



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 January 1 – March 31, 2014)

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PLAINS CO₂ REDUCTION PARTNERSHIP PHASE III
Quarterly Technical Progress Report
January 1 – March 31, 2014

EXECUTIVE SUMMARY

The Plains CO₂ Reduction (PCOR) Partnership is one of seven Regional Carbon Sequestration Partnerships competitively awarded by the U.S. Department of Energy (DOE) National Energy Technology Laboratory (NETL) in 2003 as part of a national plan to mitigate greenhouse gas emissions. The PCOR Partnership is led by the Energy & Environmental Research Center 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 January 1, 2014, through March 31, 2014.

Activities at the Bell Creek site continued at a robust pace during this reporting period. Denbury Resources Inc. (Denbury) has cumulatively injected (May 2013 – January 2014) nearly 430,000 metric tons of CO₂. Monthly operational-phase sampling events took place even during difficult winter weather conditions. In March, over 80 3-D vertical seismic profiling survey points were collected and will be processed. In addition, repeat pulsed-neutron logging was performed on four wells.

The scope of work for the additional site characterization activities at the Zama oil field, Alberta, Canada, was completed in February 2014, resulting in an updated regional technology implementation plan that is currently undergoing DOE NETL review. In March 2014, geological modeling and simulation results in relation to the Aquistore project were reported, along with the results of a petrophysical and geochemical evaluation of Aquistore core. In addition, a report detailing the storage capacity and regional implications for large-scale storage in the Basal Cambrian system was drafted.

Regional characterization, modeling and simulation, and outreach and education efforts also continued. In addition, 10 presentations sharing the goals and efforts of the PCOR Partnership were given at 15 different meetings/conferences, and 16 program deliverables, four milestones, and two value-added products were completed.



PLAINS CO₂ REDUCTION PARTNERSHIP PHASE III
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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 Partnership (RCSP) Program. The PCOR Partnership is led by the Energy & Environmental Research Center (EERC) at the University of North Dakota (UND) in Grand Forks, North Dakota, and includes stakeholders from the public and private sectors. The membership, as of March 31, 2014, 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 Northern Project Development, LP	North Dakota Industrial Commission
UND EERC	Great River Energy	Oil and Gas Research Council
Abengoa Bioenergy New Technologies	Halliburton	North Dakota Natural Resources Trust
Air Products and Chemicals, Inc.	Hess Corporation	North Dakota Petroleum Council
Alberta Department of Energy	Huntsman Corporation	North Dakota Pipeline Authority
Alberta Department of Environment	Husky Energy Inc.	Otter Tail Power Company
Alberta Innovates – Technology Futures	Indian Land Tenure Foundation	Oxand Risk & Project Management Solutions
ALLETE	Interstate Oil and Gas Compact Commission	Peabody Energy
Ameren Corporation	Iowa Department of Natural Resources	Petroleum Technology Research Centre
American Coalition for Clean Coal Electricity	Lignite Energy Council	Petroleum Technology Transfer Council
American Lignite Energy	Manitoba Geological Survey	Pinnacle, a Halliburton Service
Apache Canada Ltd.	Marathon Oil Company	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	Shell Canada Limited
British Columbia Oil and Gas Commission	National Commission on Energy Policy	Spectra Energy
C12 Energy, Inc.	Natural Resources Canada	Suncor Energy Inc.
Computer Modelling Group Ltd.	Nebraska Public Power District	TAQA North, Ltd.
Continental Resources, Inc.	North American Coal Corporation	TGS Geological Products and Services
Dakota Gasification Company	North Dakota Department of Commerce	University of Alberta
Denbury Onshore LLC	Division of Community Services	University of Regina
Eagle Operating, Inc.	North Dakota Department of Health	WBI Energy, Inc.
Eastern Iowa Community College District	North Dakota Geological Survey	Weatherford Advanced Geotechnology
Enbridge Inc.	North Dakota Industrial Commission	Western Governors' Association
Encore Acquisition Company	Department of Mineral Resources, Oil and Gas Division	Westmoreland Coal Company
Energy Resources Conservation Board/Alberta Geological Survey	North Dakota Industrial Commission	Wisconsin Department of Agriculture, Trade and Consumer Protection
Environment Canada	Lignite Research, Development and Marketing Program	Wyoming Office of State Lands and Investments
Excelsior Energy Inc.		Xcel Energy

The overall mission of the Phase III program is to 1) gather characterization data to verify the ability of the target formations to store carbon dioxide (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 development phase (Phase III) goal is implementation of large-scale field testing involving at least 1 million tons (Mt) of CO₂ a project. Each of the RCSP's large-volume injection tests is

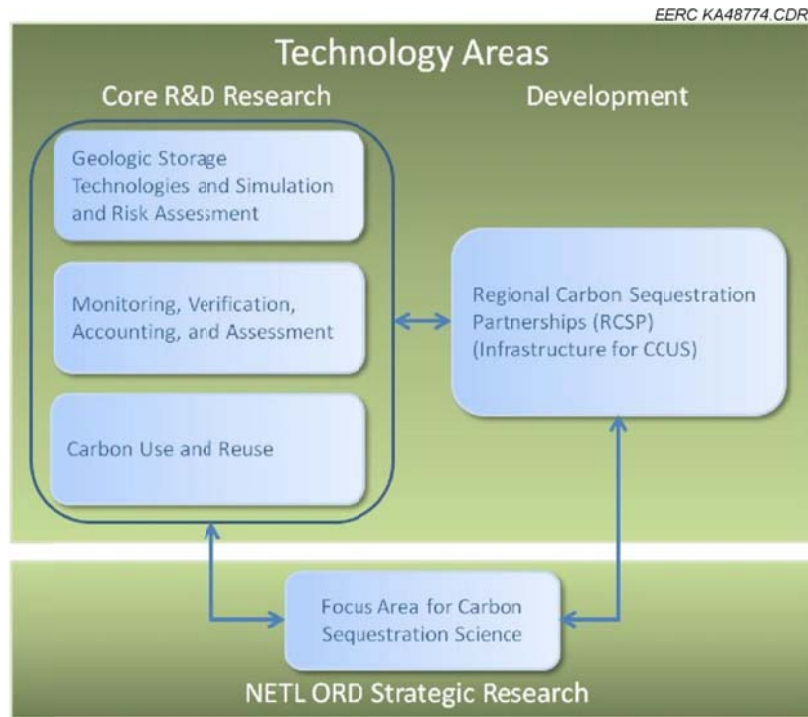


Figure 1. DOE Carbon Storage Program technology areas featuring regional partnerships (courtesy of DOE NETL; CCUS stands for carbon capture, utilization, and storage; ORD stands for Office of Research and Development).

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 two large-scale demonstration sites. The sites are located 1) in the Denbury Resources Inc. (Denbury)-operated Bell Creek oil field in Powder River County in southeastern Montana and 2) near 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 monitoring, verification, and accounting (MVA) activities associated with the Aquistore Project near Estevan, Saskatchewan, Canada. It is also working 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 working on a multiyear, binational characterization effort of the Basal Cambrian system (Figure 2).

The PCOR Partnership's objectives are as follows: 1) conduct a successful field demonstration to verify that the region's large number of oil fields have the potential to store significant quantities of 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.



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

The PCOR Partnership plans to achieve its Phase III mission through a series of 16 tasks: 1) Regional Characterization; 2) Public Outreach and Education; 3) Permitting and National Environmental Policy Act (NEPA) Compliance; 4) Site Characterization and Modeling; 5) Well Drilling and Completion; 6) Infrastructure Development; 7) CO₂ Procurement; 8) Transportation and Injection Operations; 9) Operational Monitoring and Modeling; 10) Site Closure; 11) Postinjection Monitoring and Modeling; 12) Project Assessment; 13) Project Management; 14) RCSP Water Working Group (WWG) Coordination; 15) Further Characterization of the Zama Acid Gas EOR, CO₂ Storage, and Monitoring Project; and 16) Characterization of the Basal Cambrian System. Table 2 lists the responsibility matrix for these 16 tasks.

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

Table 2. Phase III Responsibility Matrix

Phase III Task Description	Task Leader
Task 1 – Regional Characterization	Wesley D. Peck
Task 2 – Public Outreach and Education	Daniel J. Daly
Task 3 – Permitting and NEPA Compliance	Lisa S. Botnen
Task 4 – Site Characterization and Modeling	James A. Sorensen
Task 5 – Well Drilling and Completion	John A. Hamling
Task 6 – Infrastructure Development	Melanie D. Jensen
Task 7 – CO ₂ Procurement	John A. Harju
Task 8 – Transportation and Injection Operations	Melanie D. Jensen
Task 9 – Operational Monitoring and Modeling	Charles D. Gorecki
Task 10 – Site Closure	TBA*
Task 11 – Postinjection Monitoring and Modeling	TBA
Task 12 – Project Assessment	Katherine K. Anagnost
Task 13 – Project Management	Charles D. Gorecki
Task 14 – RCSP WWG Coordination	Ryan J. Klapperich
Task 15 – Further Characterization of the Zama Acid Gas EOR, CO ₂ Storage, and Monitoring Project	Charles D. Gorecki
Task 16 – Characterization of the Basal Cambrian System	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 data regarding shale gas formations within the region.
- Presented “Plains CO₂ Reduction Partnership: Demonstrating CO₂ Storage Solutions” at the Energy, Utility & Environment Conference (EUEC) on February 4, 2014, in Phoenix, Arizona.
- Continued work on the third target area (Deliverable [D]7, due September 2014), the Minnelusa Formation in Wyoming.
- Continued value-added efforts to **characterize saline formations** for CO₂ storage, including the following:
 - Continued review of the value-added Broom Creek Formation outline.
 - Continued drafting value-added outline for the Leduc Formation.
 - Worked on revising the value-added Inyan Kara Formation outline.
 - Submitted an abstract for the upcoming 12th International Conference on Greenhouse Gas Technologies (GHGT-12) entitled “A Workflow to Determine CO₂ Storage in Deep Saline Formations.”
- Worked on several additional **value-added reports**, including the following:
 - Continued work on the value-added regional characterization report, including recalculating CO₂ storage values for saline reservoirs.

- Report entitled “Montana Abandoned Oilfield Creation,” approximating the oilfield boundaries in Montana based on oilfield information contained within oil well shape files.
- Report summarizing methods of original oil in place and CO₂ storage calculations.
- White paper on characterization of the Cedar Creek Anticline.
- Report on characterization of the state of Nebraska for CO₂ storage opportunities.
- Participated in a conference call regarding the DOE “Atlas V” and worked on the PCOR Partnership pages for inclusion in the atlas.
- Continued efforts to find reservoir characteristics and information for the Pennel Field in Montana and the Cedar Hills Fields in North Dakota.
- Continued activities to update the content on the partners-only **Decision Support System (DSS)**, including the following:
 - Added a link to the PDM (permanent downhole monitoring) video short from the home page.
 - Updated the CO₂ stationary source information (based on Jensen and others, 2013).
- With regard to the **Aquistore** Project static modeling and dynamic predictive simulations effort:
 - Learned a new chief executive officer was named to PTRC, Ken From.
 - Discussed in-house the relative permeability test data and worked on fitting the property curves for simulation.
 - Worked on running the new-case simulation for the short injection period and rate.
 - Continued running simulations.
 - Summarized the simulation results.
 - Lab staff traveled to Regina, Saskatchewan, to view and retrieve additional core samples from the Aquistore well. (Figure 3)
 - Submitted D93, Geological Modeling and Simulation Report for the Aquistore Project, on March 25, 2014.

