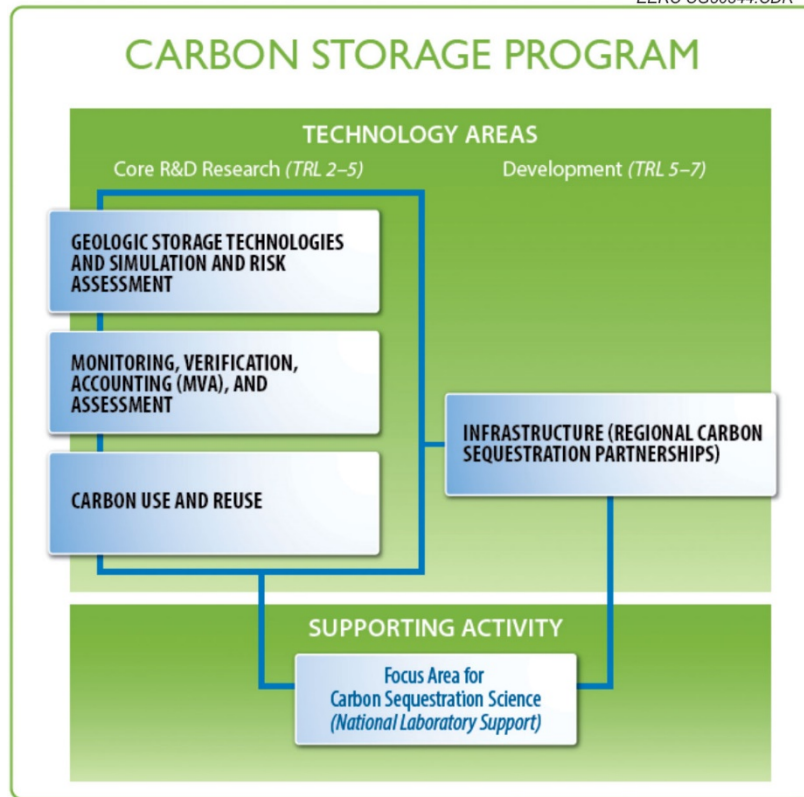


Figure 1. DOE Carbon Storage Program technology areas featuring regional partnerships (courtesy of Andrea Dunn, DOE NETL; “TRL” stands for technology readiness level).

development phase (Phase III) goal is implementation of large-scale field testing involving at least 1 million metric tons of CO₂ a project. Each of the RCSP large-volume injection tests is designed to demonstrate that the CO₂ storage sites have the potential to store regional CO₂ emissions safely, permanently, and economically for hundreds of years.

The PCOR Partnership is working with Denbury Resources Inc. (Denbury)-operated Bell Creek oil field in Powder River County in southeastern Montana. We have also conducted a feasibility study for Spectra Energy Transmission’s (Spectra’s) Fort Nelson gas-processing facility, situated near Fort Nelson, British Columbia, Canada. In addition, the PCOR Partnership is collaborating with the Petroleum Technology Research Centre (PTRC) on site characterization, risk assessment, and MVA activities associated with the Aquistore Project near Estevan, Saskatchewan, Canada. The PCOR Partnership’s work has concluded with Apache Canada Ltd. to further characterize the Zama Acid Gas Enhanced Oil Recovery (EOR), CO₂ Storage, and Monitoring Project in Alberta, Canada, as well as its work on a multiyear, binational characterization effort of the basal Cambrian system (Figure 2).



Figure 2. Location of large-scale sites in PCOR Partnership Phase III.

The PCOR Partnership's objectives are as follows: 1) investigate the efficacy of various MVA strategies as a means of developing a CO₂ storage project in conjunction with a commercial EOR operation in order to verify that the region's large number of oil fields have the potential to store significant quantities of CO₂ in a safe, economical, and environmentally responsible manner and 2) verify the economic feasibility of using the region's carbonate saline formations for safe, long-term CO₂ storage. During Phase III, the PCOR Partnership will continue to refine storage resource estimates and evaluate other factors relevant to regional storage goals.

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 (completed); 6) Infrastructure Development; 7) CO₂ Procurement (completed); 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 EOR, CO₂ Storage, and Monitoring Project (completed); and 16) Characterization of the Basal Cambrian System (completed). 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	Charles D. Gorecki
Task 4 – Site Characterization and Modeling	James A. Sorensen
Task 5 – Well Drilling and Completion (completed)	John A. Hamling
Task 6 – Infrastructure Development	Melanie D. Jensen
Task 7 – CO ₂ Procurement (completed)	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*
Task 11 – Postinjection Monitoring and Modeling	TBA
Task 12 – Project Assessment	Loreal V. Heebink
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 ₂ Storage, and Monitoring Project (completed)	Charles D. Gorecki
Task 16 – Characterization of the Basal Cambrian System (completed)	Wesley D. Peck

* To be announced.

PROGRESS OF WORK

Task 1 – Regional Characterization

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

- Continued compiling information and updating text for the PCOR Partnership Atlas (5th edition) due August 2015.
- With regard to the upcoming DOE NETL Atlas V:
 - Continued working on modifications.
- Attended and presented at the 14th Annual CCUS (Carbon Capture, Utilization, and Storage) Conference (CCUS-14) in Pittsburgh, Pennsylvania, April 28 – May 1, 2015.
- Attended an Esri ArcGIS Pro Webinar.
- Creating databases to keep the team up-to-date regarding well information.
- Added metadata to updated data sets.
- Continued database preventive maintenance of Petra projects.
- Imported additional North Dakota LAS (Log ASCII Standard) files into the Petra project.
- Continued activities to update the content and function of the partners-only **Decision Support System (DSS)**, including the following:
 - Worked on data to be updated on the PCOR Partnership DSS partner-only and public Web sites.
 - Made a few corrections/modifications. Additional changes and an update of CO₂ sources will occur within the next month.

- Updated CO₂ storage in saline formation tables.
- Continued collecting images from the last version of the PCOR Partnership Atlas to put in the image gallery.
- Continued to assemble a presentation on the DSS online mapping services to showcase the capabilities for viewing results in a comprehensive and interactive framework.
- Updated North Dakota and Montana Petra projects with the latest general well information from each state's online resource, as follows: added 465 new North Dakota wells and 16 new Montana wells.
- Updated North Dakota well injection information and production data.
- Updated South Dakota, Saskatchewan, Manitoba, and British Columbia projects.
- Imported Wyoming log data (LAS files).
- Continued work on several additional **value-added reports**, including the following:
 - Finished the draft Inyan Kara Formation report. It is currently undergoing internal review.
 - Continued work on the report summarizing methods of original oil in place and CO₂ storage calculations.
 - Continued efforts on the Cedar Creek Anticline (CCA) report:
 - ◆ Modified the CO₂ EOR section.
- Discussed the development of new value-added geologic evaluations for the Williston and Powder River Basins.
- With regard to the **Aquistore** Project static modeling and dynamic predictive simulations effort:
 - Initiation of Aquistore injection began on April 15, 2015. As of April 24, 2015, over 1555 tons of CO₂ had been injected.
 - With regard to **modeling and simulation** activities:
 - ◆ Worked on updating the Aquistore simulation in an iterative fashion using actual injection data. These data are being received daily from PTRC to update the database.
 - ◆ Continued working with PTRC Science and Engineering Research Committee (SERC) regarding the Aquistore simulation model.
 - ◆ Held a planning meeting to discuss objectives and path forward for Aquistore simulations and history matching. Will begin working on a value-added report regarding this work and how it supports Aquistore monitoring activities.
 - ◆ A script was created that calculates the average gamma ray value from the logs that were used in the model. This information is being used in the history-matching process.
 - ◆ Analyzed the previous Aquistore model, and prepared it for regular updates with field injection data. Built a new CO₂ injection-monitoring model with nested grids. This model uses the P₅₀ average aquifer properties of the previous model and has a skin factor to simulate injectivity effects.
 - ◆ Worked on log interpretation and analysis for the Aquistore site. The logs were compared to the simulation model results.
 - ◆ A graduate student intern began working on Aquistore modeling to investigate the differences between the original static model and the current history-matched dynamic model. This information will be used to update the static model.

- ◆ Continued working on history-matched model and predictive simulations. Attempting to improve model efficiency by using a different grid system. Simulations have been focused on investigating near-wellbore effects during injection.
- ◆ Successfully history-matched the bottomhole pressure of the injection and observation wells based on known field pressure/injection data. Predictive simulations are being conducted.
- ◆ Worked on adjusting the model's parameters (i.e., permeability) based on core data. Investigated the effect of relative permeability on model performance.
- ◆ Worked on updating the reservoir model properties by analyzing core sample data and log data. Permeability values in the simulation model will be updated to ensure more accurate predictive simulations.
- ◆ The current static geologic model will be compared to the history-matched model to analyze which parameters were changed to achieve a history match. This information will be used to update the model.
- ◆ Updated the Aquistore model using the latest injection data. History-matched the injection pressure and predicted CO₂ plume distribution profile. Investigated the effect of the presence of an aquifer on injection.
- ◆ Modified the simulation model grid near the observation well. This will lead to more realistic results regarding CO₂ breakthrough.
- ◆ Updated the model with field data and operational parameters, conducted simulations to predict CO₂ breakthrough based on target injection rate, and investigated the near-wellbore effects.
- A factsheet discussing the EERC's role in the Aquistore project was prepared and sent to DOE by request.
- Traveled to Estevan, Saskatchewan, Canada, to attend and film the Aquistore ribbon-cutting ceremony.
- Film from the ribbon cutting is being put in a format to review.
- Held the monthly Aquistore update meeting.
- Created a draft abstract for the DOE Carbon Storage R&D Program Review Meeting based on modeling and simulation work, including the recent history-matching efforts.

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 2 – Public Outreach and Education

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

- Submitted an update to D17, entitled “General Phase III Information PowerPoint.” Approval was received from DOE NETL.

- During this reporting period, the PCOR Partnership outreach activities included 18 oral presentations and one booth. The following quantities of PCOR Partnership outreach materials were distributed:
 - PCOR Partnership documentary entitled “Nature in the Balance: CO₂ Sequestration” – 70
 - PCOR Partnership documentary entitled “Reducing Our Carbon Footprint: The Role of Carbon Markets” – 71
 - PCOR Partnership documentary entitled “Out of the Air – Into the Soil” – 70
 - PCOR Partnership documentary entitled “Managing Carbon Dioxide: The Geologic Solution” – 201
 - PCOR Partnership documentary entitled “Global Energy and Carbon: Tracking Our Footprint” – 201
 - “Plains CO₂ Reduction Partnership Atlas, 4th Edition, Revised” – 212
- Presented at UND’s Harold Hamm School of Geology and Geological Engineering Annual Spring Banquet on April 17, 2015. The presentation featured the debut of clickers for audience feedback as part of the presentation (part of the continuing effort to gather information on audience feedback systems for use with public presentations and focus groups).
- Initiated and finalized a PowerPoint and script for presentation on the PCOR Partnership outreach activities at Session 7 at the 10th CO₂ GeoNet Open Forum, Venice, Italy, May 11–13, 2015.
- Prepared and submitted a draft abstract to the DOE Carbon Storage R&D Program Review Meeting in August for a poster presentation.
- Prepared a list of example shots available for Aquistore to use in its outreach activities and provided Aquistore personnel with a sampler of video clips as a basis for determining clips for final production.
- Continued to revise three draft Phase II project fact sheets, including holding meetings with project personnel to discuss content, with a focus on addressing comments from senior management regarding Northwest McGregor and the results section of the Lignite fact sheet.
- Corresponded by e-mail with Aquistore personnel about the potential for collaborating on an outreach paper for the Laussane International Energy Agency Greenhouse Gas (IEAGHG) meeting in September 2016.
- Continued activities associated with **education and teacher education** seminars, including the following:
 - Finalized updates for the Lignite Energy Council’s (LEC’s) teacher workshop presentation schedule for June 16, in Bismarck, North Dakota, and provided LEC with the final version.
 - The PCOR Partnership outreach team participated in two teacher training workshops and education conferences. These activities included introducing PCOR Partnership materials (DVDs, atlas, Web site awareness) to educators in K–12 schools. A total of 174 teachers representing 130 different school districts in five states in the PCOR Partnership region were in attendance. Twenty-two of the teachers had previously heard a PCOR Partnership outreach presentation at a different workshop. Figure 3

shows the geographic distribution of the teachers who received materials by their corresponding school districts for the region. The education seminars included:

- ◆ A 1-hour presentation at a 4-day coal-centric workshop presented by the North Dakota LEC held June 15–18, 2015, in Bismarck, North Dakota. Distributed packets to the 110 teachers attending the presentation.
- ◆ Participation in a 2-day CCUS-focused teacher training institute held June 23–24, 2015, in Moorhead, Minnesota. A presentation was given, and materials were disseminated.

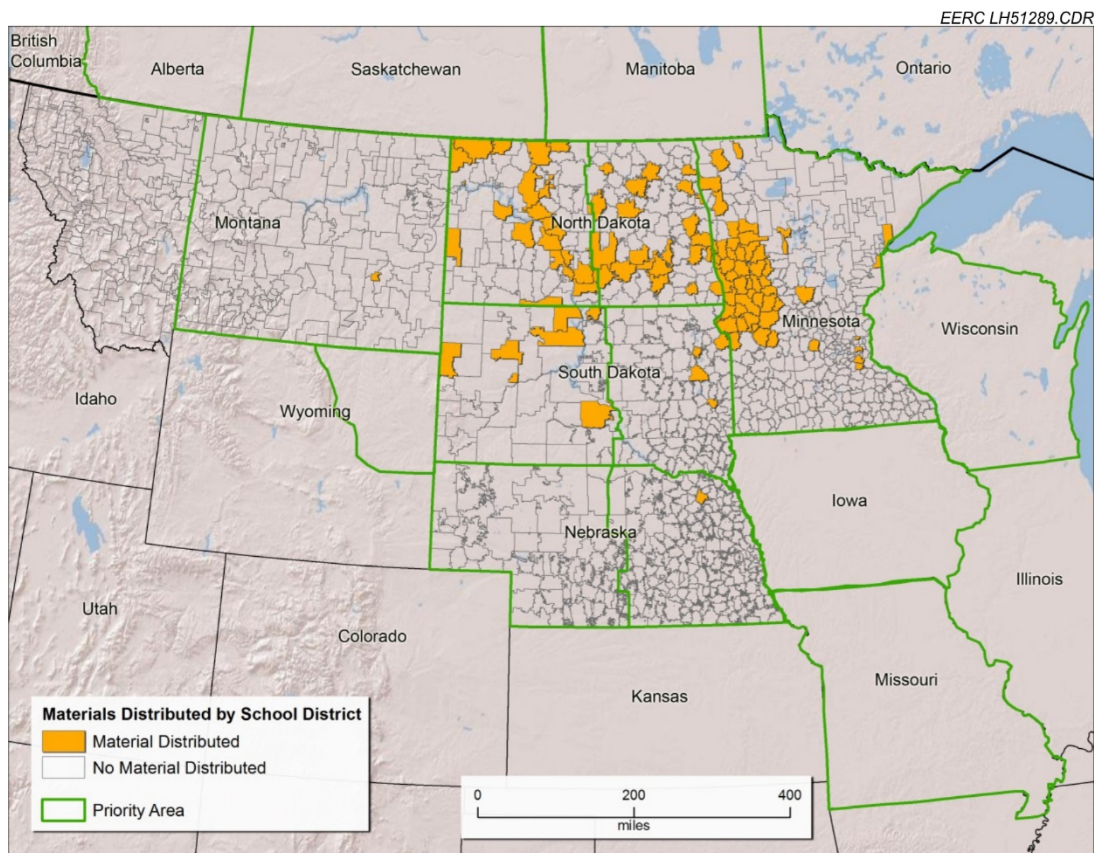


Figure 3. Distribution of teachers who received materials by school district this reporting period.