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

- With regard to the Aquistore Project, the most recent update from PTRC is that injection is delayed until June 2014.

Task 2 – Public Outreach and Education

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

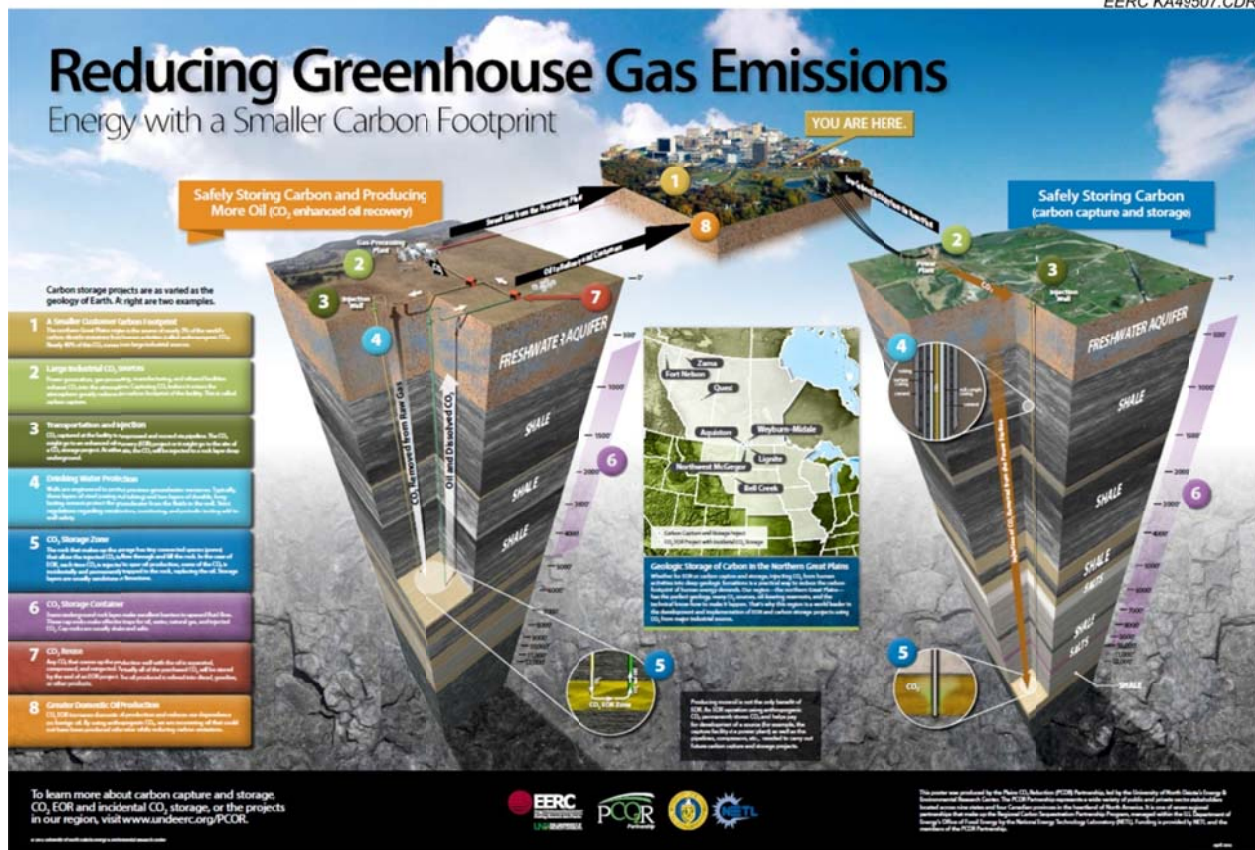
- During this reporting period, the PCOR Partnership was represented by EERC personnel at 15 conferences/meetings and one workshop. Specifically, the PCOR Partnership outreach activities included nine oral presentations and one poster presentation. The following quantities of PCOR Partnership outreach materials were distributed:
 - PCOR Partnership documentary entitled “Nature in the Balance: CO₂ Sequestration” – 21



Figure 3. A continuous section of rock core from the Aquistore project well located near Estevan, Saskatchewan. The above figure provides an example of the upper shale interval (left) and middle laminated zones (right) of particular interest to regional characterization efforts.

- PCOR Partnership documentary entitled “Reducing Our Carbon Footprint: The Role of Carbon Markets” – 21
- PCOR Partnership documentary entitled “Out of the Air – Into the Soil” – 21
- PCOR Partnership documentary entitled “Managing Carbon Dioxide: The Geologic Solution” – 21
- PCOR Partnership documentary entitled “Global Energy and Carbon: Tracking Our Footprint” – 21
- PCOR Partnership video short entitled “Installing a Casing-Conveyed Permanent Downhole Monitoring System” – 15
- “Plains CO₂ Reduction Partnership Atlas, 4th Edition, Revised” – 21
- Provided an outreach poster for presentation at the 2014 IEAGHG (IEA Greenhouse Gas R&D Programme) Social Research Network for its fourth meeting on January 14 and 15, 2014, in Calgary, Alberta, Canada.
- Presented at the “Educational Outreach Workshop – Focus on Alberta and Saskatchewan” held at the Embassy of Canada on February 26, 2014, in Washington, D.C.
- Participated in the Global Carbon Capture and Storage Institute’s 3rd Annual Americas Forum on February 27, 2014, also in Washington, D.C.
- Followed up on March 17 and 18 with members of the RCSP Outreach Working Group (OWG), Global Carbon Capture and Storage Institute (GCCSI), and PTRC on discussions held at the recent education workshop.

- Held in-house meetings on March 4 and 18, 2014, to review and discuss various task-related projects, e.g., Phase II fact sheet updates, Web site update, Google Analytics, addressing broken links on Web site, etc.
- Continued the in-house review of outreach products and actions using a standard industry-accepted framework.
- Submitted the updated CO₂ general storage poster (D24) on March 27, 2014 (Figure 4).
- Met in-house to discuss D17, the update to the general outreach PowerPoint presentation, due May 31, 2014.
- Continued efforts to prepare and update **project-related fact sheets**, including the following activities:
 - Continued drafting the 4-page Lignite Field Validation Test site overview fact sheet.
 - Continued value-added updates/revisions to the other Phase II site fact sheets.



- Updated the “Bell Creek Integrated CO₂ Enhanced Oil Recovery (EOR) and Incidental CO₂ Storage” fact sheet with updated incremental oil recovery estimates.
- Continued collaborative efforts with **Prairie Public Broadcasting** (PPB), including the following:
 - Participated in a meeting on January 23, 2014, at PPB headquarters in Fargo, North Dakota, to discuss documentary schedules and education videos.
 - Received NETL project manager (PM) approval to create a new D22 with the working title Coal and the Modern Age, a 60-minute documentary that will be due January 2016. This documentary will replace the former D22 (Domestic Energy and Carbon 30-minute documentary, due May 2015) and D23 (Storage in Carbon Management 30-minute documentary, due April 2017). Changes to the SOPO (statement of project objectives) will be approved via future award modification.
 - Prepared a proposed overview of the Bell Creek documentary (D21) for presentation to Denbury outreach personnel.
 - Produced over 50 DVD copies of “Installing a Casing-Conveyed Permanent Downhole Monitoring System” in addition to making the 20-minute video piece available to partners online.
 - Continued editing the value-added four-part education presentation video in conjunction with PPB, and held an in-house review session on March 14, 2014.
 - Held a meeting on March 10 at the EERC to discuss documentary production matters with Prairie Public Broadcasting.
 - Met with PPB personnel on March 26 at the EERC to discuss filming locations, interviews, and travel preparations to Great Britain and Europe, tentatively scheduled for June and September, respectively, for the D22 documentary, Coal and the Modern Age (working title).
- Participated in Aquistore outreach advisory conference calls on January 27 and March 31, 2014.
- Participated in RCSP OWG activities, including the following:
 - Provided a password-protected link to the RCSP OWG to view the PDM video short online.
 - Participated in a RCSP OWG conference call on February 20, 2014.
 - Followed-up with the RCSP OWG on discussions held at the GCCSI education workshop February 26, 2014, in Washington, D.C.
 - Participated in the OWG monthly conference call on March 20, focusing on a methodology for Web search optimization.
- Continued efforts to update the **public Web site** (www.undeerc.org/pcor), including the following:
 - Continued planning for the next update report (D13 due July 2014).
 - Held in-house Web update meetings on January 9 and 31 and March 26, 2014.
 - Posted the updated Bell Creek fact sheet on the Web site on January 15, 2014 (www.undeerc.org/PCOR/pdfs/PCOR_Bell_Creek_Integrated_CO2_EOR_and_Storage_Fact_Sheet_17.pdf).
 - In conjunction with Task 14, uploaded the RCSP WWG fact sheet entitled “Monitoring, Verification, and Accounting Plans for Protection of Water Resources

- During the Geologic Storage of Carbon Dioxide” to the Web site (http://undeerc.org/pcor/pdfs/WWG_Fact_Sheet_3.pdf).
- Held an in-house quarterly outreach update meeting on January 17, 2014; proposed updated materials for the Web site and reviewed status of activities under way.
 - Posted the Aquistore fact sheet on the Web site (http://undeerc.org/pcor/co2sequestrationprojects/Downloads/FS18_Aquistore_February_2014.pdf).
 - Continued repair of broken links as identified on an ongoing basis.
 - During this reporting period, information regarding the **site visits** to the PCOR Partnership public Web site included the following:
 - There were 2135 visits to the public Web site (www.undeerc.org/pcor). Traffic increased by 33% over last quarter (1602 visits).
 - There were 1773 unique visitors to the public Web site, representing a 30% increase over last quarter (1359 visitors). In particular, 96% of these visitors (1710 visitors) were new to the Web site (visitors whose visit was marked as a first-time visit in this quarter).
 - Of the 2135 visits, 47% of the Web traffic was domestic and 53% was international. Table 3 lists the top ten countries with the highest number of visits to the PCOR Partnership Web site. There was traffic from 87 countries overall (Figure 5).
 - There were 382 visits originating from within the PCOR Partnership region (Figure 6), representing an increase of 54% from the 248 visits from last quarter. Approximately 74% of the regional visits originated from the United States, and 26% came from Canada. Visits from within the PCOR Partnership region comprised 18% of the overall traffic to the public Web site (it should be noted that the totals are skewed 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).
 - During this reporting period, a breakdown of how visitors came to the PCOR Partnership Web site, also referred to as **traffic sources** (Figure 7), is provided below:
 - 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 (13%) is from persons familiar with the PCOR Partnership.
 - Search traffic refers to the use of search engines and accounted for more than 79% of the traffic. Google Analytics provides the keywords visitors used. The top keywords used include “carbon sequestration” and “carbon dioxide.”
 - Referral site traffic (8%) corresponds to the traffic directed to the PCOR Partnership Web page from other sites via links. The top two referring Web sites were mybigcampus.com and DOE.
 - During this reporting period, the **nature of the visits** to the PCOR Partnership public Web site included 4249 page views; the top 5 pages viewed are listed in Table 4.

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

Country	PCOR Partnership State/Province	Visits
1. United States		1003
	Wyoming	80
	North Dakota	71
	Minnesota	47
	Montana	30
	Nebraska	25
	Missouri	12
	Wisconsin	10
	South Dakota	5
	Iowa	2
2. India		195
3. Canada		162
	Alberta	38
	British Columbia	38
	Saskatchewan	14
	Manitoba	10
4. United Kingdom		137
5. Singapore		52
6. Australia		46
7. Philippines		41
8. Nigeria		38
9. Pakistan		20
10. Thailand		19
Other 77 Countries		422
Total Visits		2135

- During this reporting period, “Global Energy and Carbon: Tracking Our Footprint” was broadcast nine times. The nine broadcasts were in three states, namely Alaska (seven), Texas (one), and North Dakota (one).

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.

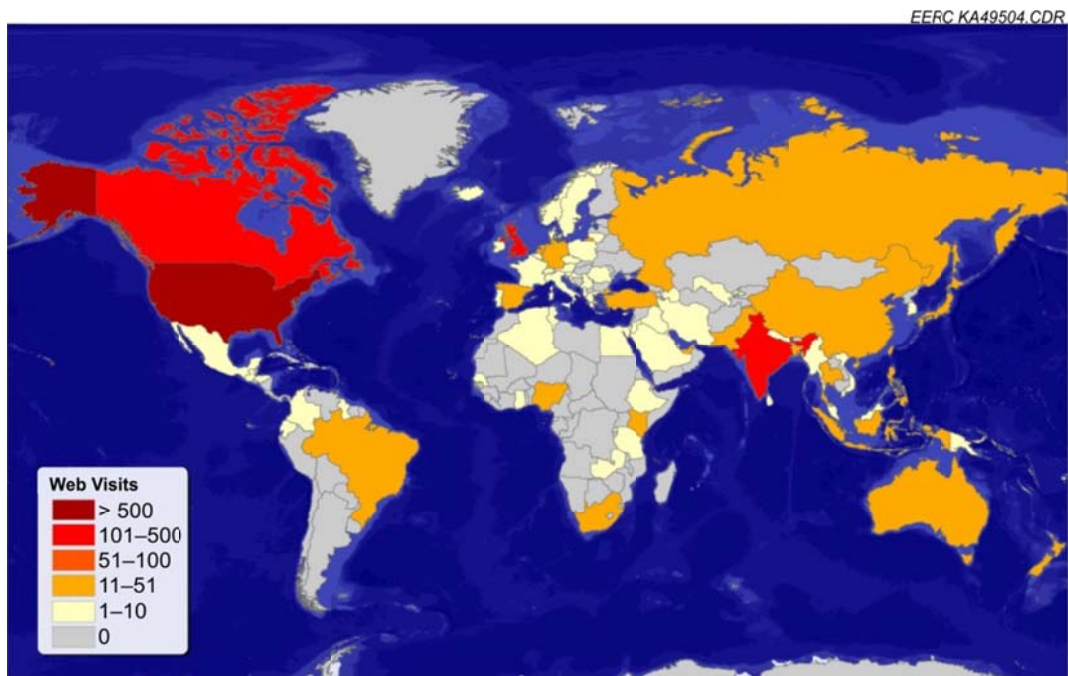


Figure 5. Map of PCOR Partnership Web site global traffic.

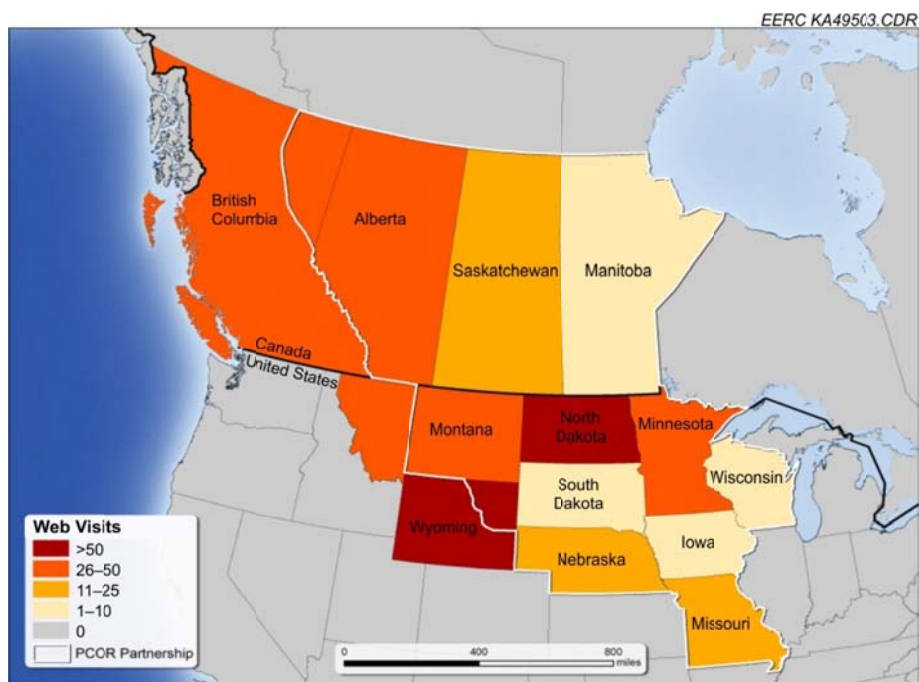


Figure 6. Map of PCOR Partnership Web site regional visits.

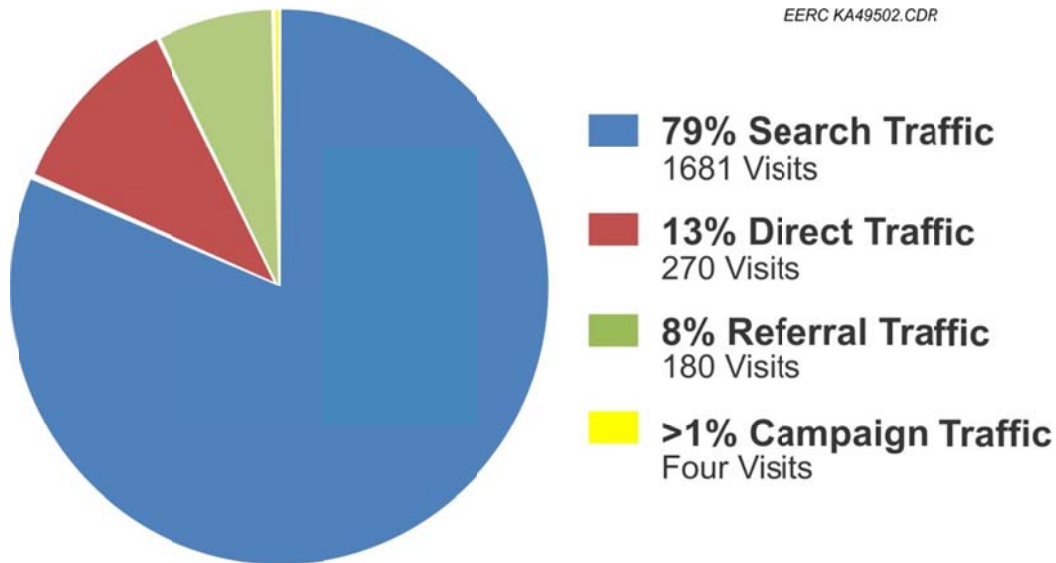


Figure 7. PCOR Partnership public Web site traffic sources.

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

Page Title	Page Views	% Page Views	Page
What Is CO ₂ Sequestration	1120	26%	www.undeerc.org/pcor/sequestration/whatissequestration.aspx
Home Page	533	13%	www.undeerc.org/pcor/
CO ₂ Sequestration Projects	209	5.0%	www.undeerc.org/pcor/co2sequestrationprojects/
Carbon Sequestration, Climate Change, and CO ₂	164	4.0%	www.undeerc.org/pcor/Sequestration/
Bell Creek Integrated EOR and CO ₂ Storage Project	152	3.6%	www.undeerc.org/pcor/co2sequestrationprojects/bellcreek.aspx

Task 3 – Permitting and NEPA Compliance

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

- Attended the SECARB (Southeast Regional Carbon Sequestration Partnership) 9th Annual Stakeholders’ Briefing March 4 and 5, 2014, in Atlanta, Georgia. A link to the agenda is at www.secarbon.org/wp-content/uploads/2011/05/2014_030414_Agenda4.pdf.
- Continued planning for the 6th Annual Regulatory Roundup meeting, including the following:

- Selected the meeting dates as June 24 and 25, 2014, in Deadwood, South Dakota.
- Sent an e-mail notice to the invitees on March 19, 2014.
- Reviewed activities and presentations related to the proposed International Organization for Standardization (ISO)/Technical Committee (TC) 265 Carbon Dioxide Capture, Transportation, and Geological Storage (www.iso.org/iso/iso_technical_committee?commid=648607).
- Participated on January 29, 2014, in the Enhanced Oil Recovery Institute's Webinar titled "Avoid Air-rors! Discuss the Air Regulations That Impact Oil and Gas Development."
- Continued to review and analyze latest U.S. Environmental Protection Agency (EPA) guidance document on Class II well to Class VI well transition and the final rule related to conditionally excluding CO₂ from the Resource Conservation and Recovery Act.
- With regard to **Interstate Oil and Gas Compact Commission (IOGCC)** Carbon Geologic Storage Task Force efforts:
 - Worked with the IOGCC on the development of a fact sheet based on the joint report entitled "Guidance for States and Provinces on Operational and Regulation of Carbon Geologic Storage."
 - Held discussions with IOGCC and North Dakota Industrial Commission (NDIC) personnel regarding publication of and fact sheets associated with the operational and postoperational liability report.
- With regard to the **Lignite Field Validation Test** site (Phase II) closure, continued efforts to monitor the site during the reclamation phase, including site visits on January 23, February 26, and March 24, 2014.

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:

- Attended a presentation on February 28, 2014, given by a Darcy lecturer on porous media and x-ray tomography and capillary trapping at the University of North Dakota.
- **Fort Nelson** test site activities included the following:
 - Notified Spectra on February 5, 2014, of approval to include a reference to PCOR Partnership funding used to support the Fort Nelson Carbon Capture and Storage Feasibility Project on the Natural Resources Canada Web site.
 - Submitted a revised version of the Fort Nelson Test Site – Site Characterization Report on February 12, 2014.
 - Submitted a revised version of the Fort Nelson Test Site – Geochemical Report on February 12, 2014.

- **Bell Creek** test site activities included the following:
 - With regard to **geomechanical efforts**, the following activities occurred:
 - ◆ Continued preparing for the 3-D mechanical earth model (MEM) and geomechanical modeling and simulations.
 - ◆ Worked on updating the properties in the 1-D MEM and 3-D MEM in Techlog and Petrel.
 - Continued work on Bell Creek characterization, using the Version 3 structural model and seismic interpretations.
 - Submitted the draft wellbore integrity report (D36) on March 19, 2014, to NETL and Denbury for review.
 - Continued work on the value-added report entitled “Laboratory Evaluation of Potential CO₂–Rock–Groundwater Interactions Within the Groundwater Zone Overlying the Bell Creek Reservoir.”
 - Reviewed Bell Creek core samples at the U.S. Geological Survey (USGS) Core Research Center (CRC) and the Colorado School of Mines (CSM) during a trip held February 11–14, 2014.
 - Scanned thin-section core samples received from Denbury.
 - Submitted the draft 3-D seismic and characterization report (D96) on March 27, 2014).
 - Continued work on M45, First Full-Repeat of Pulsed-Neutron Logging Campaign Completed, due June 2014.
 - With regard to **Applied Geology Laboratory** activities:
 - ◆ With regard to the 60 feet of full-diameter 33-14R core (collected April 2013):
 - Held an in-house kickoff meeting on January 14, 2014.
 - Completed x-ray fluorescence (XRF) analyses.
 - Continued work on x-ray diffraction (XRD) analyses.
 - Mailed thin-section billets on January 17, 2014, and requested 46 thin sections from Wagner Petrophysics.
 - Began porosity and permeability testing.
 - Met in-house on February 4, 2014, to discuss progress.
 - Compared the XRD analyses performed in-house with data provided by Core Labs.
 - Completed clay analyses.
 - Began computed tomography scanning of replacement samples for mechanical testing.
 - Began core cleaning.
 - Began determining residual fluids on five samples.
 - ◆ With regard to the 56-14R sidewall core (21 samples):
 - Discussions continued regarding planned additional analyses for 56-14R full-core plugs (CO₂ exposure and comparisons to static vs. flow-through testing).
 - Prepared a revised work plan to evaluate differences in gas and fluid permeability and determine if these differences can be attributed to sample mineralogy or morphology.
 - Met in-house to discuss the scope of work on February 3, 2014.