- Participated in a number of **conference calls** this quarter, including the following:
 - With regard to the Aquistore Outreach and Advisory Working Group monthly conference call:
 - ◆ The April 27, 2015, call focused on the press release and arrangements for the Aquistore ribbon-cutting event scheduled for late May.
 - With regard to the monthly RCSP Outreach Working Group (OWG) conference calls:
 - ◆ On April 23, May 21, and June 18, 2015, the discussions were focused on updating the NETL Outreach Best Practices Manual (BPM). The PCOR Partnership team

volunteered to take part in discussions related to developing an outreach metrics section of the BPM.

- ◆ Initiated the preparation of a summary of PCOR Partnership experience with outreach tracking and metrics for the RCSP Outreach BPM and provided written comments to the OWG regarding the ongoing preparation of the BPM.
- Continued efforts to update the **public Web site** (www.undeerc.org/pcor), including the following:
 - Moved forward on the current batch of Web page updates following internal review.
 - Reviewed and updated candidate pages for Web updates based on discussions with EERC programmers. Provided comments on the programming done to date. Gave approval, based on the review, to proceed to prepare a revised draft for review by EERC senior PCOR Partnership managers.
 - Worked on quarterly PCOR Partnership outreach maps showing PCOR Partnership web visits.
 - Continued ongoing identification and repair of broken links.
 - Continued efforts to revise and update the carbon cycle page on the public Web site, focusing on graphic and interactive elements.
 - Reviewed the “live on stage server” version of Batch 1 of the PCOR Partnership public Web page updates.
- Continued collaborative efforts with **Prairie Public Broadcasting (PPB)**, including the following:
 - Held a conference call on April 9, 2015, to discuss activities for the PPB Teacher Training Institute scheduled for June in the Fargo, North Dakota, area.
 - PPB continued editing Parts 2, 3, and 4 of the four-part education video. The PCOR Partnership team sent action items to PPB. Prepared graphics on 1) global energy and population, 2) overall concept of carbon reduction wedges, and 3) an explanation of how higher mile-per-gallon vehicles can lead to a carbon reduction wedge.
 - PPB prepared a sampler of shots for Aquistore available for use in Aquistore’s outreach activities.
 - Traveled to Fargo, North Dakota, to meet with Prairie Public Education Services regarding a presentation at an upcoming Teacher Training Institute scheduled for late June in Moorhead, Minnesota.
 - Traveled to Moorhead, Minnesota, to present at Prairie Public’s Teacher Training Institute, June 23–24, 2015. Provided a presentation on Energy, Quality of Life, CO₂, and Carbon Capture and Storage (CCS) that led into a workshop activity based on the PCOR Partnership presentation. Distributed documentaries, the PCOR Partnership Atlas, and other materials.
 - Finalized Video Education Series Part 2, and uploaded to Prairie Public Services Learning Media on June 22. It is available at <http://prairiepublic.pbslearningmedia.org/resource/3c031e45-dbc3-4dc3-9037-71982dc69346/dan-daly-presentation-part-2-energy-pcor-eerc/>.
 - Completed and closed-captioned education presentation video series Part 1: Energy and Carbon.
 - With regard to D22, the energy from coal 60-minute documentary (due January 2016):

- ◆ Participated in conference calls to discuss travel plans and finalize arrangements for location filming and interviews in New York City, New Jersey, eastern and western Pennsylvania, Virginia, Mississippi, and Washington during May and June.
- ◆ Continued to follow up on e-mail invitations to interview and requests for site access as part of the next phase of obtaining interviews and field footage.
- ◆ PPB completed filming trips to New York City, New Jersey, eastern Pennsylvania, and Virginia.
- ◆ Completed interviews in New York City, New York, and Arlington, Virginia, and location filming in New Jersey and Pennsylvania, May 31 – June 3, 2015.
- ◆ Completed interviews and location filming with PPB, June 8–12, 2015, in western Pennsylvania.
- ◆ Traveled to Meridian, Mississippi, to complete interviews and location filming with PPB, June 22–25, 2015, at the Kemper County Energy Facility in DeKalb, Mississippi, and the nearby Liberty Mine.
- ◆ Traveled to White Salmon, Washington, June 29 – July 1, 2015, for an interview.
- ◆ Continued preparations for filming in relation to documentary D22, including interviews tentatively scheduled for Minneapolis in mid-July and Grand Forks for mid-August.
- ◆ PPB requested that Rely Media provide a transcript of a document D22 interview as a basis for determining if Rely Media should be used to provide transcripts of all D22 interviews.
- During this reporting period, information regarding the **site sessions/visits** to the PCOR Partnership public Web site included the following:
 - There were 7043 sessions/visits to the public Web site (www.undeerc.org/pcor). Traffic increased 11% over last quarter (6339 sessions/visits). Over 25% of these visits were initiated from a mobile device or tablet.
 - There were 6110 unique visitors to the public Web site, representing a 10% increase from last quarter (5559 visitors). In particular, 86% of these visitors were new to the Web site (visitors whose visit was marked as a first-time visit in this quarter).
 - Of the 7043 sessions/visits, 45% of the Web traffic was domestic, and 55% was international. Table 3 lists the top ten countries for visits to the PCOR Partnership Web site. These included the United States, India, United Kingdom, Australia, Canada, New Zealand, Malaysia, Philippines, Pakistan, and Kenya. There was traffic from 126 countries overall (Figure 4).
 - There were 432 sessions/visits originating from within the PCOR Partnership region (Figure 5). Approximately 67% of the regional visits originated from the United States, and 33% came from Canada. Visits from within the PCOR Partnership region comprised 6% of the overall traffic to the public Web site (it should be noted that the totals are exaggerated to some degree because the visit location data were aggregated at the state and province levels, even though the PCOR Partnership region formally includes only portions of British Columbia, Montana, and Wyoming).

Table 3. Sessions/Visit Activity from the Top Ten Countries and the PCOR Partnership Region

	Country	Sessions/ Visits*	PCOR Partnership State/Province	Visits*
1.	United States	3170		
			Minnesota	71
			North Dakota	57
			Missouri	41
			Wisconsin	34
			Wyoming	29
			Montana	20
			Iowa	19
			Nebraska	10
			South Dakota	9
2.	India	988		
3.	United Kingdom	449		
4.	Australia	351		
5.	Canada	304		
			Alberta	75
			British Columbia	33
			Saskatchewan	27
			Manitoba	7
6.	New Zealand	124		
7.	Malaysia	116		
8.	Philippines	89		
9.	Pakistan	79		
10.	Kenya	78		
	Other 116 countries	1295		
Total Sessions/Visits		7043	Total PCOR Partnership Visits	432

*Arranged by the number of visits to the site.

- During this reporting period, a breakdown of how visitors came to the PCOR Partnership Web site, also referred to as **traffic sources** (Figure 6), was determined and is provided below:
 - Search traffic refers to the use of search engines such as Google, Bing, and Yahoo. Search traffic accounted for more than 87% of the overall traffic that came to the public Web site. Google Analytics provides keywords that visitors used to find the public Web site. The top three search phrases were “what is CO₂,” “carbon sequestration,” and “what is carbon sequestration.”

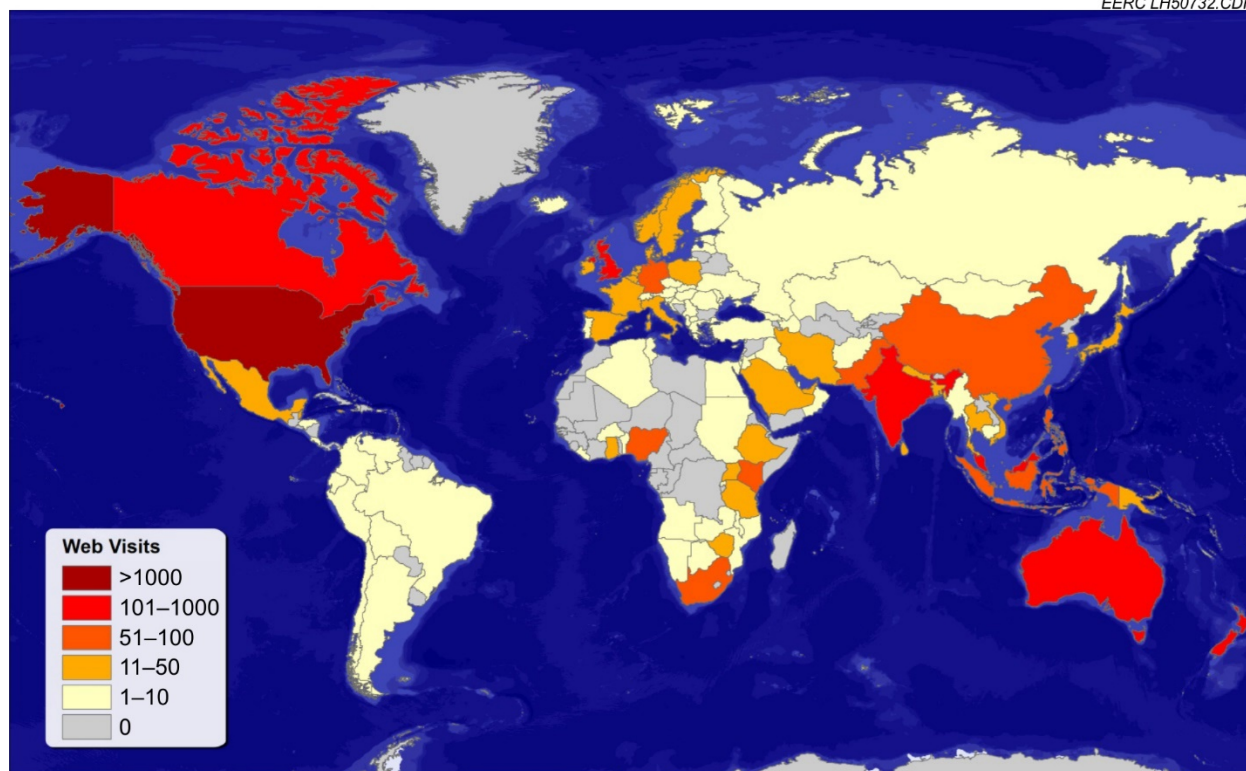


Figure 4. Map of PCOR Partnership Web site global traffic for this reporting period.

- Direct traffic consists of those visitors who bookmark or type in the URL (www.undeerc.org/pcor). It is likely that most of the direct traffic (9%) is from persons familiar with the PCOR Partnership.
- Referral site traffic (3%) corresponds to the traffic directed to the PCOR Partnership Web page from other sites via links. The top three referring Web sites were energy.gov, globalccsinstitute.com, and energy.usgs.gov.
- Less than 1% of site traffic resulted from teacher campaigns and social interactions, such as e-mail or social media sources (e.g., Facebook and YouTube).
- During this reporting period, the **nature of the sessions** to the PCOR Partnership public Web site included 9933 page views (an 8% increase from last quarter); the top five pages viewed are listed in Table 4. These five pages comprise 75% of total page views.
- All five documentaries and 50 video clips taken from the documentaries have been uploaded to the EERC's YouTube channel. The top five accessed YouTube videos are listed in Table 5. Because of the volume of material, the videos were organized into seven playlists. Each video description includes one or more links to the PCOR Partnership public Web site. Two PCOR Partnership full-length documentaries are also on the PPB YouTube Channel. These are listed in Table 6. These videos can also be streamed on the PCOR Partnership public Web site.

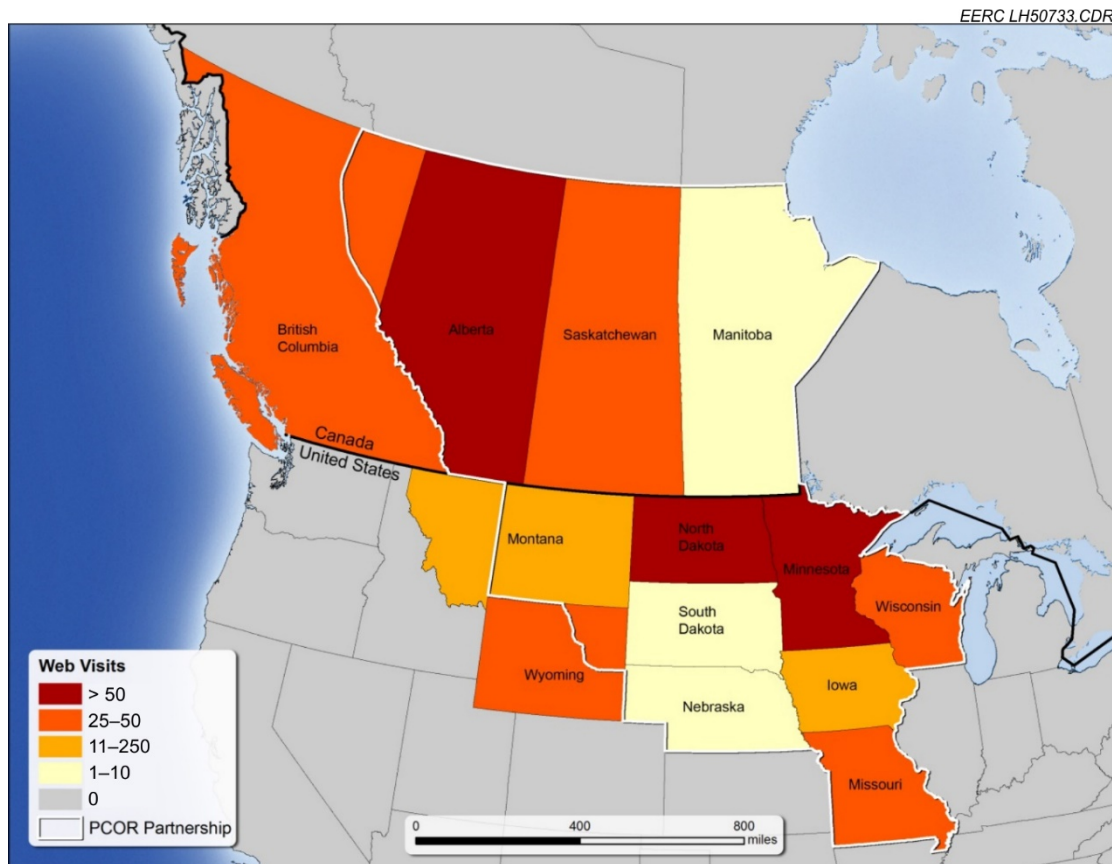


Figure 5. Map of PCOR Partnership Web site regional visits for this reporting period.

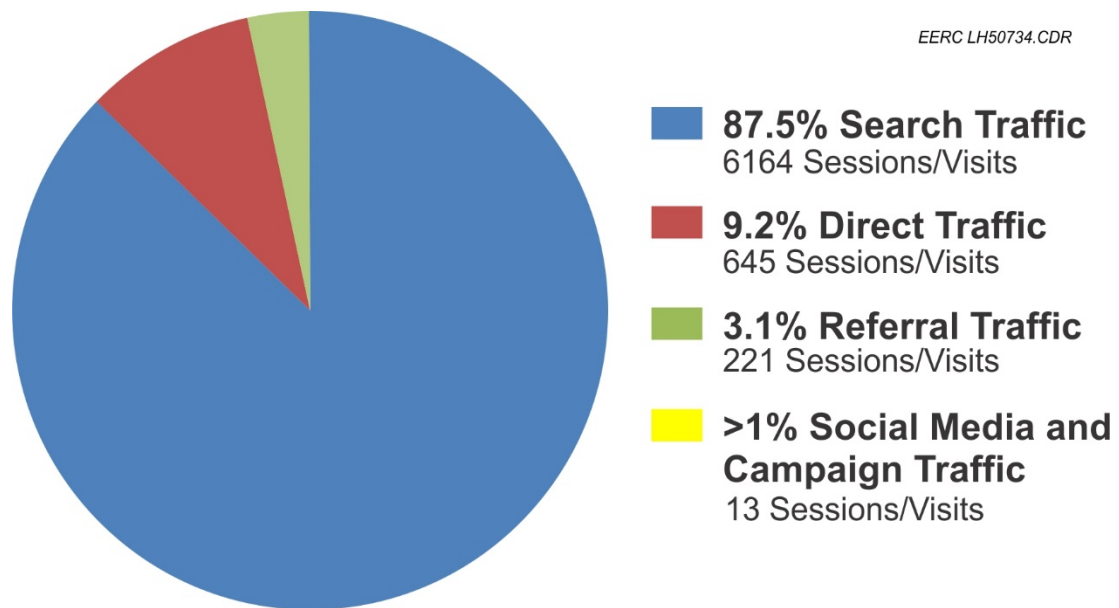


Figure 6. PCOR Partnership public Web site traffic sources for this reporting period.

Table 4. Top “Page Views” on the PCOR Partnership Public Web Site

Page Title	Page Views	% Page Views	Page
What Is CO ₂ Sequestration?	4781	48.1	www.undeerc.org/pcor/sequestration/whatissequestration.aspx
What Is CO ₂ ?	1756	17.7	www.undeerc.org/pcor/sequestration/whatisco2.aspx
Home Page	402	4.1	www.undeerc.org/pcor/default.aspx
CO ₂ Sequestration Projects	356	3.6	www.undeerc.org/pcor/co2sequestrationprojects/default.aspx
Terrestrial Sinks	170	1.7	www.undeerc.org/pcor/region/terrestrial/default.aspx

Table 5. Top EERC PCOR Partnership-Related YouTube Channel Videos Accessed

Video	Views	Est. Minutes Watched	Avg. View Duration
Reducing Our Carbon Footprint Documentary	885	4206	4:45
Reforestation in Brazil	591	1254	2:07
The Phases of Oil Recovery – So Far	221	395	1:52
Family Transportation and Carbon Footprint	84	136	1:37
Reservoir Energy Around the World	65	81	1:14

Table 6. PCOR Partnership Documentaries on PPB YouTube Channel Accessed

Video	Views	Est. Minutes Watched	Avg. View Duration
Global Energy and Carbon: Tracking Our Footprint	1884	15,728	8:34
Managing Carbon Dioxide: The Geologic Solution	308	3630	11:78

- During this reporting period, the PCOR Partnership received **public television exposure** from documentaries broadcast in North Dakota, northwestern Minnesota, and Manitoba. A total of nine broadcasts aired. The number of telecasts by documentary are as follows: “Out of the Air Into the Soil: Land Practices That Reduce Atmospheric Carbon” (3), “Managing Carbon Dioxide: The Geologic Solution” (3), and “Global Energy and Carbon: Tracking our Footprint” (3).
- During this reporting period, there was one instance of **media content** published regarding the PCOR Partnership. This is listed in Table 7.

Table 7. PCOR Partnership Media Coverage

Date	Headline	Media Organization/ Publication	City	Journalist, Author, or Source	Type
4/29/2015	PPB offering two-day teacher training institute	Jamestown Sun	Jamestown, North Dakota	Staff report	Print newspaper article

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 3 – Permitting and NEPA Compliance

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

- With regard to the 2015 Regulatory Roundup meeting:
 - Scheduled for July 22–23, 2015, in Deadwood, South Dakota.
 - Continued planning for the meeting:
 - ◆ Prepared a draft agenda.
 - ◆ Invited and confirmed potential speakers.
 - ◆ Sent an e-mail blast.
 - ◆ Discussed with Interstate Oil and Gas Compact Commission (IOGCC) representatives the regulatory topics for the 2015 PCOR Partnership regulatory meeting, including several IOGCC products
 - Reviewed notes from the 2015 Carbon Capture, Utilization, and Storage Conference to prepare for a presentation at the meeting.
- Attended the IOGCC Annual Meeting in Salt Lake City, Utah, May 18–20, 2015.
- Presented and facilitated the IOGCC Environmental and Safety Committee meeting in Salt Lake City, Utah, May 19, 2015.
- Reviewed notes from IOGCC Environmental and Safety Committee meeting.
- With regard to U.S. Environmental Protection Agency (EPA) UIC (underground injection control) Class II Transition to Class VI:
 - Provided an updated agenda to IOGCC for the upcoming Environmental and Safety Committee meeting regarding EPA UIC Class II Transition to Class VI. Provided contact information for the potential speakers, and volunteered to facilitate the topic discussion.
 - Finished presentation on Class II well-to-Class VI transition to be presented later this month at the 7th International Energy Agency (IEA) International Carbon Capture and Sequestration Regulatory Network meeting in Paris, France.
 - Reviewed EPA memorandum, which was released April 23, 2015.
- Continued review of the EPA-proposed rule for carbon emissions from existing stationary sources.
- Reviewed EPA and other Web sites regarding permits and changes to the Class VI regulations.
- Worked on updating regulatory pages for the PCOR Partnership Atlas.
- Discussed updates to the PCOR Partnership Web site.
- Continued planning for Deliverable 8, Permitting Review – Update 2, due September 30, 2015, including checking the status of North Dakota primary application and changes to EPA and Canadian regulations.

- Discussed potential PCOR Partnership value-added documents related to regulations. Gathered information for value-added report on rules, regulations, and statutes for various scenarios of CCS geologic storage and for CO₂ EOR for each of the PCOR Partnership states and provinces.
- Prepared and submitted a draft abstract for the DOE Carbon Storage R&D Program Review Meeting.
- Worked on preparing budgets for this task.

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 4 – Site Characterization and Modeling

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

- Developed a working draft of “seed best practices” and “seed case histories” to be submitted to the working group focused on revising the NETL BPM for site screening, site selection, and initial characterization. This will be uploaded to DOE’s EDX Web site.
- Participated in conference calls and Webinar for the DOE Site Characterization BPM working group. Worked on reviewing and commenting on the existing BPM and the proposed outline for the revision. An updated list of best practices and comments on the report outline were provided to the group.
- Prepared an outline for the DOE Carbon Storage Systems and Well Management Systems BPM. It is currently undergoing internal review.
- Continued work on the PCOR Partnership site characterization BPM (D35).
- Prepared for and attended a project update meeting with Denbury on April 13, 2015, in Plano, Texas. Topic areas included updates regarding Bell Creek geologic interpretation, seismic, near-surface monitoring, and pressure and temperature monitoring.
- An in-house petrophysics and petrophysical modeling training was held at the EERC, May 27–28, 2015. PCOR Partnership partner Eric Pasternack of Outsource Petrophysics led the training, which included an overview of using PowerLog software. The knowledge gained in this training will be used to support the PCOR Partnership’s Bell Creek modeling and simulation activities.
- Held two half-day Petrel training sessions (June 23–24). This training was led by EERC staff and was attended by several other staff members and interns. A comprehensive workflow for creating a model and performing quality control on the data is being developed to assist with this work in the future.
- Began planning for in-house training led by Baker Hughes for its JewelSuite software. This geologic modeling software may be used to supplement and support current modeling activities. Tentative dates for the training are July 28–31.
- Finalized the list of cores to view at the U.S. Geological Survey Core Research Center (CRC-Denver). Information gained from viewing the core will support the new

understanding of the Bell Creek depositional model. Will likely schedule a trip to view these cores soon.

- **Bell Creek** test site activities included the following:
 - Summer graduate student interns prepared Bell Creek data for modeling.
 - Worked with Core Labs in Houston, Texas, to get an update on the progress of the special core analysis (SCAL) work being conducted. The work is complete and will be reported on within the month.
 - With regard to **geomechanical** efforts, the following activities occurred:
 - ◆ Continued improving the rock mechanical properties (e.g., Young's modulus, Poisson's Ratio) and reservoir stresses using synthetic well logs (e.g., sonic logs) in the 3-D mechanical earth model (MEM). Continued setting up practice simulations in Computer Modelling Group's (CMG's) GEM to check the efficiency of the software for the simulation of CO₂ plume development during and after injection.
 - ◆ Worked on determining methods for using seismic data to contribute to more accurate geomechanical modeling. This included amplitude versus offset inversion. Several in-house meetings were held to discuss this.
 - ◆ Continued reviewing the geomechanics module of COMSOL Multiphysics and investigating the application of this software to the Bell Creek geomechanical simulation work and subsurface fluid flow.
 - ◆ Worked on creating a model of the Bell Creek injection zone using COMSOL modeling software. This could be used as initial input for any 2-D modeling conducted in COMSOL. COMSOL is being investigated as a means to provide additional support to the Bell Creek modeling and simulation activities.
 - ◆ Renewed Hampson–Russell seismic processing software licenses. This software is donated by CGG to universities for research.
 - ◆ Continued preparing and practicing for the geomechanical simulations within Petrel and CMG, including:
 - Conducted literature review for references regarding transferring data between CMG's GEM and FLAC-3D software for designing the geomechanical simulation process. Compatibility between the two software packages can be challenging since they are from two different companies. Both are being used for Bell Creek geomechanical work.
 - Continued working on the numerical tuning process in CMG GEM, specifically using the geomechanics function.
 - Worked on improving the data accuracy using the well logs and seismic data.
 - Continued work on Bell Creek **characterization**, including the following:
 - ◆ Held weekly modeling and simulation update meetings. All staff working on Bell Creek modeling and simulation discussed progress and collaborated to resolve any difficulties.
 - ◆ Continued investigating statistical methods for analyzing variability within the pulsed-neutron logging (PNL) results.
 - ◆ Worked on comparing effective porosity calculated from PNLs to history-matched simulation results to understand uncertainty between the current version of the history-matched simulation model and field observations with the goal of informing

areas to be improved in the ongoing iterations. Nineteen wells have been compared to date, and these results were reviewed.

- ◆ Worked on a petrophysical workflow to recalculate effective porosity above the reservoir zone using the PNLs in order to better characterize potential monitor zones. This was presented at a weekly in-house modeling meeting.
- ◆ Worked with Schlumberger to get the effective porosity logs from the PNL work in a different format.
- ◆ Worked on characterizing the Mowry lithology using the current PNL data. This has proven difficult because the zone is rich in organic shale.
- ◆ Held two in-house presentations regarding the most recent PNL analysis. This work included 1) comparing the effective porosity and saturation values from the PNLs with the history-matched model's values and 2) using the PNLs to derive rock properties for layers above the reservoir. The current work has been completed; however, a plan is being created for the next steps of integrating the PNL and history-matched data sets to improve the geologic models. These analyses result in a more accurate model and better predictive simulations, leading to an improved understanding of reservoir performance for monitoring the injected CO₂.
- ◆ Worked on creating synthetic DT (sonic velocity) logs from the PNLs. These will be used to improve the seismic inversion process and geomechanical modeling efforts.
- ◆ Worked on developing a plan for the next steps with the 3-D seismic inversion to derive properties from the seismic data, and in turn, use these properties in the 3-D MEM.
- ◆ Investigated options of adding newly interpreted petrophysical results into the near-surface model.
- ◆ Generated plot of official total, historical oil production by month for Phases 1–4; highlights improvement to production because of EOR.
- ◆ Discussed with team members regarding identifying fault and fracture systems from field data (e.g., logs and seismic data), and potential effects on CCS projects.
- ◆ Continued investigating options regarding microseismic data-processing services.
- ◆ Continued developing ideas for a Bell Creek journal article related to facies modeling to be prepared in collaboration with Denbury.
- ◆ Held a wrap-up Webinar with Paulsson Inc. on May 18, 2015. Paulsson has been processing the repeat 3-D vertical seismic profiles and presented the results to EERC staff during this Webinar.
- ◆ Continued working on Version 3 of the geologic model:
 - including integration of a 3-D seismic amplitude map, logs, and core to develop detailed geobody, depositional environment, and facies interpretations.
- ◆ Investigated the potential to add properties from core-shifted logs into the 3-D reference project.
- ◆ Worked on adding data from the near-surface modeling into the reference model.
- ◆ Worked on analyzing the structure in the Version 2 model. Uncertainty was discovered in select formation tops in the model. These tops are being adjusted as needed to create a more realistic structure for the Version 3 geologic model which, in turn, will lead to better simulation and history-matching results. This work will

also improve the seismic processing and inversion and geomechanical modeling efforts.

- ◆ Worked on assessing the formation tops in the geomechanical model for the Bell Creek Field, including the overburden and underburden formations. The location of these tops will affect future geomechanical simulations.
- **Applied Geology Laboratory** activities included the following:
 - ◆ With regard to the 60 feet of full-diameter 33-14R core (collected April 2013):
 - Continued work on the permeability-to-air report.
 - ◆ With regard to the 56-14R full-core plugs (collected March 2013):
 - An outline was prepared for the 56-14R core work final report.

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 5 – Well Drilling and Completion

This task ended in Quarter 3 – BP4, Year 7 (June 2014).

Task 6 – Infrastructure Development

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

- Submitted D85 entitled “Opportunities and Challenges Associated with CO₂ Compression and Transport During CCS Activities.” Activities while preparing the report this quarter included summarizing the energy requirements and economics of compression and liquefaction and the basis for each method.
- Updated CO₂ source statistics for the document outlining PCOR Partnership’s accomplishments.
- A value-added report entitled “Assessing Temporary Storage Options to Manage Variable-Rate CO₂ Emissions for Use During Enhanced Oil Recovery” continued undergoing internal PCOR Partnership management review. Following DOE review, the authors plan to submit the manuscript for possible publication in *Energy & Environmental Science*.
- Downloaded new CO₂ pipeline test data from the Det Norske Veritas PIPETRANS site. The data are from tests performed on a highly instrumented, 1-km-long pipeline filled with CO₂ in which a hole was intentionally blown to determine 1) what happens during a pipeline rupture and 2) how CO₂ disperses from a large pipeline leak.
- Worked on updating the budget with respect to the budget period extension for this task.
- Responded to a question from a PCOR Partnership utility partner.