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

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

- Led Bell Creek in-house update meetings on January 30, and March 20, 2014.
- Attended the Society of Petroleum Engineers (SPE) Williston Basin Section meeting and lecture on February 27, 2014, in Williston, North Dakota.
- Completed review of the value-added baseline surface and near-surface MVA report and appendixes.
- Continued work on D44 – Drilling and Completion Activity 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 6 – Infrastructure Development

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

- Provided information on March 11, 2014, in response to a request received from WorleyParsons.
- Registered for the 2014 CO₂ Capture Technology Meeting scheduled for July 29 – August 1, 2014, in Pittsburgh, Pennsylvania.
- Continued work on a journal article about the attenuation of variable CO₂ sources for use in EOR. The journal selected is “Energy & Environmental Science” (www.rsc.org/publishing/journals/ee/about.asp).
- Researched several capture technologies for the update to the existing capture technology overview.
- Collected information to respond to a partner’s question.
- In conjunction with Task 1, finished rectifying several discrepancies associated with adding a new EPA greenhouse gas identifier to the U.S. portion of the PCOR Partnership region.
- Submitted M41, Decision (Not) to Incorporate Ramgen Compression Technology into Bell Creek Project, on January 29, 2014.
 - Identified two opportunities for implementation of the Ramgen technology, i.e., CO₂ compression leaving the Lost Cabin gas-processing facility and recompression of recycle CO₂ stream at Bell Creek.

- Because compression had already been installed at Lost Cabin and based on current Rampressor development coupled with the project time frame, it has been determined that the compressor cannot be incorporated into the Bell Creek project but may be viable for future EOR projects.

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:

- Participated in relevant in-house project meetings.

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

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

Task 9 – Operational Monitoring and Modeling

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

- EERC staff attended the SPE Williston Basin Section annual meeting held January 15, 2014, in Dickinson, North Dakota.
- Modeling staff attended Schlumberger PetroMod Fundamentals modeling software training March 23–29, 2014, in Houston, Texas. (www.nexttraining.net/Sessions/Details/17103/PetroMod-Fundamentals-%28previously-Introduction-to-PetroMod%29.aspx).
- Continued **Bell Creek** site activities, including the following:
 - Cumulative CO₂ injection is 429,881 metric tons through January 31, 2014 (Table 5).
 - Participated in Bell Creek project-specific project review and planning meetings held February 6, 2014, at Denbury headquarters in Plano, Texas.
 - Participated in Bell Creek risk assessment update on February 25, 2014.
 - Attended in-house personal protective meter and safety training to comply with new site requirements.

Table 5. Bell Creek CO₂ Injection Totals November 2013 – January 2014

	November 2013 Injection (Mcf)	December 2013 Injection (Mcf)	January 2014 Injection (Mcf)
TOTAL, Mscf	978,071	1,315,521	1,347,888
TOTAL, U.S. tons*	55,944	75,246	77,097
TOTAL, metric tons*	50,801	68,328	70,009
Cumulative Total, Mscf ⁺	5,613,089	6,928,610	8,276,498
Cumulative Total, U.S. tons* ⁺	321,060	396,306	473,403
Cumulative Total, metric tons* ⁺	291,544	359,872	429,881

Source: Montana Board of Oil & Gas [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(s) listed.

- Field staff traveled to the Bell Creek site to download 05-06 OW PDM monitoring data on March 24, 2014.
- Acquired a sample of CO₂ from the incoming supply stream (prior to comingling with recycle) to be analyzed for chemical composition and isotope content in order to enhance MVA interpretation.
- Continued work on updating and implementing new data management practices to better accommodate the larger, higher-frequency data sets acquired during the operational monitoring phase project.
- Initiated development of an interactive database-driven map product capable of querying, displaying, and enhancing rapid targeted comparison and interpretation of the large analytical data sets from near-surface monitoring data from both the baseline and operational monitoring periods.
- With regard to **modeling and simulation** activities:
 - ◆ Continued building the updated facies model for the fieldwide model.
 - ◆ Worked on the Bell Creek simulation to include CO₂ injection and production data.
 - ◆ Worked on preparing data for the Phase 2 simulations, including cutting the geomodel.
 - ◆ Began work on D66, Simulation Update, due August 2014, including review of various core and wellsite information and correlation with seismic data.
 - ◆ Worked on upgrading the latest Computer Modelling Group (CMG) software.
 - ◆ Responded to Denbury’s questions regarding D66, Simulation Update, prepared August 2013, and began preparing for a WebEx for further discussion.
 - ◆ Held weekly in-house modeling and simulation meetings.
 - ◆ Worked on preparing two PowerPoint presentations for the 2014 CMG Technical Symposium (June 3 and 4, 2014, in The Woodlands, Texas), namely: “Implementation of Detailed Reservoir Simulation to Demonstrate CO₂ EOR and Storage in the Bell Creek Field” and “Tools for Interfacing and Integrating CMG Software with Other Software Packages.”

- Conducted **literature reviews** on the following topics:
 - ◆ Reviewed literature for geochemical simulation.
 - ◆ Continued literature review for using seismic data analysis to characterize rock mechanical properties.
 - ◆ Reviewed literature for geomechanical simulation.
- With regard to **injection-phase seismic** efforts:
 - ◆ Discussed planning for a repeat vertical seismic profile (VSP) survey centered on the 05-06 OW and 04-03 OW wells.
 - ◆ Traveled to the site to observe and lend technical support to the collection of 3-D VSP survey that began on March 1, 2014.
 - ◆ Discussed processing VSP shot points with Denbury and SIGMA³.
 - ◆ Submitted M44, First 3-D VSP Repeat Surveys Completed, on March 25, 2014.
- Continued analysis of **pressure gauge response** from the 05-06 OW well, including:
 - ◆ Processed PDM data.
 - ◆ Continued work on developing a methodology to allocate pressure response from the PDM system to individual production/injection wells.
- With regard to **injection-phase pulsed-neutron logging** (PNL) activities:
 - ◆ Reprocessed the initial seven repeat PNLs utilizing updated ELAN processing (probabilistic) methodology to refine saturation estimates. Compared results of probabilistic vs. deterministic processing and identified better conformance utilizing probabilistic workflows. Completed acquisition and processing of repeat PNLs on the 05-06 OW and 04-04, 33-12, and 56-08 wells.
 - ◆ Continued work on M46, First Full-Repeat of PNL Campaign Completed, due June 2014.
 - ◆ Held calls with Denbury and Outsource Petrophysics, Inc., personnel regarding the upcoming PNL review meeting tentatively scheduled for April 17, 2014, at the EERC.
- With regard to **injection-phase sampling** activities:
 - ◆ Completed data analysis and processing of the December 2013 monthly sampling event, comprising soil gas profile station (SGPS)/Phase 1/interspaced locations (133 total samples) and two Fox Hills Formation groundwater-monitoring wells.
 - ◆ Completed the monthly January sampling event on January 15, 2014, comprising SGPS/Phase 1/interspaced locations (approximately 130 samples) and two Fox Hills Formation groundwater-monitoring wells.
 - Collected and archived the most recent Fox Hills Formation groundwater-monitoring well field parameter data from the January 2014 sampling month.
 - Completed data input (133 samples) for the January 2014 soil gas results (from handheld meter and Micro Quad gas chromatograph).
 - Completed data analyses and processing, and completed quality assessment/quality control (QA/QC) measures.
 - ◆ Traveled to Bell Creek during the week of January 27, 2014, to distribute the October and November 2013 landowner package water quality documents to nine landowners.



Figure 8. EERC field personnel record water table elevation data and purge a minimum of three well casing volumes during groundwater monitoring at Fox Hills monitoring well MW33-12 (Fox Hills) (February 2014).

- ◆ Completed the monthly February sampling event during the week of February 9, 2014, comprising ten SGPS and two Fox Hills Formation groundwater-monitoring wells (Figure 8).
 - Sampled the Fox Hills Formation wells for a full suite of laboratory analyses such as major anions and cations, metals, nonmetals, organics, isotopes, etc.
 - Completed data analysis and processing for the Fox Hills Formation groundwater-monitoring wells.
- ◆ Completed the monthly March sampling event during the week of March 9, 2014, comprising ten SGPS, adjacent Phase 1 locations, and two Fox Hills Formation groundwater-monitoring wells.
 - Collected and archived most recent Fox Hills Formation groundwater-monitoring well field parameter data.
 - Completed data analysis and processing for the Fox Hills Formation groundwater-monitoring wells sampling results
 - Collected and archived data input (44 samples) for the soil gas results (from handheld meter and Micro Quad gas chromatograph).

- Began QA/QC measures.
- Continued **Fort Nelson** site activities, including the following:
 - Continued work on the Best Practices Manual – Fort Nelson Feasibility Study (D100, due June 2014).
 - Submitted on March 4, 2014, a revised version of D67, Fort Nelson Simulation Report, to NETL for review and approval.

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

- No Phase 1 or interspaced locations were sampled during the week of February 9–13 because of frost-related issues affecting soil gas probe sampling.
- Only about 1/10 of the 3-D VSP survey was completed (82 of 930 shot points) on March 1, 2014, before operations were terminated; these data points will be processed to determine the likelihood that future seismic surveys can detect the presence of CO₂.

Task 10 – Site Closure

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

Task 11 – Postinjection Monitoring and Modeling

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

Task 12 – Project Assessment

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

- Submitted D57, the annual assessment report for Program Year (PY) 6 (October 1, 2012, to September 30, 2013), on January 31, 2014.

Task 13 – Project Management

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

- On February 10, 2014, a new DOE NETL PM was assigned to the PCOR Partnership Program: Andrea Dunn.
- Received two modifications to DOE NETL Award No. DE-FC26-05NT42592:
 - Modification No. 27, dated January 22, 2014, increased the government financial share and the EERC cost share and updated the SOPO.
 - Modification No. 28, dated February 10, 2014, named Andrea Dunn as the new award administrator.
- Continued planning the 2014 PCOR Partnership **Annual Membership Meeting** scheduled for September 16 and 17, 2014, at the Embassy Suites in downtown Denver, Colorado.

- Sent an e-mail “Save the Date” notification on January 13, 2014, to the partners and interested parties regarding the annual meeting.
- Activated the online registration Web site at www.undeerc.org/pcor14 (Figure 9).
- Mailed a notification postcard to all partners and invitees.
- Began work on an e-mail blast announcing that registration is open.
- With regard to the **2013 IEAGHG Expert Review**:
 - Participated in a conference call on January 24, with DOE NETL regarding the IEAGHG expert panel’s comments and recommendations.
 - Submitted our draft responses to recommendations on February 21, 2014.
 - Received comments on our responses to the expert review recommendations on March 10, 2014, and discussed the same with DOE NETL.
- Provided information to NETL on March 11, 2014, regarding several meetings attended by NETL personnel (for internal audit purposes).
- On March 13, 2014, provided a letter proposal to NETL with proposed changes to the SOPO.
- Provided information on March 18, 2014, regarding Fort Nelson publicly released information in response to a request from NETL and an interested partner.
- Met with DOE personnel to discuss programmatic goals on February 25 and 26, 2014, in Pittsburgh, Pennsylvania.
- Received for review on March 3, 2014, information from NETL regarding CO₂ capacity estimates in organic-rich shales.