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 7 – CO₂ Procurement

This task ended Quarter 4, BP4, Year 6 (September 2013).

Task 8 – Transportation and Injection Operations

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

- Performed literature searches and worked on preparation of D49, the Bell Creek Test Site Transportation and Injection Operations Report.

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

- Still working to acquire data from site operators for inclusion in D49.
- If data are not able to be acquired, publically available data will be used to create the report.

Task 9 – Operational Monitoring and Modeling

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

- With regard to the DOE BPMs:
 - Participated in a kickoff Webinar meeting for the DOE BPM for MVA.
 - ◆ Participated in the DOE MVA BPM 2016 revision editing committee call, and provided input on the draft outline. The PCOR Partnership took the lead in suggesting a combined approach for outline options by process or by formation to appeal to a wider audience, as well as adding a conclusion/summary section, both of which were accepted by the DOE RCSP team.
 - Participated in kickoff conference call for the DOE Carbon Storage Systems and Well Management Systems BPM.
 - ◆ Sent seed lessons learned based on PCOR Partnership experience related to the DOE Carbon Storage Systems and Well Management Systems BPM to the lead organization.
 - ◆ Reviewed and provided first-pass comments related to technical content of 2013 revision of BPM in preparation for a call on June 3, 2015.
 - ◆ Participated in the June 3, 2015, conference call. Finalized and submitted suggested changes to the outline.
 - Participated in Webinars and conference calls for the DOE Simulation and Risk Assessment BPM. Will supply five best practice/case histories to the working group for discussion, along with comments on the document's overall outline.
 - ◆ Participated in the DOE Simulation and Risk Assessment BPM Webinar. Commented on the outline, and uploaded the updated document to the EDX workspace.

- Continued developing an outline and executive summary of the PCOR Partnership MVA BPM.
- Continued preparing for PCOR Partnership annual meeting workshop.
- Sent comments on an article that Global Carbon Capture and Storage Institute (GCCSI) will feature in its newsletter to promote the EERC videographic BPM entitled “Installing a Casing-Conveyed Permanent Downhole Monitoring (PDM) System.” There will be a link on GCCSI’s Web site to this BPM.
- Attended and presented at the CCUS-14 in Pittsburgh, Pennsylvania, April 28 – May 1, 2015.
- Attended the 2015 U.S. Rock Mechanics Geomechanics Symposium and Workshop in San Francisco, California, held June 27 – July 1, 2015.
- Attended and presented at the IEAGHG Monitoring Network Meeting in Berkeley, California, held June 10–12, 2015.
- Continued development of D66, the modeling and simulation report (due August 31, 2015). A preliminary outline was created. Held several progress meetings to discuss.
- Submitted M49 “1.5 Million Metric Tons of CO₂ Injected” (due June 30, 2015).
- Continued the internal review process on M50, “Bell Creek Test Site – 2 years of Near-Surface Assurance Monitoring Completed,” (due July 31, 2015).
- Continued working on M51 “Bell Creek Test Site – Initial Analysis for First Large-Scale Repeat Pulsed-Neutron Logging Campaign Post-Significant CO₂ Injection Completed,” (due August 31, 2015).
- The potential to host in-house training for Linux administration is being investigated to train technical and information technology staff in order to improve efficiency of operating the Linux geophysics processing workstations.
- Continued **Bell Creek** site activities, including the following:
 - Based on the most recent publicly available data, cumulative total gas injection (composition >95% CO₂) is 2,539,042 metric tons through April 30, 2015 (Table 8).
 - Compiled and performed quality assurance/quality control checks on the most recent publically available Bell Creek well production data (water, oil, and gas) from MBOG (Montana Board of Oil and Gas) data through April 2015.
 - Compiled all Phase 1 historical production data from MBOG database to derive decline curves for estimating CO₂ incremental oil production.
 - Matched the overall production and injection profile in subsection of the Phase 2 area of the combined model, including primary and secondary oil, water and gas production, water injection, etc. Analyzing production data of individual wells to identify possible aquifer and barrier locations in the reservoir. This information will help predict CO₂ plume distribution.
 - Worked on analyzing CO₂ injection and production in each well of the Bell Creek Field in an attempt to determine why certain wells have higher CO₂ production than others. This information will be useful for predictive simulations and history matching.
 - Completed additional decline curve analysis examples for a well-by-well approach for estimating incremental oil production from CO₂ EOR.
 - Screened wells for a potential tracer study.
 - Worked on preparing pressure maps at different dates. These will be used to help calculate saturation values at the same dates.

Table 8. Bell Creek CO₂ Injection Totals for April 2015 (cumulative totals May 2013 to April 2015)

	April 2015 Injection
Total, Mscf	3,280,561
Total, U.S. tons*	187,643
Total, metric tons*	170,392
Cumulative Total, Mscf ⁺	48,884,167
Cumulative Total, U.S. tons* ⁺	2,796,097
Cumulative Total, metric tons* ⁺	2,539,042

Source: MBOG database.

* There is an approximately 2–3-month lag in posting of injection/production volumes to the MBOG database. This was calculated utilizing a conversion of 17.483 Mscf/U.S. ton and 19.253 Mscf/metric ton.

⁺ Cumulative totals are for the period from May 2013 to the month listed.

- Updated Bell Creek production/injection GeoPDF maps through February 2015 for upcoming meetings and to the Bell Creek interactive map.
- Continued work on reformatting the Bell Creek-related information.
- Continued analysis of processed PDM data.
- Interns worked on producing a file of original well log images of the reservoir as part of the core-viewing trip being planned.
- Held a WebEx on April 6, 2015, to prepare for the Bell Creek update meeting with Denbury.
- Held an update meeting with Denbury, April 13, 2015, in Plano, Texas. Distributed comprehensive update binders for the project team and presented on several topics, including monitoring, net carbon negative (green) oil, seismic activities (i.e., surface, vertical seismic profiling, passive).
- Continued to develop alternate strategies for reduced near-surface monitoring, moving toward a commercially viable strategy, specifically regarding frequency and focusing on key indicator analytes now that the focus area is well characterized. Expansion into additional development phases is also being evaluated with the site operator.
- Analyzed hydrocarbon distributions from 20 Bell Creek crude oil samples collected from three production wells over approximately a 1-year time frame. This includes oil samples collected before CO₂ injection and for several months after the injection of CO₂. The data are currently being analyzed to determine any changes in crude oil composition that may result from EOR and whether such changes correspond with the appearance of injected CO₂ in the production wells.
- Continued experiments to determine the effect of methane in CO₂ on Bell Creek crude oil MMP (minimum miscibility pressure).
- Continued data reduction on Bell Creek produced oil hydrocarbon molecular weight changes following CO₂ injection.
- Continued miscible-phase sampling of mobilized hydrocarbons using methane, CO₂, and ethane.
- With regard to **modeling and simulation** activities:
 - ◆ Successfully completed the history matching for CO₂ flooding for the combined Phase 1 and 2 model. This work included integrating CO₂ injection and fluid

production data; comparing CO₂ flooding with primary depletion and water flooding; examining the geologic structure, permeability, water saturation, and relative permeability distributions in the combined region; and identifying ways to improve matching performance. The overall production and injection profile in a subsection of the Phase 2 area of the combined model was successfully matched. This match included primary and secondary oil, water, and gas production; water injection; and analyzing production data of individual wells to identify possible aquifer and barrier locations in the reservoir. This information will help predict CO₂ plume distribution.

- ◆ Began researching depositional environments for object modeling input into the near-surface model.
- ◆ Conducted a literature study for new methods to better simulate and analyze single-well performance. This information will be used to better understand performance of the wells and to update simulations.
- ◆ A summer intern (graduate student from the University of Houston) started May 16, 2015, to help with Bell Creek simulation activities.
- ◆ Worked on checking the accuracy of the relative permeability curves used in the simulation model.
- ◆ Continued analyzing CO₂ injection and production in each well of the Bell Creek Field in an attempt to determine why certain wells have higher CO₂ production than others. This information will be useful for predictive simulations and history matching.
- ◆ A graduate student intern began assisting with Bell Creek simulation work, comparing the original and processed core and logging data with data in the simulation model. A difference in vertical permeability distribution was identified. The results will be used in updating the simulation model, analyzing single-well performance, and updating the Version 3 static model.
- ◆ Finished checking core data and logs for all wells in Phase 1 and 2 areas. These data were compared with simulation model settings. Some differences were noted and will lead to further investigation, e.g., values for vertical permeability.
- ◆ Continued work on inversion of 3-D seismic data to derive geomechanical parameters for Bell Creek. Well ties and horizon picking are progressing.
- ◆ Several team members attended a Webinar hosted by CMG regarding numerical tuning during simulation. Numerical tuning is used to improve the simulation models to provide more accurate results.
- ◆ Practiced using the CMOST numerical tuning function in CMG to improve simulation efficiency.
- ◆ Worked on updating the formation tops used in the simulation model and seismic data interpretation.
- ◆ Finished one continuous CO₂ injection and one water alternating gas predictive simulation case; the results will be included in the D66 report.
- ◆ Spoke with a representative of Denbury to conduct additional simulation scenarios. This work is ongoing.
- With regard to **injection-phase seismic** efforts:
 - ◆ The GeoTomo MiVu software purchase was finalized. The software will be used for processing the microseismic data set collected at Bell Creek.

- ◆ A graduate student intern is currently working on processing the microseismic data collected at Bell Creek.
- ◆ Continued database entry for tracking data drives for the borehole array and recording system.
- ◆ Conducted a successful hard drive swap for the borehole geophone array on June 25. This process installed new hard drives for recording of passive seismic data.
- ◆ Continued to monitor the borehole seismic acquisition system via remote check-in and e-mail updates.
- With regard to **injection-phase PNL** activities:
 - ◆ Began planning summer 2015 PNL campaign.
- With regard to **injection-phase sampling** activities:
 - ◆ Continued to work with Denbury personnel to collect periodic oil and gas samples from select wells in the Phase 1 area. A plan was devised to collect one gas and one oil sample from each of the three production wells (32-02, 56-14, and 05-06) on an estimated quarterly basis.
 - ◆ Conducted training with EERC personnel on downloading procedures for the MOREVision and Qorex units.
 - ◆ Downloaded PDM data (January 15 – April 28, 2015) from the MOREVision and Qorex units.
 - ◆ Continued analysis of processed PDM data.
 - ◆ Met with landowners, and distributed landowner water analysis packages from the September 2014 event.
 - ◆ Continued planning and preparation for the semiannual Bell Creek surface and near-surface sampling event. Conducted the sampling April 24–29, 2015.
 - In preparation, continued contacting landowners; completed sampling-personnel training; organized sampling kits; prepared a protocol (SOP [standard operating procedure]) for prioritizing Bell Creek groundwater sample laboratory analyses based on field analytical results; and generated tables of recorded ranges for pH, alkalinity, and conductance at all groundwater-sampling locations to aid the sampling crew in detecting anomalies while in the field.
 - Collected groundwater samples from six stock wells and nine residential wells.
 - Collected surface water samples from nine locations.
 - Sampled Fox Hills Formation groundwater-monitoring wells from two locations.
 - Collected oil samples from Production Wells 05-06 and 32-02. Processing is under way.
 - Collected gas samples from the purchase and recycle stream and Production Wells 32-02, 56-14, and 05-06.
 - Micro Quad and laboratory gas chromatography (GC) processing is completed for the purchase and recycled stream gas samples.
 - Completed the field (Micro Quad) GC analyses for the following produced gas analyses from three production wells:
 - 32-02 (sampled in March 2015)
 - 56-14 (sampled in March 2015)
 - 05-06 (sampled in January and March 2015)

- Laboratory GC analysis and processing are under way for the 32-02, 56-14, and 05-06 produced gas samples.
- o Collected approximately 350 total soil gas samples from individual well pads, interspaced locations, soil gas profile stations, plugged and abandoned well locations, redrilled well locations, and regional background samples.
- o Completed the EERC Analytical Research Laboratory and the selected Energy Laboratory water analyses from the following:
 - Residential well water samples = eight (8) project samples + (2) duplicate samples.
 - Stock well water samples = six (6) project samples.
 - Surface water samples = nine (9) project samples.
 - Fox Hills Formation groundwater-monitoring wells = two (2) project samples.
 - Compiled and completed review of landowner packages (groundwater results).
- o Completed processing the field analyses of fieldwide water sampling (26 sample locations total).
 - Statistical analyses (i.e., outlier tests, box plots, etc.) were completed based on all baseline field results by water type, as well as compared to operational monitoring results for possible outliers – no outliers of significance were observed.
- o Completed Micro Quad GC analyses on over 390 total bags for soil gas samples (including quality assurance/quality control samples such as blanks and duplicates).
 - Completed statistical processing of handheld meter and Quad Micro GC soil gas analyses.
- ◆ Continued planning and preparation for the quarterly Bell Creek surface and near-surface sampling event (scheduled for the week of June 22, 2015), including organizing sampling kits; prepared a protocol (SOP) for prioritizing Bell Creek groundwater sample laboratory analyses based on field analytical results; and generated tables of recorded ranges for pH, alkalinity, and conductance at all groundwater-sampling locations to aid the sampling crew in detecting any potential anomalies while in the field.
- o Conducted the quarterly Bell Creek MVA sample event (June 22–27, 2015). The following samples were collected:
 - Over 200 total soil gas sample bags, including quality assurance/quality control samples such as blanks and duplicates.
 - Took water field parameter recordings from seven of eleven groundwater sites, which included the two Fox Hills Formation groundwater wells. Four of eleven planned groundwater sites could not be recorded because of a power outage and storm event.
 - Data processing is under way.
- o Contacted all affected landowners ahead of the event.
- ◆ Continued development of Bell Creek near-surface MVA sampling strategies for FY2016.

- With regard to the **Fort Nelson** project:
 - There were no activities related to Fort Nelson in this quarter.

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 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 12 for the reporting period included the following:

- No activity this quarter.

Task 13 – Project Management

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

- Worked on preparing budgets for the 6-month, \$4.5M extension to BP4. Created a list of deliverables and milestones that will need to be adjusted because of the extension.
- Continued planning for the 2015 annual meeting to be held in Chicago, Illinois, in September, including:
 - Worked on the draft meeting and workshop agendas.
 - Made available the Web page with information and registration.
 - Spoke with a representative of Shell regarding his interest in presenting at the upcoming PCOR Partnership annual meeting. He expressed interest in giving an overview of Shell's CCS activities. A formal invitation will follow.
 - Mailed the evening event postcard.
 - Made registration live.
 - Continue to confirm presenters.
- Prepared a document outlining the PCOR Partnership's technical and nontechnical accomplishments throughout all phases (Phases I–III). This was prepared by request from DOE for inclusion in a document it is creating on the accomplishments of the entire RCSP Program.
- Staff participated in the EDX 101 and 102 training Webinars in preparation for the development of the DOE BPMs.

- Spoke with consultant Dave Nakles of The CETER Group (CETER), Inc., regarding CETER's participation in the development of DOE BPMs and PCOR Partnership value-added reports.
- Hosted visitors from DOE NETL personnel on April 8–9, 2015, and presented an update on the PCOR Partnership.
- Attended and presented at the Workshop on CCS–EOR Utilization and Storage hosted by the Global Carbon Capture and Storage Institute in Beijing, China, April 16, 2015.
- Prepared a list of all of the stakeholders that have been involved in the PCOR Partnership over all phases and years. The list was submitted on April 14.
- Prepared a list (descriptions and photographs) for DOE regarding suggestions of what the EERC could submit to support DOE's National Lab Day. The list was submitted on April 17.
- Attended and presented on Class II well to Class VI transition at the IEA International CCS Regulatory Network Meeting in Paris, France, on April 23, 2015.
- Attended and presented at the CCUS-14 in Pittsburgh, Pennsylvania, April 28 – May 1, 2015.
- Attended and exhibited at the Williston Basin Petroleum Conference held April 28–30 in Regina, Saskatchewan, Canada.
- Attended and presented at the 10th Anniversary CO₂ GeoNet Open Forum in Venice, Italy, May 11–12, 2015. Three presentations were given: an overview of the PCOR Partnership, adaptive management approach, and outreach. Spoke with a representative from the Midwest Geological Sequestration Consortium (MGSC) at the forum regarding the potential to have a PCOR Partnership–MGSC collaborative technical meeting.
- Spoke with Denbury regarding potential future surface seismic activities and InSAR monitoring at Bell Creek. Investigating the possibility of setting up a monthly WebEx with Denbury to discuss ongoing seismic activities.
- Participated in a kickoff Webinar meeting regarding the DOE BPMs. Sent a list of contact information for EERC staff who will be participating in the development of the BPMs to DOE.
- Traveled to Estevan, Saskatchewan, Canada, to attend the Aquistore ribbon-cutting ceremony.
- Attended the IOGCC Annual Meeting in Salt Lake City, Utah, May 18–20, 2015.
- Traveled to Regina, Saskatchewan, to present at the Carbon Sequestration Leadership Forum (CSLF) Mid-Year Meeting, June 15–18, 2015.
- Continued investigating the specifications and costs of purchasing expanded storage for the data server, an additional node for the simulation cluster, and new modeling and simulation workstations. This equipment would be used for PCOR Partnership geologic modeling, seismic analysis, and simulation.
- Submitted the purchase approval request to DOE for the new modeling and simulation workstations. This equipment would be used for PCOR Partnership geologic modeling, seismic analysis, and simulation. Approval for this purchase was received from DOE.
- Hosted a Webinar on June 22, 2015, with the PCOR Partnership Technical Advisory Board (TAB) to discuss the transition of CO₂ EOR to CO₂ storage. TAB provided a great deal of feedback regarding this issue and gave suggestions for areas needing further research. Potential journal article ideas were also discussed.

- Participated in a conference call with a representative of the U.S. Clean Air Task Force regarding the Climate Change Working Group platform. The U.S. Clean Air Task Force is interested in having Bell Creek be a sister project to an EOR project in China.
- Reviewed and submitted abstracts to the DOE Carbon Storage R&D Program Review Meeting (six abstracts in total were submitted).
- Held a task leader meeting May 5, 2015. Topics discussed included brief updates on Bell Creek and Aquistore, upcoming conferences/meetings, and task leader updates.
- Held a task leader meeting June 8, 2015. Topics discussed included the BP4 extension, including budgets and deliverables; upcoming conferences/meetings; and task leader updates.
- Deliverables and milestones completed in April:
 - March monthly update
 - Task 13: D58/D59 – Quarterly Progress Report
 - Task 14: M23 – Monthly WWG call held
- Deliverables and milestones completed in May:
 - April monthly update
 - Task 6: D85 – Opportunities and Challenges Associated with CO₂ Compression and Transportation During CCS Activities
 - Task 14: M23 – Monthly WWG call held
- Deliverables and milestones completed in June:
 - May monthly update
 - Task 2: D17 – General Phase III Information PowerPoint Presentation (Update 6)
 - Task 9: M49 – Bell Creek Test Site – 1.5 million metric tons of CO₂ Injected
 - Task 14: M23 – Monthly WWG call held

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 14 – RCSP WWG Coordination

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

- On June 15, 2015, distributed the formal announcement of the Special Issue of the *International Journal of Greenhouse Gas Control* (IJGGC) on the “Nexus of Water and Carbon Capture and Storage” to the various stakeholders. These included the WWG, select members of the PCOR Partnership, select participants of the 12th International Conference on Greenhouse Gas Technologies (GHGT-12), and other researchers focused on water and CCS issues. Abstracts are due July 17, 2015.
- With regard to monthly conference calls (M23):
 - On April 28, 2015, discussed updates for the current WWG BPM, the annual meeting agenda items and potential guests, and the annual WWG meeting during DOE’s annual partnership review meeting in August.

- Held the monthly conference call on May 28, 2015. Discussed updates for the current WWG BPM and potential areas of overlap with current DOE BPM updates, discussed updates on a special journal of IJGGC, and held a brief discussion regarding the WWG annual meeting.
- On June 23, 2015, discussed updates for the current WWG BPM and the WWG annual meeting.
- Distributed the latest update of the WWG BPM text to the group with a request for references appropriate to the discussion from the various partnership representatives.
- Distributed the March, April, and May WWG conference call notes.
- Completed the redesign of the water–CCS nexus graphic for both the WWG Web site and future fact sheet revisions.
- With regard to the WWG annual meeting to be held in August in Pittsburgh, Pennsylvania:
 - The meeting will focus on the development of the WWG BPM and its relation to the DOE BPMs being developed.
 - Developed a draft agenda.
 - Distributed the official announcement.
- Submitted an abstract for a poster to be presented at the DOE Carbon Storage R&D Program Review Meeting. The abstract focuses on the last fact sheet developed by the WWG on the subject of long-term protection of freshwater resources.
- Continued collaborative efforts with CETER, including the following:
 - Discussed the WWG conference calls.
 - Reviewed revisions for the BPM and suggestions for the annual meeting.
 - Discussed upcoming April conference call and how to move forward with the BPM outline.
 - Discussed development of a solicitation for the special edition of IJGGC.
 - Continued development of the WWG BPM (D80, due November 30, 2016). We are working on having draft text prepared in time for the annual meeting.
 - ♦ The draft annotated outline was sent to Andrea McNemar for approval.

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 15 – Further Characterization of the Zama Acid Gas EOR, CO₂ Storage, and Monitoring Project

This task ended Quarter 2, BP4, Year 7 (February 2014).

Task 16 – Characterization of the Basal Cambrian System

This task ended Quarter 2, BP4, Year 7 (March 2014).

PHASE III COST STATUS

The approved BP4 (Modification No. 32) budget along with actual costs incurred and in-kind cost share reported is shown in Table 9. A spending plan for BP4 and actual incurred cost by quarter of cash funds for BP4 are provided in Figure 7 and Table 10.

Table 9. Phase III Budget – BP4

Organization	Approved Budget,* \$	Actual Costs Incurred, \$
DOE Share – Cash	60,623,437	53,798,463
Nonfederal Share – Cash	2,411,971	2,932,310
Nonfederal Share – In-Kind	33,783,776	34,228,295
Total	96,819,184	90,959,068

*As of Modification No. 32.

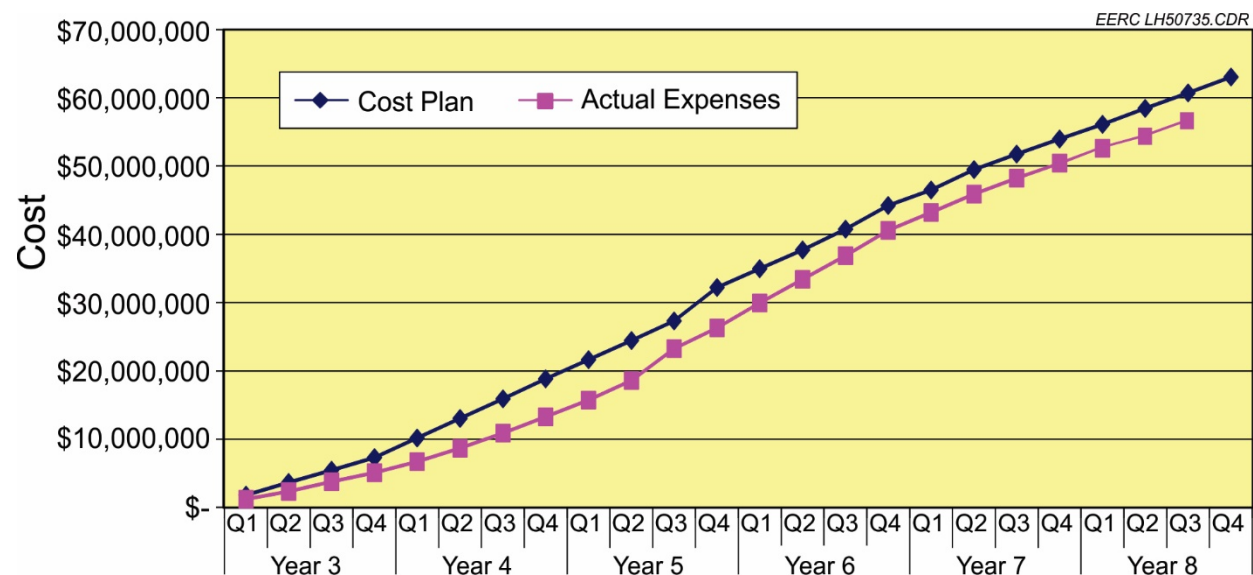


Figure 7. PCOR Partnership Phase III, BP4, Years 3–8 funding (cash only).

PHASE III SCHEDULE STATUS

Table 11 lists all deliverables and milestones by quarter, with completion dates, through the end of the reporting period (see Table 12 for the Gantt chart for BP4, Years 7 and 8).

Table 10. Phase III, BP4, Years 3–8 Spending Plan

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
Baseline Cost Plan																
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
Actual Incurred Cost																
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
Variance																
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
Baseline Cost Plan																
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	\$2,862,592	\$38,476,517	\$3,362,375	\$41,838,891
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	\$3,007,777	\$40,743,303	\$3,507,560	\$44,250,862
Actual Incurred Cost																
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	\$3,463,510	\$27,849,893	\$ 3,244,138	\$31,094,031	\$3,271,990	\$34,366,021	\$3,542,974	\$37,908,995
Nonfederal Share	\$ 160,751	\$ 1,222,584	\$ 134,138	\$ 1,356,722	\$ 264,409	\$ 1,621,131	\$ 296,942	\$ 1,918,073	\$ 156,655	\$ 2,074,728	\$ 244,345	\$ 2,319,073	\$ 209,528	\$ 2,528,601	\$ 156,775	\$ 2,685,376
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	\$3,620,165	\$29,924,621	\$ 3,488,483	\$33,413,104	\$3,481,518	\$36,894,622	\$3,699,749	\$40,594,371
Variance																
Federal Share	\$ 416,224	\$ 5,767,749	\$ (90,843)	\$ 5,676,906	\$ (1,677,589)	\$ 3,999,318	\$2,002,824	\$ 6,002,141	\$ (850,810)	\$ 5,151,332	\$ (631,438)	\$ 4,519,894	\$ (409,399)	\$ 4,110,496	\$ (180,600)	\$ 3,929,896
Nonfederal Share	\$ (8,322)	\$ 151,360	\$ 18,291	\$ 169,651	\$ (111,980)	\$ 57,671	\$ (144,513)	\$ (86,842)	\$ (11,470)	\$ (98,312)	\$ (99,160)	\$ (197,472)	\$ (64,343)	\$ (261,815)	\$ (11,590)	\$ (273,405)
Total Variance	\$ 407,902	\$ 5,919,109	\$ (72,552)	\$ 5,846,557	\$ (1,789,569)	\$ 4,056,989	\$1,858,311	\$ 5,915,299	\$ (862,280)	\$ 5,053,020	\$ (730,598)	\$ 4,322,422	\$ (473,742)	\$ 3,848,681	\$ (192,190)	\$ 3,656,491

Baseline Reporting Quarter	Year 7								Year 8							
	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
Baseline Cost Plan																
Federal Share	\$2,253,496	\$44,092,387	\$ 2,977,355	\$47,069,742	\$ 2,253,496	\$49,323,237	\$2,253,496	\$51,576,733	\$2,136,847	\$53,713,580	\$ 2,303,285	\$56,016,865	\$2,303,286	\$58,320,151	\$2,303,286	\$60,623,437
NonFederal Share	\$ -	\$ 2,411,971	\$ -	\$ 2,411,971	\$ -	\$ 2,411,971	\$ -	\$ 2,411,971	\$ -	\$ 2,411,971	\$ -	\$ 2,411,971	\$ -	\$ 2,411,971	\$ -	\$ 2,411,971
Total Planned	\$2,253,496	\$46,504,358	\$ 2,977,355	\$49,481,713	\$ 2,253,496	\$51,735,208	\$2,253,496	\$53,988,704	\$2,136,847	\$56,125,551	\$ 2,303,285	\$58,428,836	\$2,303,286	\$60,732,122	\$2,303,286	\$63,035,408
Actual Incurred Cost																
Federal Share	\$2,579,307	\$40,488,302	\$ 2,644,052	\$43,132,354	\$ 2,349,302	\$45,481,656	\$2,087,549	\$47,569,205	\$2,171,628	\$49,740,833	\$ 1,707,622	\$51,448,455	\$2,350,008	\$53,798,463		
NonFederal Share	\$ 62,881	\$ 2,748,257	\$ 14,980	\$ 2,763,237	\$ 15,096	\$ 2,778,333	\$ 90,494	\$ 2,868,827	\$ 2,587	\$ 2,871,414	\$ 44,275	\$ 2,915,689	\$ 16,621	\$ 2,932,310		
Total Incurred Cost	\$2,642,188	\$43,236,559	\$ 2,659,032	\$45,895,591	\$ 2,364,398	\$48,259,989	\$2,178,043	\$50,438,032	\$2,174,215	\$52,612,247	\$ 1,751,897	\$54,364,144	\$2,366,629	\$56,730,773		
Variance																
Federal Share	\$ (325,811)	\$ 3,604,085	\$ 333,303	\$ 3,937,388	\$ (95,806)	\$ 3,841,581	\$ 165,947	\$ 4,007,528	\$ (34,781)	\$ 3,972,747	\$ 595,663	\$ 4,568,410	\$ (46,722)	\$ 4,521,688		
NonFederal Share	\$ (62,881)	\$ (336,286)	\$ (14,980)	\$ (351,266)	\$ (15,096)	\$ (366,362)	\$ (90,494)	\$ (456,856)	\$ (2,587)	\$ (459,443)	\$ (44,275)	\$ (503,718)	\$ (16,621)	\$ (520,339)		
Total Variance	\$ (388,692)	\$ 3,267,799	\$ 318,323	\$ 3,586,122	\$ (110,902)	\$ 3,475,219	\$ 75,453	\$ 3,550,672	\$ (37,368)	\$ 3,513,304	\$ 551,388	\$ 4,064,692	\$ (63,343)	\$ 4,001,349		

Table 11. Phase III Milestones and Deliverables

Title/Description	Due Date	Actual Completion Date
Year 1 – Quarter 1 (October–December 2007)		
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
Year 1 – Quarter 2 (January–March 2008)		
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
Year 1 – Quarter 3 (April–June 2008)		
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
Year 1 – Quarter 4 (July–September 2008)		
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
Year 2 – Quarter 1 (October–December 2008)		
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 11. Phase III Milestones and Deliverables (continued)

Title/Description	Due Date	Actual Completion Date
Year 2 – Quarter 2 (January–March 2009)		
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 ₂ 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
Year 2 – Quarter 3 (April–June 2009)		
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
Year 2 – Quarter 4 (July–September 2009)		
M23: Task 14 – Monthly WWG Conference Call Held	Not applicable	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 11. Phase III Milestones and Deliverables (continued)

Title/Description	Due Date	Actual Completion Date
Year 3 – Quarter 1 (October–December 2009)		
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
Year 3 – Quarter 2 (January–March 2010)		
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
Year 3 – Quarter 3 (April–June 2010)		
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
Year 3 – Quarter 4 (July–September 2010)		
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 11. Phase III Milestones and Deliverables (continued)

Title/Description	Due Date	Actual Completion Date
Year 4 – Quarter 1 (October–December 2010)		
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
Year 4 – Quarter 2 (January–March 2011)		
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 ₂ 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
Year 4 – Quarter 3 (April–June 2011)		
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 11. Phase III Milestones and Deliverables (continued)

Title/Description	Due Date	Actual Completion Date
Year 4 – Quarter 3 (April–June 2011) (continued)		
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
Year 4 – Quarter 4 (July–September 2011)		
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 ⁺	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
Year 5 – Quarter 1 (October–December 2011)		
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

⁺ Name change requested September 28, 2011, and approved October 3, 2011.