Figure 9. PCOR Partnership Annual Membership Meeting online registration (www.undeerc.org/pcor14).

- Received notifications of acceptance for two abstracts submitted to the 2014 Rocky Mountain Section American Association of Petroleum Geologists (AAPG) Annual Meeting (www.aapg.org/2014):
 - “Characterization and 3-D Modeling of Devonian Pinnacle Reefs for CO₂ Storage and Enhanced Oil Recovery.”
 - “Training Image Characterization and Multipoint Statistical Modeling of Clastic and Carbonate Formations.”
- Hosted the Technical Advisory Board (TAB) winter meeting on March 5 and 6, 2014, in Austin, Texas.
 - Received international travel approval on February 25, 2014, for a TAB member to travel from his Perth, Australia, residence to Austin, Texas.
 - Held a run-through of the TAB meeting presentation with the meeting facilitator at the EERC on February 24, 2014, and prepped for the TAB meeting.
 - Submitted M36, Annual Advisory Board Meeting Scheduled, on March 25, 2014.
- Participated in a WebEx meeting with DOE NETL and the other regional partnerships to discuss the National Risk Assessment Partnership (NRAP) on January 16, 2014.
- Presented at a NRAP stakeholders meeting held February 4 and 5, 2014, in Washington, D.C.
- Worked on partnership invoices (cash cost share) for current project year.
- Presented at the Carbon Sequestration Leadership Forum (CSLF) Technical Group Meeting and Technology Workshop on March 24–27, 2014, in Seoul, South Korea.
- As part of the 12th International Conference on Greenhouse Control Technologies (GHGT-12) review panel, reviewed several abstracts prior to the February 14, 2014, deadline.
- Presented an e-Poster entitled “CO₂ Enhanced Oil Recovery: The Plains CO₂ Reduction Partnership’s Approach to Carbon Capture and Storage” at the International Petroleum Technology Conference (IPTC) held January 18–23, 2014, in Doha, Qatar.
- Submitted abstracts and received notifications of acceptance to present to the 13th Annual Carbon Capture, Utilization & Storage Conference (CCUS-13), including the following:
 - “Carbon Dioxide Storage Potential of the Basal Saline System in the Alberta and Williston Basins of North America”
 - “The Plains CO₂ Reduction Partnership’s Adaptive Management Strategy for CO₂ Storage”
 - “Development of a Monitoring, Verification, and Accounting Plan for a Potential CCS Project at Fort Nelson, British Columbia, Canada”
 - “Modeling of Acid Gas Injection for Enhanced Oil Recovery and Long-Term Storage in Devonian-Aged Pinnacle Reefs”
- In addition to the seven abstracts submitted in December 2013, submitted an additional six abstracts to the 12th International Conference on Greenhouse Gas Control Technologies (GHGT-12) as set forth below:
 - “A Rapid Method for Determining CO₂–Oil MMP (minimum miscibility pressure) and Visual Observations of CO₂–Oil Interactions at Reservoir Conditions”
 - “The Nexus of Water and CCS: A Regional Carbon Sequestration Partnership Perspective”

- “Evaluation of Large-Scale Carbon Dioxide Storage Potential in the Basal Saline System in the Alberta and Williston Basins in North America”
- “Characterization and Time-Lapse Monitoring Utilizing Pulsed-Neutron Well Logging at an Incidental CO₂ Storage Demonstration”
- “An Adaptive Management Approach to CO₂ Storage Projects”
- “Monitoring One Year’s Worth of CO₂ Injection and Incidental Storage at the Bell Creek Oil Field”
- Participated in conference calls with BillyJack Consulting.
- With regard to an update to the **programmatic risk management plan**:
 - Held a conference call on February 7, 2014, with a consultant to discuss an update to the risk management plan.
 - Identified potential risks on February 25, 2014, first to the overall program and also to the Bell Creek project. The value-added programmatic risk management plan update (including an updated Bell Creek risk assessment) will be completed by August 2014.
 - Ranked the identified potential programmatic and Bell Creek project-related risks.
- Conducted monthly **task leader meetings** on January 7, February 4, and March 11, 2014. Topics discussed included updates on the Bell Creek, Fort Nelson, Aquistore, and Basal Cambrian projects; overview of TAB meeting; review of upcoming conferences and deliverables; and updates from each task leader present.
- Deliverables and milestones completed in January:
 - Task 6: M41 – Decision to Incorporate Ramgen Compression Technology into Bell Creek Project
 - Task 12: D57 – Project Assessment Annual Report
 - Task 13: D58/D59 – Quarterly Progress Report/Milestone Quarterly Report
 - Task 14: M23 – Monthly WWG Conference Call Held
- Deliverables and milestones completed in February:
 - January monthly update
 - Task 14: M23 – Monthly WWG Conference Call Held
 - Task 15: D86 – Updated Regional Technology Implementation Plan
- Deliverables and milestones completed in March:
 - February Monthly update
 - Task 2: D24 – PCOR Partnership Region CO₂ Storage General Poster (Update)
 - Task 4: D36 – Bell Creek Test Site – Wellbore Leakage Final Report
 - Task 16: D92 – Report – Storage Capacity and Regional Implications for Large-Scale Storage in the Basal Cambrian System
 - Task 1: D93 – Geological Modeling and Simulation Report for the Aquistore Project
 - Task 4: D96 – Bell Creek Test Site – 3-D Seismic Acquisition and Characterization Report
 - Task 14: M23 – Monthly WWG Conference Call Held
 - Task 13: M36 – Annual Advisory Board Meeting Scheduled
 - Task 4: M44 – Bell Creek Test Site – First 3-D VSP Repeat Surveys Completed

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:

- Finalized and submitted an abstract to GHGT-12.
- Continued working on a plan for the upcoming WWG year; options for the annual meeting venue and upcoming deliverables are under consideration.
- Held pre-WWG monthly calls with NETL PM.
- Scheduled and held the monthly conference call on January 28, 2014. Agenda items included the following:
 - Outline upcoming plan for year.
 - Review IEAGHG water-related, partnership-submitted abstracts.
 - Discuss potential fact sheet topics (next fact sheet due October 2014).
 - Review RCSP updates.
- Reviewed and edited notes from the January conference call.
- Distributed notes from the January conference call on February 18, 2014.
- Amended the list of water-related abstracts that were submitted to GHGT-12 by WWG members.
- Scheduled and held the monthly conference call on February 27, 2014. Agenda items included the following:
 - Review of fact sheet subject ideas
 - Review and discussion of WWG Web site content
 - Update on GHGT-12 special session
 - RCSP updates
- Distributed notes from the February conference call on March 19, 2014.
- Scheduled and held the monthly conference call on March 25, 2014. Agenda items included discussions of the following:
 - Updates to WWG Web site content
 - Outline of new fact sheet
 - Purpose and topics for the annual meeting
 - RCSP updates
- Continued to work on proposed content for a WWG-related Web site.

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

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

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

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

- Submitted the Updated Regional Technology Implementation Plan for Zama (D86) on February 28, 2014.

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. This task ended February 28, 2014.

Task 16 – Characterization of the Basal Cambrian System

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

- Submitted D92, Report – Storage Capacity and Regional Implications for Large-Scale Storage in the Basal Cambrian System on March 27, 2014.
- Worked on an abstract for the Society of Exploration Geophysicists (SEG) Summer Research Workshop scheduled for August 3–8, in San Diego, California (www.seg.org/events/upcoming-seg-meetings/sd14).
- With regard to the Aquistore project (20 core samples) mineralogical characterization:
 - Rechecked porosity on one of the core plugs on the relative permeability apparatus and began testing another core.
 - Cleaned core sample via Dean–Stark extraction to remove salt residue; porosity testing will be completed on the humidified plug.
 - Tested an additional sample (higher permeability) that will be provided to the modelers when possible.
 - Reran permeability to air on the sample.
 - Completed relative permeability testing on a second core sample.
 - Updated the summary of lab results.
 - Submitted the companion report to Task 1, D93, a value-added report entitled “Petrophysical Evaluation of Core From the Aquistore CO₂ Injection Site” on March 26, 2014.

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. This task ended March 31, 2014.

PHASE III COST STATUS

The approved BP4 (Modification No. 26) budget along with actual costs incurred and in-kind cost share reported is shown in Table 6. A spending plan for BP4 and actual incurred cost by quarter of cash funds for BP4 are provided in Figure 10 and Table 7.

PHASE III SCHEDULE STATUS

Table 8 lists all deliverables and milestones by quarter, with completion dates, through the end of the reporting period (see Table 9 for the Gantt chart for BP4, Years 7 and 8).

Table 6. Phase III Budget – BP4

Organization	Approved Budget*, \$	Actual Costs Incurred, \$
DOE Share – Cash	60,124,121	43,132,354
Nonfederal Share – Cash	2,411,971	2,763,237
Nonfederal Share – In-Kind	33,483,776	33,094,738
Total	96,019,868	78,990,329

*As of Mod 26.

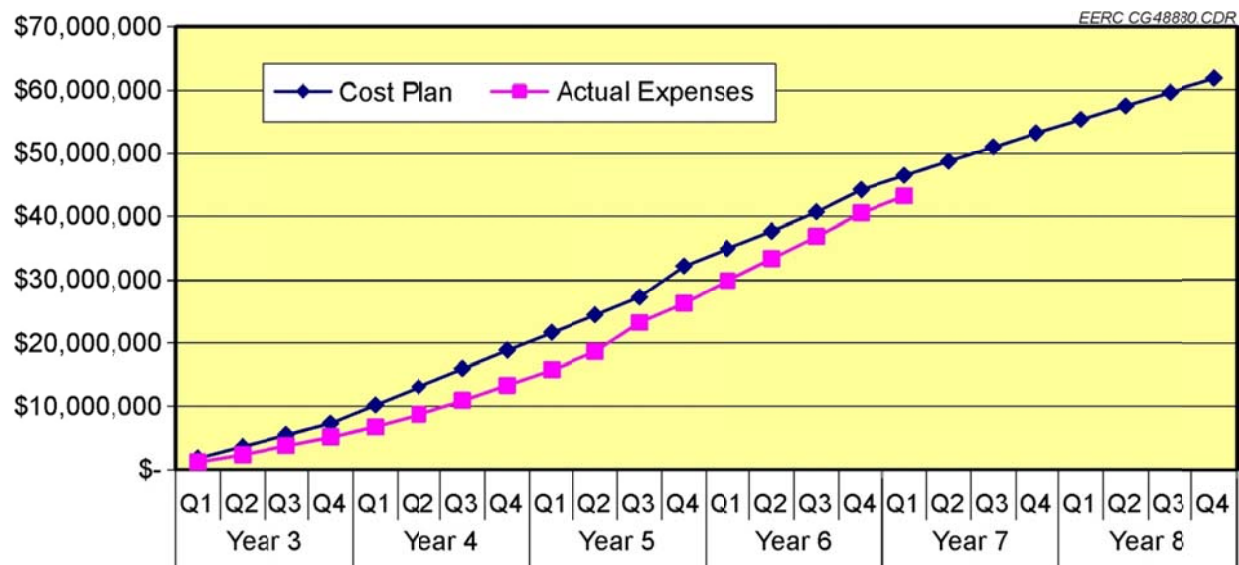


Figure 10. PCOR Partnership Phase III, BP4, Years 3–8 funding (cash only).