Continued . . .

Table 11. Phase III Milestones and Deliverables (continued)

Title/Description	Due Date	Actual Completion Date
Year 5 – Quarter 2 (January–March 2012)		
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
Year 5 – Quarter 3 (April–June 2012)		
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 ₂ 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 11. Phase III Milestones and Deliverables (continued)

Title/Description	Due Date	Actual Completion Date
Year 5 – Quarter 4 (July–September 2012)		
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
Year 6 – Quarter 1 (October–December 2012)		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	10/31/12	10/31/12
M23: Task 14 – Monthly WWG Conference Call Held	10/31/12	10/25/12
M23: Task 14 – Monthly WWG Conference Call Held	11/30/12	11/28/12
D57: Task 12 – Project Assessment Annual Report	12/31/12	12/28/12
M23: Task 14 – Monthly WWG Conference Call Held	12/31/12	Waived by DOE
Year 6 – Quarter 2 (January–March 2013)		
D32: Task 4 – Bell Creek Test Site – Geomechanical Final Report	1/31/13	1/31/13
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	1/31/13	1/31/13
M23: Task 14 – Monthly WWG Conference Call Held	1/31/13	1/16/13
D14: Task 2 – General Phase III Fact Sheet (update)	2/28/13	2/28/13
M23: Task 14 – Monthly WWG Conference Call Held	2/28/13	2/28/13
D85: Task 6 – Report – Opportunities and Challenges Associated with CO ₂ Compression and Transportation During CCS Activities	3/31/13	Waived by DOE (journal article)
D89: Task 16 – Report – Geochemical Evaluation of the Basal Cambrian System	3/31/13	3/28/13
D99: Task 14 – Water/CCS Nexus-Related Fact Sheet	3/31/13	3/22/13
M23: Task 14 – Monthly WWG Conference Call Held	3/31/13	3/28/13
M36: Task 13 – Annual Advisory Board Meeting Scheduled	3/31/13	3/27/13

Continued . . .

Table 11. Phase III Milestones and Deliverables (continued)

Title/Description	Due Date	Actual Completion Date
Year 6 – Quarter 3 (April–June 2013)		
D15: Task 2 – Bell Creek Test Site Fact Sheet (update)	4/15/13	3/25/13
D16: Task 2 – Fort Nelson Test Site Fact Sheet (update)	4/30/13	Waived by DOE
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	4/30/13	4/30/13
M14: Task 4 – Bell Creek Test Site Geological Characterization Data Collection Completed	4/30/13	4/30/13
M23: Task 14 – Monthly WWG Conference Call Held	4/30/13	4/25/13
M35: Task 16 – Basal Cambrian Dynamic Capacity Estimation Completed	4/30/13	4/30/13
D17: Task 2 – General Phase III Information PowerPoint Presentation (update)	5/31/13	5/31/13
D43: Task 5 – Bell Creek Test Site – Monitoring Experimental Design Package	5/31/13	5/31/13
M23: Task 14 – Monthly WWG Conference Call Held	5/31/13	5/30/13
M27: Task 5 – Bell Creek Test Site – MVA Equipment Installation and Baseline MVA Activities Completed	5/31/13	5/31/13
M23: Task 14 – Monthly WWG Conference Call Held	6/30/13	6/27/13
M26: Task 8 – Bell Creek Test Site – CO ₂ Injection Initiated	6/30/13	May 2013 – sent 6/25/13
M37: Task 3 – IOGCC Task Force Subgroup Meeting 2 Held	5/9/13	5/29/13
M42: Task 3 – Findings and Recommendations of the Operational and Postoperational Subgroups Presented to the Carbon Geologic Storage (CGS) Task Force	6/30/13	6/20/13 – sent 6/28/13
Year 6 – Quarter 4 (July–September 2013)		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	7/31/13	7/31/13
D33: Task 4 – Bell Creek Test Site – Geochemical Final Report	7/31/13	7/31/13
M12: Task 4 – Bell Creek Test Site Geochemical Work Completed	7/31/13	7/31/13
M23: Task 14 – Monthly WWG Conference Call Held	7/31/13	7/25/13
D64: Task 4 – Bell Creek Test Site – Site Characterization Report	8/31/13	8/29/13
D66: Task 9 – Bell Creek Test Site – Simulation Report	8/31/13	8/30/13
D81: Task 1 – Regional Carbon Sequestration Atlas (update)	8/31/13	5/1/13
M23: Task 14 – Monthly WWG Conference Call Held	8/31/13	Waived by DOE

Continued . . .

Table 11. Phase III Milestones and Deliverables (continued)

Title/Description	Due Date	Actual Completion Date
Year 6 – Quarter 4 (July–September 2013) (continued)		
D1: Task 1 – Review of Source Attributes	9/30/13	9/5/13
D6: Task 3 – Permitting Review – Update 1	9/30/13	9/24/13
D48: Task 7 – Bell Creek Test Site – Procurement Plan and Agreement Report	9/30/13	9/24/13
D90: Task 16 – Report – Wellbore Evaluation of the Basal Cambrian System	9/30/13	9/5/13
D94: Task 2 – Aquistore Project Fact Sheet	9/30/13	9/30/13
D95: Task 2 – Aquistore Project Poster	9/30/13	9/30/13
D98: Task 3 – Report – Findings, Recommendations, and Guidance of CGS Task Force	9/30/13	8/30/13
M23: Task 14 – Monthly WWG Conference Call Held	9/30/13	9/30/13
M38: Task 3 – IOGCC Task Force Wrap-Up Meeting Held	9/30/13	8/16/13 – sent 9/5/13
M39: Task 3 – IOGCC Task Force Editing Subgroup Meeting Held	9/30/13	6/3/13 – sent 9/5/13
M40: Task 15 – Further Characterization of the Zama Acid Gas EOR, CO ₂ Storage, and Monitoring Project Completed	9/30/13	9/24/13
Year 7 – Quarter 1 (October–December 2013)		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	10/31/13	10/31/13
D42: Task 5 – Bell Creek Test Site – Injection Experimental Design Package	10/31/13	10/30/13
D99: Task 14 – Water/CCS Nexus-Related Fact Sheet	10/31/13	10/31/13
M23: Task 14 – Monthly WWG Conference Call Held	10/31/13	10/31/13
M23: Task 14 – Monthly WWG Conference Call Held	11/30/13	11/21/13
M23: Task 14 – Monthly WWG Conference Call Held	12/31/13	Waived by DOE
M24: Task 14 – WWG Annual Meeting Held	12/31/13	8/19/13
M43: Task 9 – Bell Creek Test Site – First Full-Repeat Sampling of the Groundwater- Soil Gas-Monitoring Program Completed	12/31/13	11/15/13 – sent 12/13/13
Year 7 – Quarter 2 (January–March 2014)		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	1/31/14	1/31/14
D57: Task 12 – Project Assessment Annual Report	1/31/14	1/31/14
M23: Task 14 – Monthly WWG Conference Call Held	1/31/14	1/28/14
M41: Task 6 – Decision to Incorporate Ramgen Compression Technology into Bell Creek Project	1/31/14	1/29/14

Continued . . .

Table 11. Phase III Milestones and Deliverables (continued)

Title/Description	Due Date	Actual Completion Date
Year 7 – Quarter 2 (January–March 2014) (continued)		
D86: Task 15 – Updated Regional Implementation Plan for Zama	2/28/14	2/28/14
M23: Task 14 – Monthly WWG Conference Call Held	2/28/14	2/27/14
D24: Task 2 – PCOR Partnership Region Sequestration General Poster (update)	3/31/14	3/27/14
D36: Task 4 – Bell Creek Test Site – Wellbore Leakage Final Report	3/31/14	3/19/14
D92: Task 16 – Report – Storage Capacity and Regional Implications for Large-Scale Storage in the Basal Cambrian System	3/31/14	3/27/14
D93: Task 1 – Geological Modeling and Simulation Report for the Aquistore Project	3/31/14	3/25/14
D96: Task 4 – Bell Creek Test Site – 3-D Seismic and Characterization Report	3/31/14	3/27/14
M23: Task 14 – Monthly WWG Conference Call Held	3/31/14	3/25/14
M36: Task 13 – Annual Advisory Board Meeting Scheduled	3/31/14	3/4/14 – sent 3/25/14
M44: Task 9 – Bell Creek Test Site – First 3-D VSP Repeat Surveys Completed	3/31/14	3/1/14 – sent 3/25/14
Year 7 – Quarter 3 (April–June 2014)		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	4/30/14	4/30/14
M23: Task 14 – Monthly WWG Conference Call Held	4/30/14	4/24/14
D17: Task 2 – General Phase III Information PowerPoint Presentation (update)	5/31/14	5/30/14
D101: Task 14 – WWG Web Site Content Update	5/31/14	5/30/14
M23: Task 14 – Monthly WWG Conference Call Held	5/31/14	5/21/14
D44: Task 5 – Bell Creek Test Site – Drilling and Completion Activities Report	6/30/14	5/30/14
M23: Task 14 – Monthly WWG Conference Call Held	6/30/14	6/26/14
M45: Task 9 – Bell Creek Test Site – First Full-Repeat of Pulsed Neutron Logging Campaign Completed	6/30/14	6/9/14
M46: Task 9 – Bell Creek Test Site – 1 Year of Injection Completed	6/30/14	6/26/14

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Table 11. Phase III Milestones and Deliverables (continued)

Title/Description	Due Date	Actual Completion Date
Year 7 – Quarter 4 (July–September 2014)		
D13: Task 2 – Public Site Updates	7/31/14	7/29/14
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	7/31/14	7/31/14
M23: Task 14 – Monthly WWG Conference Call Held	7/31/14	7/17/14 WebEx
D66: Task 9 – Bell Creek Test Site – Simulation Report	8/31/14	8/27/14 Exec. Sum.
M23: Task 14 – Monthly WWG Conference Call Held	8/31/14	Waived by DOE
D1: Task 1 – Review of Source Attributes	9/30/14	9/24/14
D7: Task 1 – Third Target Area Completed	9/30/14	9/26/14
D93: Task 1 – Geological Modeling and Simulation Report for the Aquistore Project	9/30/14	9/30/14
D100: Task 9 – Fort Nelson Test Site – Best Practices Manual – Feasibility Study	9/30/14	9/30/14
M23: Task 14 – Monthly WWG Conference Call Held	9/30/14	9/30/14
Year 8 – Quarter 1 (October–December 2014)		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	10/31/14	10/31/14
D99: Task 14 – Water/CCS Nexus-Related Fact Sheet	10/31/14	10/31/14
M23: Task 14 – Monthly WWG Conference Call Held	10/31/14	10/28/14
M48: Task 9 – Bell Creek Test Site – 1 Million Metric Tons of CO ₂ Injected	10/31/14	10/29/14
M23: Task 14 – Monthly WWG Conference Call Held	11/30/14	11/25/14
D57: Task 12 – Project Assessment Annual Report	12/31/14	12/30/14
M24: Task 14 – WWG Annual Meeting Held	12/31/14	8/11/14
Year 8 – Quarter 2 (January–March 2015)		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	1/31/15	1/30/15
D32: Task 4 – Bell Creek Test Site – Geomechanical Report (Update 1)	1/31/15	1/28/15
M23: Task 14 – Monthly WWG Conference Call Held	1/31/15	1/27/15
M23: Task 14 – Monthly WWG Conference Call Held	2/28/15	2/26/15
D25: Task 2 – Bell Creek Test Site Poster (update)	3/31/15	2/5/15
M23: Task 14 – Monthly WWG Conference Call Held	3/31/15	3/25/15
M36: Task 13 – Annual Advisory Board Meeting Scheduled	3/31/15	3/31/15

Continued . . .