Table 7. 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	\$ 2,136,847	\$ 55,850,427	\$ 2,136,847	\$ 57,987,274	\$ 2,136,847	\$ 60,124,121
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	\$ 2,136,847	\$ 58,262,398	\$ 2,136,847	\$ 60,399,245	\$ 2,136,847	\$ 62,536,092
Actual Incurred Cost																
Federal Share	\$ 2,579,307	\$ 40,488,302	\$ 2,644,052	\$ 43,132,354												
NonFederal Share	\$ 62,881	\$ 2,748,257	\$ 14,980	\$ 2,763,237												
Total Incurred Cost	\$ 2,642,188	\$ 43,236,559	\$ 2,659,032	\$ 45,895,591												
Variance																
Federal Share	\$ (325,811)	\$ 3,604,085	\$ 333,303	\$ 3,937,388												
NonFederal Share	\$ (62,881)	\$ (336,286)	\$ (14,980)	\$ (351,266)												
Total Variance	\$ (388,692)	\$ 3,267,799	\$ 318,323	\$ 3,586,122												

Table 8. 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 8. 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	N/A	Not required
D19: Task 2 – Fort Nelson Test Site PowerPoint Presentation	7/31/09	7/31/09
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	7/31/09	7/31/09
M22: Task 14 – Draft White Paper – Nexus of CCS and Water Available for Comments	8/17/09	8/18/09 (DOE) 8/21/09 (WWG)
M23: Task 14 – Monthly WWG Conference Call Held	8/31/09	8/25/09
D1: Task 1 – Review of Source Attributes	9/30/09	9/25/09
D3: Task 1 – Permitting Review – One State and One Province	9/30/09	9/30/09
D9: Task 1 – Updated DSS	9/30/09	9/29/09
D47: Task 6 – Report on the Preliminary Design of Advanced Compression Technology	9/30/09	9/30/09
D77: Task 13 – Risk Management Plan Outline	9/30/09	9/18/09
M4: Task 4 – Bell Creek Test Site Selected	9/30/09	9/30/09
M5: Task 4 – Bell Creek Test Site – Data Collection Initiated	9/30/09	9/30/09
M23: Task 14 – Monthly WWG Conference Call Held	9/30/09	9/22/09

Continued . . .

Table 8. 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 8. 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 8. 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 8. 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 8. 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
M37: Task 3 – IOGCC Task Force Subgroup Meeting 1 Held	12/31/12	12/21/12
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 8. 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 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 8. 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 8. Phase III Milestones and Deliverables (continued)

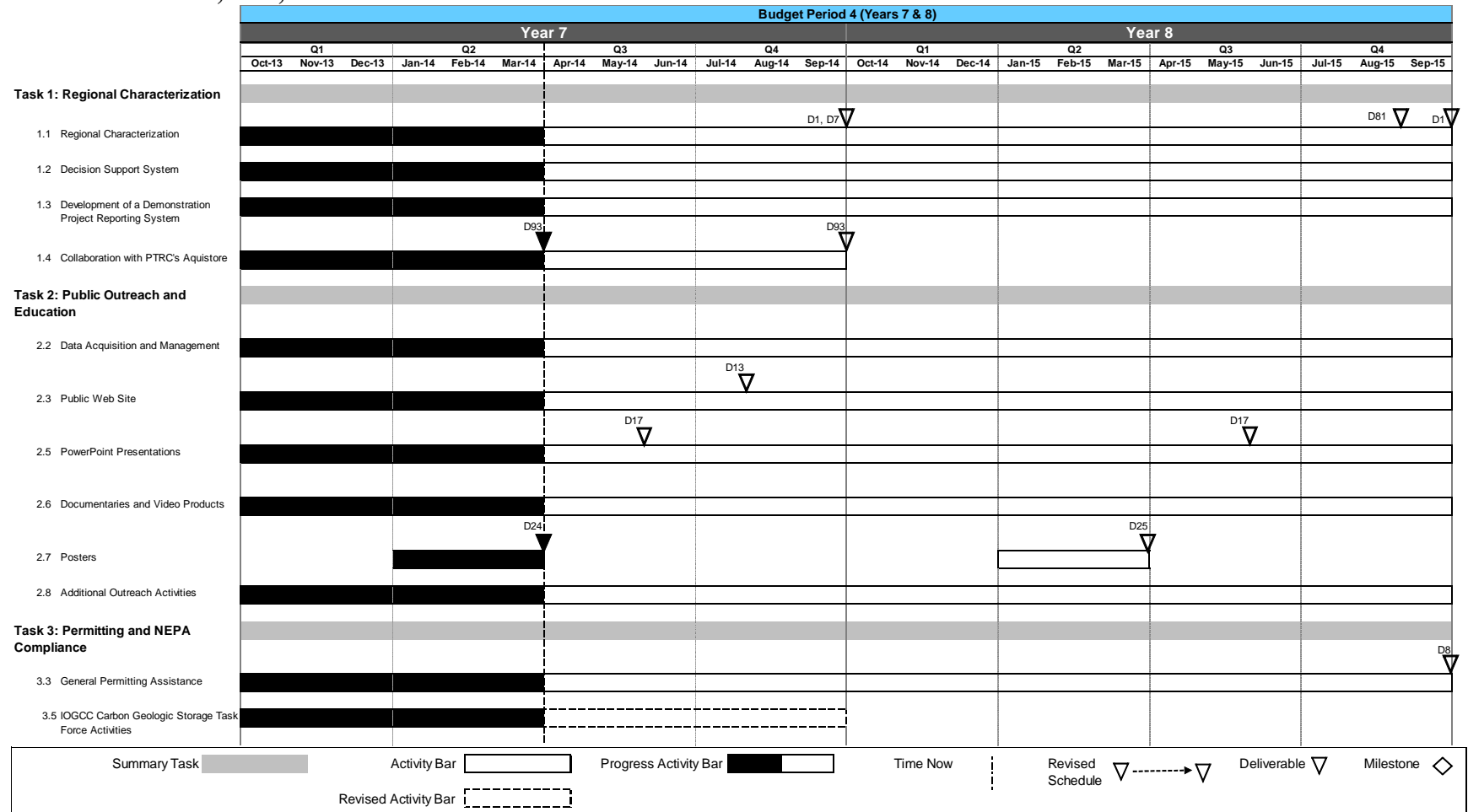
Title/Description	Due Date	Actual Completion Date
Year 7 – Quarter 2 (January–March 2014) (continued)		
D86: Task 15 – Updated Regional Implementation Plan for Zama	2/28/14	2/28/14
M23: Task 14 – Monthly WWG Conference Call Held	2/28/14	2/27/14
D24: Task 2 – PCOR Partnership Region Sequestration General 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	
M23: Task 14 – Monthly WWG Conference Call Held	4/30/14	
D17: Task 2 – General Phase III Information PowerPoint Presentation (update)	5/31/14	
D101: Task 14 – WWG Web Site Content Update	5/31/14	
M23: Task 14 – Monthly WWG Conference Call Held	5/31/14	
D44: Task 5 – Bell Creek Test Site – Drilling and Completion Activities Report	6/30/14	
D100: Task 9 – Fort Nelson Test Site – Best Practices Manual – Feasibility Study	6/30/14	
M23: Task 14 – Monthly WWG Conference Call Held	6/30/14	
M45: Task 9 – Bell Creek Test Site – First Full-Repeat of Pulsed Neutron Logging Campaign Completed	6/30/14	
M46: Task 9 – Bell Creek Test Site – 1 Year of Injection Completed	6/30/14	

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Table 8. Phase III Milestones and Deliverables (continued)

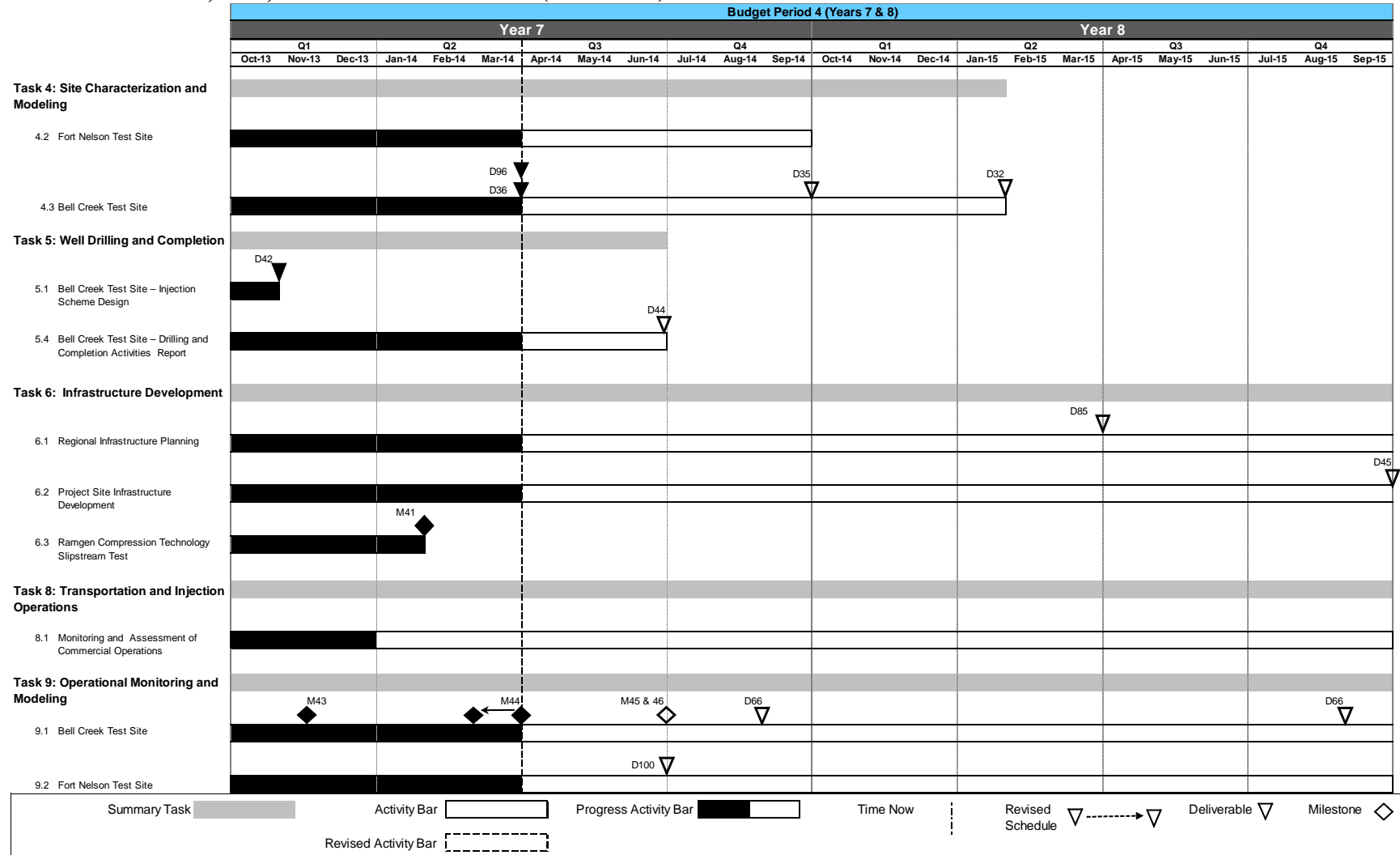
Title/Description	Due Date	Actual Completion Date
Year 7 – Quarter 4 (July–September 2014)		
D13: Task 2 – Public Site Updates	7/31/14	
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	7/31/14	
M23: Task 14 – Monthly WWG Conference Call Held	7/31/14	
D66: Task 9 – Bell Creek Test Site – Simulation Report	8/31/14	
M23: Task 14 – Monthly WWG Conference Call Held	8/31/14	
D1: Task 1 – Review of Source Attributes	9/30/14	
D7: Task 1 – Third Target Area Completed	9/30/14	
D35: Task 4 – Bell Creek Test Site – Best Practices Manual – Site Characterization	9/30/14	
D93: Task 1 – Geological Modeling and Simulation Report for the Aquistore Project	9/30/14	
M23: Task 14 – Monthly WWG Conference Call Held	9/30/14	
Year 8 – Quarter 1 (October–December 2014)		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	10/31/14	
D99: Task 14 – Water/CCS Nexus-Related Fact Sheet	10/31/14	
M23: Task 14 – Monthly WWG Conference Call Held	10/31/14	
M23: Task 14 – Monthly WWG Conference Call Held	11/30/14	
D57: Task 12 – Project Assessment Annual Report	12/31/14	
M23: Task 14 – Monthly WWG Conference Call Held	12/31/14	
M24: Task 14 – WWG Annual Meeting Held	12/31/14	
Year 8 – Quarter 2 (January–March 2015)		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	1/31/15	
D32: Task 4 – Bell Creek Test Site – Geomechanical Report (Update 1)	1/31/15	
M23: Task 14 – Monthly WWG Conference Call Held	1/31/15	
M23: Task 14 – Monthly WWG Conference Call Held	2/28/15	
D25: Task 2 – Bell Creek Test Site Poster (Update)	3/31/15	
D85: Task 6 – Report – Opportunities and Challenges Associated with CO2 Compression and Transportation During CCUS Activities (Update)	3/31/15	
M23: Task 14 – Monthly WWG Conference Call Held	3/31/15	
M36: Task 13 – Annual Advisory Board Meeting Scheduled	3/31/15	