Table 11. Phase III Milestones and Deliverables (continued)

Title/Description	Due Date	Actual Completion Date
Year 8 – Quarter 3 (April–June 2015)		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	4/30/15	4/29/15
M23: Task 14 – Monthly WWG Conference Call Held	4/30/15	4/28/15
D17: Task 2 – General Phase III Information PowerPoint Presentation (update)	5/31/15	6/1/15
M23: Task 14 – Monthly WWG Conference Call Held	5/30/15	5/28/15
D85: Task 6 – Report – Opportunities and Challenges Associated with CO ₂ Compression and Transportation During CCUS Activities (update)	5/31/15	5/29/15
M23: Task 14 – Monthly WWG Conference Call Held	6/30/15	6/23/15
M49: Task 9 – Bell Creek Test Site – 1.5 Million Metric Tons of CO ₂ Injected	6/30/15	6/30/15
Year 8 – Quarter 4 (July–September 2015)		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	7/31/15	
D49: Task 8 – Bell Creek Test Site – Transportation and Injection Operations Report	7/31/15	
M23: Task 14 – Monthly WWG Conference Call Held	7/31/15	
M50: Task 9 – Bell Creek Test Site – 2 Years of Near-Surface Assurance Monitoring Completed	7/31/15	
D35: Task 4 – Bell Creek Test Site – Best Practices Manual – Site Characterization	8/31/15	
D66: Task 9 – Bell Creek Test Site – Simulation Report	8/31/15	
D81: Task 1 – Regional Carbon Sequestration Atlas (update)	8/31/15	
M23: Task 14 – Monthly WWG Conference Call Held	8/31/15	
M51: Task 9 – Bell Creek Test Site – Initial Analysis for First Large-Scale Repeat Pulsed-Neutron Logging Campaign Post-Significant CO ₂ Injection Completed	8/31/15	
D1: Task 1 – Review of Source Attributes (update)	9/30/15	
D8: Task 3 – Permitting Review – Update 2	9/30/15	
D45: Task 6 – Bell Creek Test Site – Infrastructure Development Report	9/30/15	
M23: Task 14 – Monthly WWG Conference Call Held	9/30/15	

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Table 11. Phase III Milestones and Deliverables (continued)

Title/Description	Due Date	Actual Completion Date
Year 9 – Quarter 1 (October–March 2015)		
D59/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	10/31/15	
M23: Task 14 – Monthly WWG Conference Call Held	10/31/15	
M23: Task 14 – Monthly WWG Conference Call Held	11/30/15	
D57: Task 12 – Project Annual Assessment Report	12/31/15	
M24: Task 14 – WWG Annual Meeting Held	12/31/15	
Year 9 – Quarter 2 (January–March 2016)		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	1/31/16	
D22: Task 2 – Energy from Coal 60-minute Documentary	1/31/16	
M23: Task 14 – Monthly WWG Conference Call Held	1/31/16	
D14: Task 2 – General Phase III Fact Sheet (Update)	2/29/16	
M23: Task 14 – Monthly WWG Conference Call Held	2/29/16	
D11: Task 2 – Outreach Plan (Update)	3/31/16	
D53: Task 9 – Fort Nelson Test Site – Monitoring for CO ₂ Storage in a Brine Formation Best Practices Manual	3/31/16	
D55: Task 11 – Bell Creek Test Site – Cost-Effective Long-Term Monitoring Strategies Report	3/31/16	
D69: Task 9 – Bell Creek Test Site – Best Practices Manual – Simulation Report	3/31/16	
M23: Task 14 – Monthly WWG Conference Call Held	3/31/16	
M36: Task 13 – Annual Advisory Board Meeting Scheduled	3/31/16	
Year 9 – Quarter 3 (April–June 2016)		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	4/30/16	
D15: Task 2 – Bell Creek Test Site Fact Sheet (Update)	4/16/16	
D16: Task 2 – Fort Nelson Test Site Fact Sheet (Update)	4/30/16	
D21: Task 2 – Bell Creek Test Site 30-minute Documentary	4/30/16	
D56: Task 11 – Cost-Effective Long-Term Monitoring Strategies for the Fort Nelson Test Site	4/30/16	
M23: Task 14 – Monthly WWG Conference Call Held	4/30/16	
D17: Task 2 – General Phase III Information PowerPoint Presentation (Update)	5/31/16	
D101: Task 14 – WWG Web Site Content Update 1	5/31/16	
M23: Task 14 – Monthly WWG Conference Call Held	5/31/16	
M23: Task 14 – Monthly WWG Conference Call Held	6/30/16	

Continued . . .

Table 11. Phase III Milestones and Deliverables (continued)

Title/Description	Due Date	Actual Completion Date
Year 9 – Quarter 4 (July–September 2016)		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	7/31/16	
D13: Task 2 – Public Site Updates	7/31/16	
D70: Task 9 – Fort Nelson Test Site – Best Practices Manual – Simulation Report	7/31/16	
M23: Task 14 – Monthly WWG Conference Call Held	7/31/16	
D103: Task 13 – Best Practices Manual – Programmatic Risk Management	8/31/16	
M23: Task 14 – Monthly WWG Conference Call Held	8/31/16	
D1: Task 1 – Review of Source Attributes (Update)	9/30/16	
D73: Task 11 – Bell Creek Test Site –Monitoring and Modeling Fate of CO ₂ Progress Report	9/30/16	
M23: Task 14 – Monthly WWG Conference Call Held	9/30/16	

Table 12. Phase III, BP4, Years 7–8 Gantt Chart



Continued . . .

Table 12. Phase III, BP4, Years 7–8 Gantt Chart (continued)

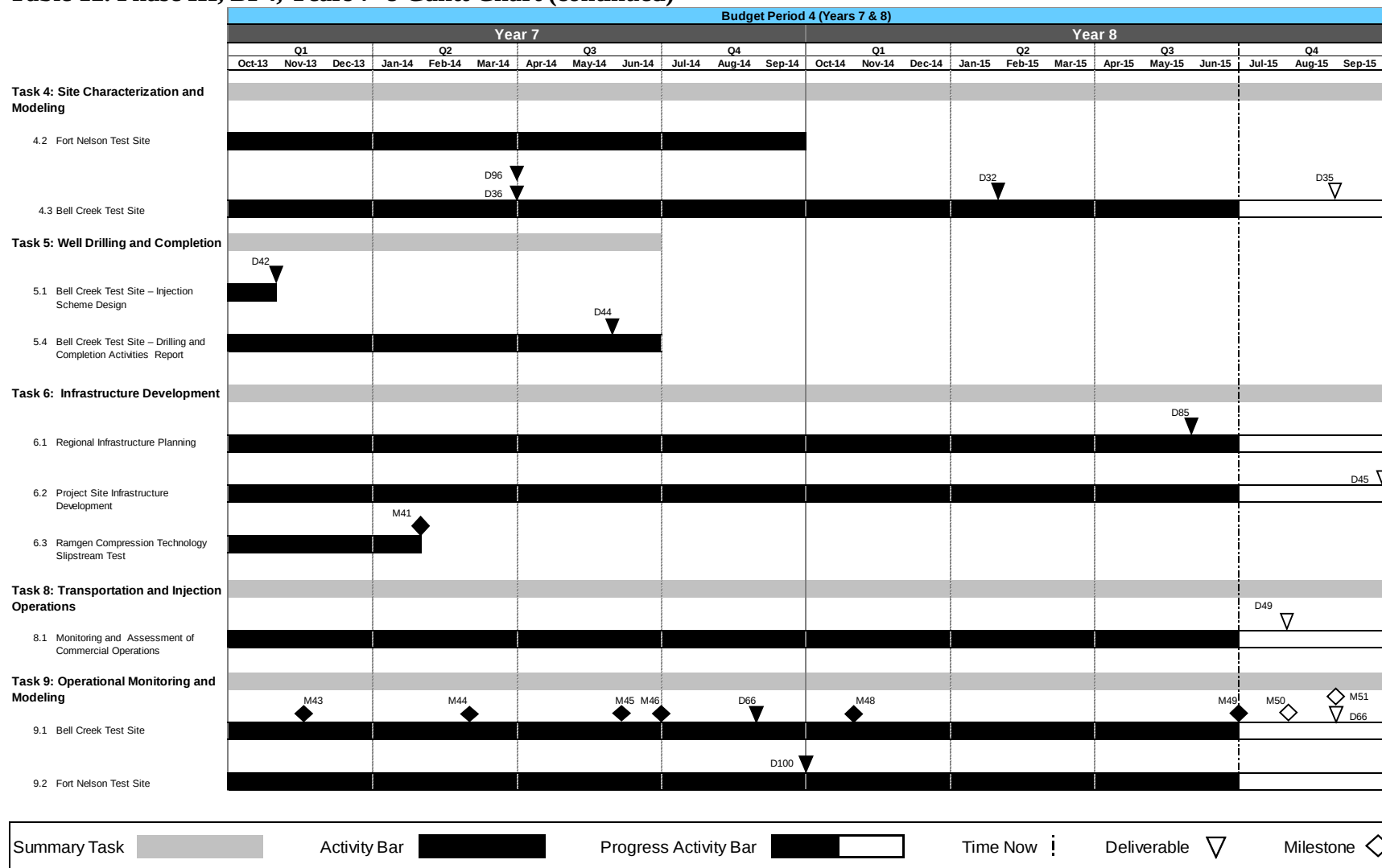
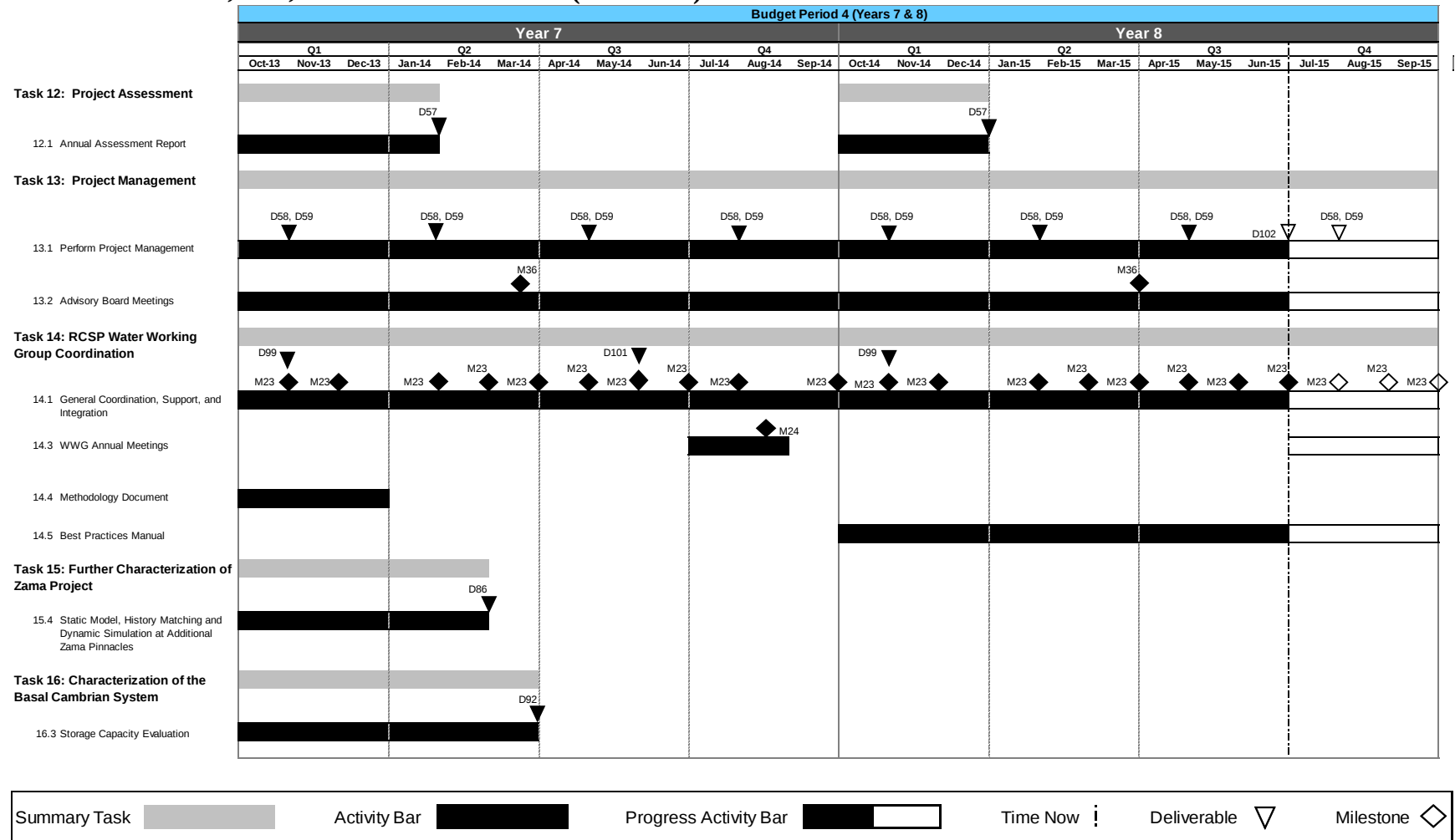


Table 12. Phase III, BP4, Years 7–8 Gantt Chart (continued)



Continued . . .

Table 12. Phase III BP4, Years 7–8 Gantt Chart (continued)

Key for Deliverables				Key for Milestones	
D1	Review of Source Attributes	D58	Quarterly Progress Report	M23	Monthly WWG Conference Call Held
D7	Third Target Area Completed	D57	Project Assessment Annual Report	M24	WWG Annual Meeting Held
D8	Permitting Review – Update 2	D59	Milestone Quarterly Report	M36	Annual Advisory Board Meeting Scheduled
D13	Public Site Updates	D66	BC Test Site – Simulation Report	M41	Decision to Incorporate Ramgen Compression Technology into BC Project
D17	General Phase III Information PowerPoint Presentation	D81	Regional Carbon Sequestration Atlas		
D22	Energy from Coal 60-Minute Documentary	D85	Report – Opportunities and Challenges Associated with CO ₂ Compression and Transportation During CCUS Activities	M43	BC Test Site – First Full-Repeat Sampling of the Groundwater- and Soil Gas- Monitoring Program Completed
D24	PCOR Partnership Region CO ₂ Storage General Poster				
D25	BC Test Site Poster (Update)	D86	Updated Regional Technology Implementation Plan for Zama	M44	BC Test Site – First 3-D VSP Repeat Surveys Completed
D32	BC Test Site – Geomechanical Report	D92	Report – Storage Capacity and Regional Implications for Large-Scale Storage in the Basal Cambrian System	M45	BC Test Site – First Full-Repeat of Pulsed-Neutron Logging Campaign Completed
D35	BC Test Site – Best Practices Manual – Site Characterization				
D36	BC Test Site – Wellbore Leakage Final Report	D93	Report – Geological Modeling and Simulation for the Aqistore Project	M46	BC Test Site – 1 Year of Injection Completed
D42	BC Test Site – Injection Experimental Design Package	D96	BC Test Site – 3-D Seismic Acquisition and Characterization Report	M48	BC Test Site – 1 Million Metric Tons of CO ₂ Injected
D44	BC Test Site – Drilling and Completion Activities Report	D99	Nexus of Water and CCS Fact Sheet	M49	BC Test Site – 1.5 Million Metric Tons of CO ₂ Injected
D45	Report – Infrastructure Development	D100	FN Test Site – Best Practices Manual– Feasibility Study	M50	BC Test Site – 2 Years of Near-Surface Assurance Monitoring Completed
D49	BC Test Site – Transportation and Injection Operations Report	D101	WWG Web Site Content Update		
		D102	Best Practices Manual – Adaptive Management Approach	M51	Initial Analysis for First Large-Scale Repeat Pulsed-Neutron Logging Campaign Post-Significant CO ₂ Injection Completed

PHASE III PRODUCTS OR TECHNOLOGY TRANSFER ACTIVITIES

During the reporting period, nine abstracts were submitted for presentation, four were accepted for presentation, and 18 oral presentations were given at 13 different meetings/conferences/workshops. In addition, a quarterly progress report, four deliverables/milestones (three draft, one approved), and one value-added product (approved) were completed. In addition to the products cited below, staff also attended eight project management site trips. For more detail, see the Meetings/Travel section.

Abstracts

Submitted

Daly, D.J., Crocker, C.R., Crossland, J.L., Gorecki, C.D., and Steadman, E.N., 2015, PCOR Partnership outreach – a multifaceted program [abs.]: Transforming Technology Through Integration and Collaboration Carbon Storage R&D Project Review Meeting, Pittsburgh, Pennsylvania, August 18–20, 2015.

Klapperich, R.J., Jensen, M.D., Stepan, D.J., Gorecki, C.D., and Nakles, D.V., 2015, Long-term protection of freshwater resources [abs.]: Transforming Technology Through Integration and Collaboration Carbon Storage R&D Project Review Meeting, Pittsburgh, Pennsylvania, August 18–20, 2015.

Peck, W.D., and Gorecki, C.D., 2015, Guiding MVA deployment using near-real-time history matching at the Aquistore site [abs.]: Transforming Technology Through Integration and Collaboration Carbon Storage R&D Project Review Meeting, Pittsburgh, Pennsylvania, August 18–20, 2015.

Sorensen, J.A., Smith, S.A., Gorecki, C.D., Steadman, E.N., and Harju, J.A., 2015, The adaptive management approach to CCS project planning—the Fort Nelson CCS project as a case study [abs.]: Transforming Technology Through Integration and Collaboration Carbon Storage R&D Project Review Meeting, Pittsburgh, Pennsylvania, August 18–20, 2015.

Wilson, W.I., Doll, T.E., Gorecki, C.D., Ayash, S.C., Steadman, E.N., and Harju, J.A., 2015, Permitting for carbon capture and storage in the Plains CO₂ Reduction Partnership region [abs.]: Transforming Technology Through Integration and Collaboration Carbon Storage R&D Project Review Meeting, Pittsburgh, Pennsylvania, August 18–20, 2015.

Submitted and Accepted for Presentation

Gorecki, C.D., Ayash, S.C., Klapperich, R.J., Sorensen, J.A., Hamling, J.A., Steadman, E.N., and Harju, J.A., 2015, An adaptive management approach to CO₂ storage projects [abs.]: 10th CO₂GeoNet Open Forum, San Servolo Island, Venice, Italy, May 11–12, 2015.

Gorecki, C.D., Daly, D.J., Crocker, C.R., Crossland, J.L., and Steadman, E.N., 2015, PCOR Partnership outreach—over a decade of activity [abs.]: 10th CO₂GeoNet Open Forum, San Servolo Island, Venice, Italy, May 11–12, 2015.

Gorecki, C.D., Steadman, E.N., Harju, J.A., Hamling, J.A., Sorensen, J.A., Peck, W.D., Daly, D.J., Jensen, M.D., Klapperich, R.J., Ayash, S.C., and Anagnost, K.K., 2015, The Plains CO₂

Reduction Partnership—demonstrating the geologic storage of carbon dioxide [abs.]: 10th CO₂GeoNet Open Forum, San Servolo Island, Venice, Italy, May 11–12, 2015.

Submitted and Accepted for Poster

Bosshart, N.W., Braunberger, J.R., Burton-Kelly, M.E., Dotzenrod, N.W., and Gorecki, C.D., 2015, Multiscale reservoir modeling for CO₂ storage and enhanced oil recovery using multiple point statistics [abs.]: EAGE Petroleum Geostatistics 2015 Conference, Biarritz, France, September 7–11, 2015.

Presentations

Bosshart, N.W., 2015, Bell Creek version 3 geologic model update—a new geologic interpretation: Presented at the Bell Creek Project Update Meeting, Plano, Texas, April 13, 2015.

Bosshart, N.W., Hamling, J.A., and Gorecki, C.D., 2015, Thoughts on a potential tracer study in Phase 1, Bell Creek Field: Presented at the Bell Creek Project Update Meeting, Plano, Texas, April 13, 2015.

Braunberger, J.R., and Hamling, J.A., 2015, Bell Creek pulsed-neutron well-logging update: Presented at the Bell Creek Project Update Meeting, Plano, Texas, April 13, 2015.

Burnison, S., 2015, Geophysics at the EERC—overview of projects, status, and plans: Presented to Denbury Resources Inc. personnel, Bell Creek Project Update Meeting, Plano, Texas, April 13, 2016.

Daly, D.J., Crocker, C.R., Gorecki, C.D., Steadman, E.N., and Harju, J.A., 2015, Energy and carbon—considering the big question: Presented at the Harold H. Hamm School of Geology and Geological Engineering, Grand Forks, North Dakota, April 17, 2015.

Daly, D.J., Crocker, C.R., Gorecki, C.D., Steadman, E.N., and Harju, J.A., 2015, Energy and CO₂ management—carbon capture and storage: Presented at the Energy, Economics & Environment 2015 Lignite Education Seminar, Bismarck, North Dakota, June 15–18, 2015.

Gorecki, C.D., Ayash, S.C., Klapperich, R.J., Sorensen, J.A., Hamling, J.A., Steadman, E.N., and Harju, J.A., 2015, An adaptive management approach to CO₂ storage projects: Presented at the 10th CO₂GeoNet Open Forum, San Servolo Island, Venice, Italy, May 11–12, 2015.

Gorecki, C.D., Daly, D.J., Crocker, C.R., Crossland, J.L., Steadman, E.N., and Harju, J.A., 2015, PCOR Partnership outreach—over a decade of activity: Presented at the 10th CO₂GeoNet Open Forum, San Servolo Island, Venice, Italy, May 11–12, 2015.

Gorecki, C.D., Hamling, J.A., Sorensen, J.A., Peck, W.D., Daly, D.J., Jensen, M.D., Klapperich, R.J., Ayash, S.C., Anagnost, K.K., Steadman, E.N., and Harju, J.A., 2015, Implementing carbon capture and storage—an overview of the Plains CO₂ Reduction Partnership: Presented at the 14th Annual Carbon Capture, Utilization & Storage Conference, Pittsburgh, Pennsylvania, April 28 – May 1, 2015.

Gorecki, C.D., Steadman, E.N., Harju, J.A., Hamling, J.A., Sorensen, J.A., Peck, W.D., Daly, D.J., Jensen, M.D., Klapperich, R.J., Ayash, S.C., and Anagnost, K.K., 2015, Implementing carbon capture and storage—an overview of the Plains CO₂ Reduction Partnership: Presented at the 10th CO₂GeoNet Open Forum, San Servolo Island, Venice, Italy, May 11–12, 2015.

- Hamling, J.A., 2015, Bell Creek oil field—a study of associated CO₂ storage with a commercial CO₂ enhanced oil recovery project: Presented at the IEAGHG 10th Monitoring Network Meeting, San Francisco, California, June 10–12, 2015.
- Leroux, K.M., and Hamling, J.A., 2015, 05-06 OW AZMI pressure analysis: Presented at the Bell Creek Project Update Meeting, Plano, Texas, April 13, 2015.
- Peck, W.D., and Ayash, S.C., 2015, PCOR Technical Advisory Board discussion on transition of CO₂ EOR to CO₂ storage: Presentation for the PCOR Technical Advisory Board Webinar, June 22, 2015.
- Peck, W.D., and Gorecki, C.D., 2015, Geologic modeling and simulation at the Aquistore site—a guide to MVA deployment: Presented at the 14th Annual Carbon Capture, Utilization & Storage Conference, Pittsburgh, Pennsylvania, April 28 – May 1, 2015.
- Sorensen, J.A., Gorecki, C.D., Steadman, E.N., and Harju, J.A., 2015, An overview of the Plains CO₂ Reduction (PCOR) Partnership: Presented to China Coal Information Institute personnel, Grand Forks, North Dakota, April 13, 2015.
- Steadman, E.N., 2015, Lessons learned from enhanced oil recovery operations—the Plains CO₂ Reduction Partnership: Presented at the 2015 Carbon Sequestration Leadership Forum (CSLF) Technology Workshop, Regina, Saskatchewan, June 17, 2015.
- Steadman, E.N., 2015, The Plains CO₂ Reduction (PCOR) Partnership EOR and storage demonstration projects: Presented at the Workshop on CCS–EOR Utilization and Storage, Beijing, China, April 16, 2015.
- Stepan, D.J., and Hamling, J.A., 2015, Surface and shallow subsurface soil gas and water monitoring at the Bell Creek oil field: Presented at the Bell Creek Project Update Meeting, Plano, Texas, April 13, 2015.

Deliverables/Milestones

Draft

- Gorecki, C.D., Kalenze, N.S., Hamling, J.A., Steadman, E.N., and Harju, J.A., 2015, Bell Creek test site—1.5M metric tons of CO₂ injected: Plains CO₂ Reduction Partnership Phase III draft Task 9 Milestone M49 for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592, Grand Forks, North Dakota, Energy & Environmental Research Center, June.

Approved

- Ayash, S.C., Gorecki, C.D., Steadman, E.N., and Harju, J.A., 2015, Technical Advisory Board meeting scheduled: Plains CO₂ Reduction (PCOR) Partnership Phase III Task 13 Milestone M36 for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592, EERC Publication 2015-EERC-04-02, Grand Forks, North Dakota, Energy & Environmental Research Center, March.

Draft Submitted and Approved

Daly, D.J., Crocker, C.R., Gorecki, C.D., Steadman, E.N., and Harju, J.A., 2015, General audience CO₂ sequestration outreach PowerPoint presentation: Plains CO₂ Reduction (PCOR) Partnership Phase III Task 2 Deliverable D17 (Update 6) for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592, Grand Forks, North Dakota, Energy & Environmental Research Center, June.

Jensen, M.D., Gorecki, C.D., Steadman, E.N., and Harju, J.A., 2015, Opportunities and challenges associated with CO₂ compression and transportation during CCS activities: Plains CO₂ Reduction Partnership Phase III Task 6 Deliverable D85 for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592, EERC Publication 2015-EERC-06-08, Grand Forks, North Dakota, Energy & Environmental Research Center, May.

Progress Reports

Monthlies

Gorecki, C.D., Steadman, E.N., Peck, W.D., Daly, D.J., Sorensen, J.A., Hamling, J.A., Jensen, M.D., Harju, J.A., Heebink, L.V., and Klapperich, R.J., 2015, Plains CO₂ Reduction (PCOR) Partnership: Phase III monthly report (March 1–31, 2015) for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592, Grand Forks, North Dakota, Energy & Environmental Research Center, April.

Gorecki, C.D., Steadman, E.N., Peck, W.D., Daly, D.J., Sorensen, J.A., Hamling, J.A., Jensen, M.D., Harju, J.A., Heebink, L.V., and Klapperich, R.J., 2015, Plains CO₂ Reduction (PCOR) Partnership: Phase III monthly report (April 1–30, 2015) for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592, Grand Forks, North Dakota, Energy & Environmental Research Center, May.

Gorecki, C.D., Steadman, E.N., Peck, W.D., Daly, D.J., Sorensen, J.A., Hamling, J.A., Jensen, M.D., Harju, J.A., Heebink, L.V., and Klapperich, R.J., 2015, Plains CO₂ Reduction (PCOR) Partnership: Phase III monthly report (May 1–31, 2015) for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592, Grand Forks, North Dakota, Energy & Environmental Research Center, June.

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., Heebink, L.V., Anagnost, K.K., and Votava, T.J., 2015, Plains CO₂ Reduction Partnership Phase III Task 13 Deliverable D58/59 quarterly technical progress report (January 1 – March 31, 2015) 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, April.

Value-Added Products

Approved

Smith, S.A., Heebink, L.V., Beddoe, C.J., Hurley, J.P., Eylands, K.E., Peck, W.D., Kurz, B.A., Gorecki, C.D., and Steadman, E.N., 2015, Petrophysical evaluation of Bakken Formation core from the Aquistore CO₂ injection site: Plains CO₂ Reduction (PCOR) Partnership Phase III Task 3 value-added report for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592, EERC Publication 2015-EERC-04-05; Grand Forks, North Dakota, Energy & Environmental Research Center, January.

Meeting Minutes

Klapperich, R.J., and Tennyson, M., 2015, Minutes—Regional Carbon Sequestration Partnership Water Working Group conference call: March 25, 2015.

Klapperich, R.J., and Tennyson, M., 2015, Minutes—Regional Carbon Sequestration Partnership Water Working Group conference call: April 28, 2015.

Klapperich, R.J., and Tennyson, M., 2015, Minutes—Regional Carbon Sequestration Partnership Water Working Group conference call: May 28, 2015.

MEETINGS/TRAVEL

Representatives from the PCOR Partnership incurred travel costs for their participation in the following five meetings/conferences, two workshops, and four project management site trips in this reporting period:

- April 10–13, 2015: traveled to Plano, Texas, for update meetings with Denbury.
- April 20–25, 2015: traveled to Paris, France, to present at the 7th IEA International Carbon Capture and Sequestration Regulatory Network meeting.
- April 22–24, 2015: traveled to Miles City, Montana, for Bell Creek site work.
- April 22 – May 1, 2015: traveled to Gillette, Wyoming, for Bell Creek project work.
- April 27–30, 2015: traveled to Regina, Saskatchewan, Canada, to attend the Williston Basin Petroleum Conference.
- April 27 – May 2, 2015: traveled to Pittsburgh, Pennsylvania, to present at CCUS-14.
- April 28 – May 1, 2015: traveled to Miles City, Montana, for Bell Creek site work.
- April 23 – May 1, 2015: traveled to Gillette, Wyoming, for Bell Creek project work.
- April 27–30, 2015: traveled to Regina, Saskatchewan, Canada, to attend the Williston Basin Petroleum Conference.
- April 27 – May 2, 2015: traveled to Pittsburgh, Pennsylvania, to present at CCUS-14.
- April 28 – May 1, 2015: traveled to Miles City, Montana, for Bell Creek site work.
- May 9–14, 2015: traveled to Venice, Italy, to present at the 10th CO₂ GeoNet Open Forum and Workshop.
- May 16–21, 2015: traveled to Salt Lake City, Utah, to attend the IOGCC Annual Meeting.

- May 28–29, 2015: traveled to Estevan, Saskatchewan, Canada, to attend and film the Aquistore project ribbon-cutting ceremony.
- June 9–14, 2015: traveled to Berkeley, California, to present at the IEAGHG 10th Monitoring Network Meeting.
- June 11, 2015: traveled to Fargo, North Dakota, to meet with PPB education staff regarding the Teacher Training Institute.
- June 15–18, 2015: traveled to Regina, Saskatchewan, to present at the CSLF Mid-Year Meeting.
- June 16, 2015: traveled to Bismarck, North Dakota, to present at the Lignite Energy Council teacher workshop.
- June 22–25, 2015: traveled to Meridian, Mississippi, to film locations and obtain interviews at Southern Company’s Kemper County Energy Facility to use in the Coal and the Modern Age documentary.
- June 22–28, 2015: traveled to Gillette, Wyoming, for sampling at the Bell Creek site.
- June 23–24, 2015: traveled to Moorhead, Minnesota, to present at the Prairie Public Teacher Training Institute.
- June 26 – July 8, 2015: traveled to San Francisco, California, to attend the 2015 U.S. Rock Mechanics Geomechanics Symposium and Workshop.
- June 29 – July 1, 2015: traveled to White Salmon, Washington, to work as a technical advisor on the Coal and the Modern Age documentary.

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