Table 9. Phase III, BP4, Years 7–8 Gantt Chart



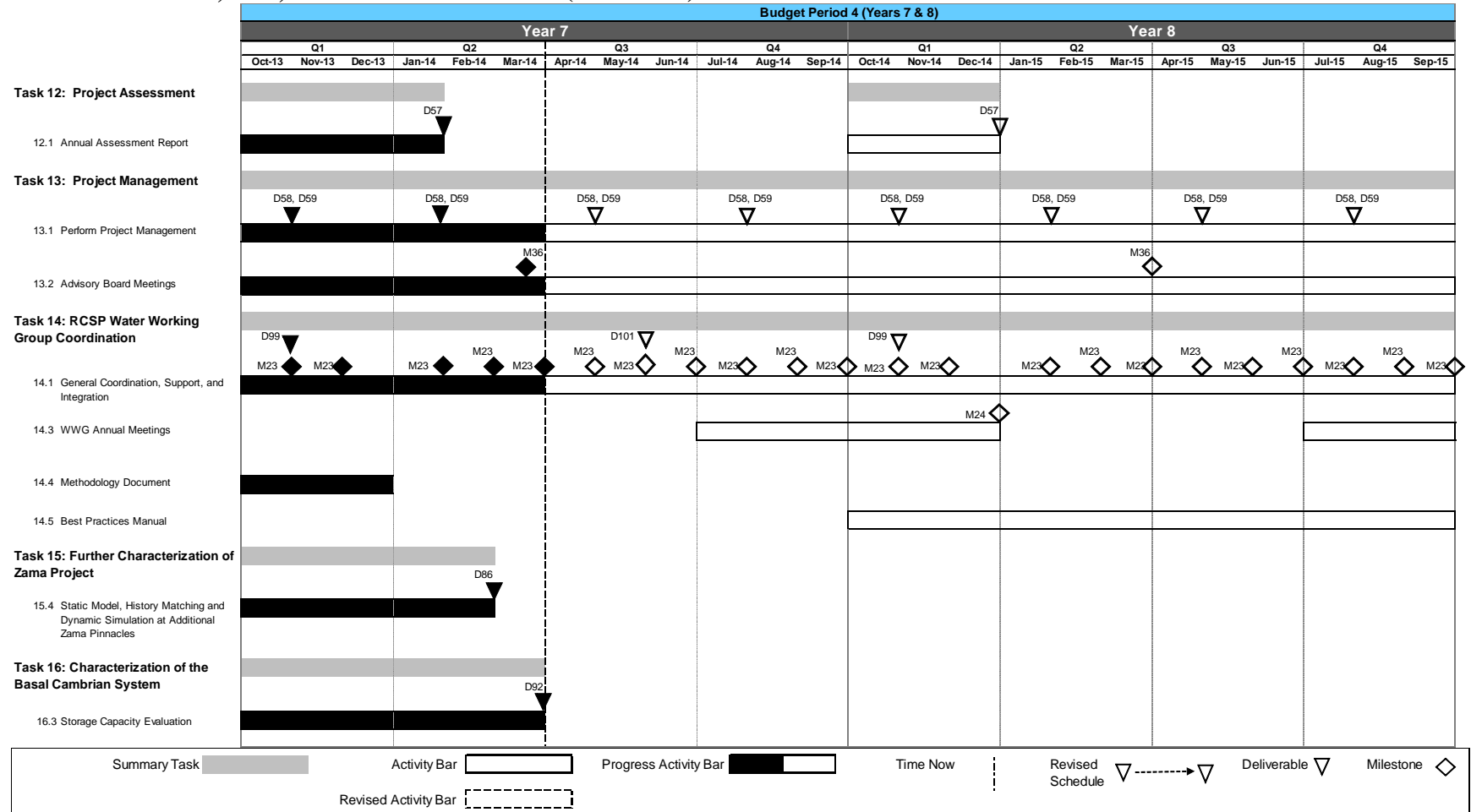
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Table 9. Phase III, BP4, Years 7–8 Gantt Chart (continued)



Continued.....

Table 9. Phase III, BP4, Years 7–8 Gantt Chart (continued)



Continued...

Table 9. 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 Aquestore 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		
D44	BC Test Site – Drilling and Completion Activities Report	D99	Nexus of Water and CCS Fact Sheet		
D45	Report – Infrastructure Development	D100	FN Test Site – Best Practices Manual– Feasibility Study		
		D101	WWG Web Site Content Update		
				4/28/2014	

4/28/2014

PHASE III PRODUCTS OR TECHNOLOGY TRANSFER ACTIVITIES

During the reporting period, 13 abstracts were submitted, six abstracts were accepted for presentation, one abstract was accepted for poster presentation, and 10 presentations (nine oral and one poster) were given at 15 different meetings/conferences. In addition, a quarterly progress report, 16 deliverables (six draft and 10 approved), four milestones (four approved), and two value-added products were completed.

Abstracts

Submitted

Botnen, L.S., Harju, J.A., Connors, K.C., Bliss, K.J., and Bengal, L.E., 2013, Guidance for states and provinces on operational and postoperational liability in the regulation of carbon geologic storage [abs.]: International Conference on Greenhouse Gas Technologies (GHGT-12), Austin, Texas, October 5–9, 2014.

Braunberger, J.R., Hamling, J.A., Gorecki, C.D., Steadman, E.N., Harju, J.A., Miller, H., Rawson, J., Walsh, F., Pasternack, E., Rowe, W., and Butsch, R., 2013, Characterization and time-lapse monitoring utilizing pulsed-neutron well logging at an incidental CO₂ storage demonstration [abs.]: International Conference on Greenhouse Gas Technologies (GHGT-12), Austin, Texas, October 5–9, 2014.

Gao, P., Gorecki, C.D., Braunberger, J.R., Ayash, S.C., Steadman, E.N., and Harju, J.A., 2014, Demonstrating acid gas EOR and CO₂ storage technologies in Devonian-aged pinnacle reefs [abs.]: International Conference on Greenhouse Gas Technologies (GHGT-12), Austin, Texas, October 5–9, 2014.

Glazewski, K.A., Hamling, J.A., Peck, W.D., Doll, T.E., Laumb, J.D., Gorecki, C.D., Azzolina, N.A., Nakles, D.V., Steadman, E.N., and Harju, J.A., 2013, A regional wellbore evaluation of the Basal Cambrian system [abs.]: International Conference on Greenhouse Gas Technologies (GHGT-12), Austin, Texas, October 5–9, 2014.

Gorecki, C.D., Ayash, S.C., Klapperich, R.J., Sorensen, J.A., Hamling, J.A., Steadman, E.N., and Harju, J.A., 2013, An adaptive management approach to CO₂ storage projects [abs.]: International Conference on Greenhouse Gas Technologies (GHGT-12), Austin, Texas, October 5–9, 2014.

Hamling, J.A., Gorecki, C.D., Klapperich, R.J., Kalenze, N.S., Stepan, D.J., Steadman, E.N., Harju, J.A., Miller, H., Rawson, J., Welch, R., and Walsh, F., 2013, Monitoring one year's worth of CO₂ injection and incidental storage at the Bell Creek oil field [abs.]: International Conference on Greenhouse Gas Technologies (GHGT-12), Austin, Texas, October 5–9, 2014.

Hawthorne, S.B., Miller, D.J., Gorecki, C.D., Sorensen, J.A., Hamling, J.A., Roen, T.D., Steadman, E.N., Harju, J.A., and Melzer, L.S., 2014, A rapid method for determining CO₂/oil MMP and visual observations of CO₂/oil interactions at reservoir conditions [abs.]: International Conference on Greenhouse Gas Technologies (GHGT-12), Austin, Texas, October 5–9, 2014.

- Jensen, M.D., Schlasner, S.M., Sorensen, J.A., and Hamling, J.A., 2014, Operational flexibility of CO₂ transport and storage [abs.]: International Conference on Greenhouse Gas Technologies (GHGT-12), Austin, Texas, October 5–9, 2014.
- Klapperich, R.J., Stepan, D.J., Jensen, M.D., Gorecki, C.D., Steadman, E.N., Harju, J.A., Nakles, D.V., and McNemar, A.T., 2014, The nexus of water and CCS—a regional carbon sequestration partnership perspective [abs.]: International Conference on Greenhouse Gas Technologies (GHGT-12), Austin, Texas, October 5–9, 2014.
- Klenner, R.C.L., Peck, W.D., Ayash, S.C., Gorecki, C.D., Braunberger, J.R., Liu, G., and Dotzenrod, N.W., 2014, A workflow to determine CO₂ storage potential in deep saline formations [abs.]: International Conference on Greenhouse Gas Technologies (GHGT-12), Austin, Texas, October 5–9, 2014.
- Liu, G., Peck, W.D., Braunberger, J.R., Klenner, R.C.L., Gorecki, C.D., Steadman, E.N., and Harju, J.A., 2014, Evaluation of large-scale carbon dioxide storage potential in the basal saline system in the Alberta and Williston Basins in North America [abs.]: International Conference on Greenhouse Gas Technologies (GHGT-12), Austin, Texas, October 5–9, 2014.
- Peck, W.D., Klenner, R.C.L., Liu, G., Gorecki, C.D., Ayash, S.C., Steadman, E.N., and Harju, J.A., 2013, Model development of the Aquistore CO₂ storage project [abs.]: International Conference on Greenhouse Gas Technologies (GHGT-12), Austin, Texas, October 5–9, 2014.
- Sorensen, J.A., Smith, S.A., Gorecki, C.D., Botnen, L.A., Steadman, E.N., and Harju, J.A., 2013, Application of Canadian Standards Association guidelines for geologic storage of CO₂ toward the development of a monitoring, verification, and accounting plan for a potential CCS project at Fort Nelson, British Columbia, Canada [abs.]: International Conference on Greenhouse Gas Technologies (GHGT-12), Austin, Texas, October 5–9, 2014.

Submitted and Accepted for Presentation

- Braunberger, J.R., Bosshart, N.W., Klenner, R.C.L., Liu, G., Peck, W.D., and Gorecki, C.D., 2014, Characterization and 3-D modeling of Devonian pinnacle reefs for CO₂ storage and enhanced oil recovery [abs.]: 2014 Rocky Mountain Section AAPG Annual Meeting, Denver, Colorado, July 20–22, 2014.
- Dotzenrod, N.W., Braunberger, J.R., Klenner, R.C.L., Liu, G., and Gorecki, C.D., 2014, Workflow optimization using Python programming, a tool kit for every geoscientist [abs.]: 2014 Rocky Mountain Section AAPG Annual Meeting, Denver, Colorado, July 20–22, 2014.
- Gao, P., Gorecki, C.D., Braunberger, J.R., Ayash, S.C., Steadman, E.N., and Harju, J.A., 2014, Modeling of acid gas injection for enhanced oil recovery and long-term storage in Devonian-aged pinnacle reefs [abs.]: 13th Annual Carbon Capture, Utilization & Storage Conference, Pittsburgh, Pennsylvania, April 28 – May 1, 2014.
- Gorecki, C.D., Ayash, S.C., Klapperich, R.J., Sorensen, J.A., Hamling, J.A., Steadman, E.N., and Harju, J.A., 2014, The Plains CO₂ Reduction Partnership's adaptive management strategy for CO₂ storage [abs.]: 13th Annual Carbon Capture, Utilization & Storage Conference, Pittsburgh, Pennsylvania, April 28 – May 1, 2014.
- Klenner, R.C.L., Braunberger, J.R., Dotzenrod, N.W., Bosshart, N.W., Peck, W.D., and Gorecki, C.D., 2014, Training image characterization and multipoint statistical modeling of clastic and

carbonate formations [abs.]: 2014 Rocky Mountain Section AAPG Annual Meeting, Denver, Colorado, July 20–22, 2014.

Liu, G., Peck, W.D., Braunberger, J.R., Klenner, R.C.L., Gorecki, C.D., Steadman, E.N., and Harju, J.A., 2014, Carbon dioxide storage potential of the basal saline system in the Alberta and Williston Basins of North America [abs.]: 13th Annual Carbon Capture, Utilization & Storage Conference, Pittsburgh, Pennsylvania, April 28 – May 1, 2014.

Submitted and Accepted for Poster Presentation

Sorensen, J.A., Smith, S.A., Gorecki, C.D., Botnen, L.A., Steadman, E.N., and Harju, J.A., 2014, Development of a monitoring, verification, and accounting plan for a potential CCS project at Fort Nelson, British Columbia, Canada [abs.]: 13th Annual Carbon Capture, Utilization & Storage Conference, Pittsburgh, Pennsylvania, April 28 – May 1, 2014.

Presentations

Daly, D.J., 2014, PCOR Partnership educator outreach and collaborative activities with Prairie Public Broadcasting: Presented at the Canadian Embassy's Educational Outreach Workshop, Washington, D.C., February 26, 2014.

Gorecki, C.D., 2014, CO₂ enhanced oil recovery—the Plains CO₂ Reduction Partnership's approach to carbon capture and storage: ePoster presented at IPTC International Petroleum Technology Conference, Doha, Qatar, January 20–22, 2014, no. 1574.

Gorecki, C.D., 2014, PCOR Partnership Program—accomplishments and path forward: Presented to Konkuk University and Sejong University personnel, Grand Forks, North Dakota, February 20, 2014.

Gorecki, C.D., Sorensen, J.A., Nakles, D., and Jackson, B., 2014, PCOR Partnership Technical Advisory Board Meeting: Presentation for the PCOR Partnership Technical Advisory Board Meeting, Austin, Texas, March 4–5, 2014.

Harju, J.A., and Steadman, E.N., 2014, The Energy & Environmental Research Center's economic case for CCUS—reducing capture costs and increasing demand for commodity CO₂: Presented at the Carbon Sequestration Leadership Forum 2014 CSLF Technology Workshop, Seoul, Korea, March 26, 2014.

Harju, J.A., and Steadman, E.N., 2014, The Plains CO₂ Reduction (PCOR) Partnership: Presented to U.S. Department of Energy National Energy Technology Laboratory personnel, Pittsburgh, Pennsylvania, February 25–26, 2014.

Peck, W.D., 2014, The Plains CO₂ Reduction (PCOR) Partnership—demonstrating CO₂ storage solutions: Presented at EUEC 2014: Energy, Utility & Environment Conference, Phoenix, Arizona, February 3–5, 2014.

Steadman, E.N., 2014, CO₂ utilization and storage capabilities: Presented to North American Coal Corporation personnel, Grand Forks, North Dakota, January 10, 2014.

Steadman, E.N., 2014, The Plains CO₂ Reduction (PCOR) Partnership: Presented at the National Risk Assessment Partnership (NRAP) Stakeholders Meeting, Washington, D.C., February 4–5, 2014.

Poster Presentations

Daly, D.J., Crocker, C.R., Crossland, J.L., Gorecki, C.D., Steadman, E.N., and Harju, J.A., 2014, Regional and project-based CCUS outreach – the PCOR Partnership experience: Poster presented at the 2014 IEAGHG Social Research Network Annual Meeting, Calgary, Alberta, January 14–15, 2014.

Deliverables/Milestones

Draft

Burnison, S.A., Burton-Kelly, M.E., Zhang, X., Gorecki, C.D., Steadman, E.N., and Harju, J.A., 2014, Bell Creek test site – 3-D seismic and characterization report: Plains CO₂ Reduction (PCOR) Partnership Phase III draft Task 4 Deliverable D96 for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592, Grand Forks, North Dakota, Energy & Environmental Research Center, March.

Daly, D.J., Crocker, C.R., Gorecki, C.D., Steadman, E.N., and Harju, J.A., 2014, Reducing greenhouse gas emissions – energy with a smaller carbon footprint: Plains CO₂ Reduction (PCOR) Partnership Phase III draft Task 2 Deliverable D24 for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592, Grand Forks, North Dakota, Energy & Environmental Research Center, March.

Gao, P., Sorensen, J.A., Braunberger, J.R., Doll, T.E., Smith, S.A., Gorecki, C.D., Hawthorne, S.B., Steadman, E.N., and Harju, J.A., 2014, Updated regional technology implementation plan for Zama: Plains CO₂ Reduction (PCOR) Partnership Phase III draft Task 15 Deliverable D86 for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592, Grand Forks, North Dakota, Energy & Environmental Research Center, February 2014.

Laumb, J.D., Klapperich, R.J., Hamling, J.A., Glazewski, K.A., Kalenze, N.S., Gorecki, C.D., Steadman, E.N., and Harju, J.A., 2014, Bell Creek wellbore integrity study: Plains CO₂ Reduction (PCOR) Partnership Phase III draft Task 4 Deliverable D36 for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592, Grand Forks, North Dakota, Energy & Environmental Research Center, March.

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Peck, W.D., Liu, G., Klenner, R.C.L., Grove, M.M., Gorecki, C.D., Steadman, E.N., and Harju, J.A., 2014, Storage capacity and regional implications for large-scale storage in the Basal Cambrian system: Plains CO₂ Reduction (PCOR) Partnership Phase III draft Task 16 Deliverable D92 for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592, Grand Forks, North Dakota, Energy & Environmental Research Center, March.

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- Anagnost, K.K., Harju, J.A., and Steadman, E.N., 2013, Bell Creek test site – carbon dioxide (CO₂) procurement efforts for a large-scale CO₂ storage and CO₂ enhanced oil recovery project: Plains CO₂ Reduction (PCOR) Partnership Phase III Task 7 Deliverable D48 for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592, EERC Publication 2014-EERC-02-04, Grand Forks, North Dakota, Energy & Environmental Research Center, September.
- Daly, D.J., Crocker, C.R., Gorecki, C.D., Steadman, E.N., and Harju, J.A., 2013, Aquistore—demonstrating carbon storage: Plains CO₂ Reduction (PCOR) Partnership Phase III Task 2 Deliverable D95 for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592, Grand Forks, North Dakota, Energy & Environmental Research Center, September.
- Daly, D.J., Crocker, C.R., Gorecki, C.D., Steadman, E.N., and Harju, J.A., 2014, PCOR Partnership role in the Aquistore project: Plains CO₂ Reduction (PCOR) Partnership Phase III Task 2 Deliverable D94 for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592, Grand Forks, North Dakota, Energy & Environmental Research Center, February.
- Glazewski, K.A., Hamling, J.A., Peck, W.D., Doll, T.E., Laumb, J.D., Gorecki, C.D., Steadman, E.N., and Harju, J.A., 2013, Wellbore evaluation of the Basal Cambrian system: Plains CO₂ Reduction (PCOR) Partnership Phase III Task 16 Deliverable D90 for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592, EERC Publication 2014-EERC-02-08, Grand Forks, North Dakota, Energy & Environmental Research Center, September.
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Meeting Minutes

Klapperich, R.J., 2014, Minutes—Regional Carbon Sequestration Partnership Water Working Group monthly conference call: January 28, 2014.

Klapperich, R.J., 2014, Minutes—Regional Carbon Sequestration Partnership Water Working Group monthly conference call: February 27, 2014.

MEETINGS/TRAVEL

Representatives from the PCOR Partnership attended and/or participated in the following 15 meetings/conferences, one workshop, 12 project management site trips, and one training opportunity in this reporting period:

- January 12–17, 2014: Traveled to the Bell Creek area for sampling activities.
- January 12–18, 2014: Remotely located staff participated in project-related meetings in Grand Forks, North Dakota.
- January 14–15, 2014: Attended the SPE Williston Basin Section annual meeting in Dickinson, North Dakota.
- January 18–23, 2014: Presented at IPTC in Doha, Qatar.
- January 21–23, 2014: Attended meetings with the North Dakota Public Service Commission and NDIC Oil and Gas Research Council in Bismarck, North Dakota.
- January 23, 2014: Attended a meeting with PPB at its offices in Fargo, North Dakota.
- January 23–25, 2014: Inspected the Phase II Lignite Field Validation Test site near Kenmare, North Dakota, and visited the Bell Creek site for data download.
- January 28–31, 2014: Traveled to the Bell Creek area for landowner visits.
- February 2–7, 2014: Presented at EUEC in Phoenix, Arizona.
- February 2–5, 2014: Presented at the NRAP Stakeholders Group meeting in Washington, D.C.
- February 6–7, 2014: Discussed project-related activities with Denbury at its headquarters in Plano, Texas.
- February 9–14, 2014: Traveled to the Bell Creek area for sampling activities.
- February 10–14, 2014: Remotely located staff participated in project-related meetings in Grand Forks, North Dakota.
- February 11–14, 2014: Viewed core samples at USGS CRC and CSM in Denver, Colorado.
- February 23–26, 2014: Met with various DOE NETL staff members in Pittsburgh, Pennsylvania.
- February 25–28, 2014: Presented at the 3rd Annual America's Forum in Washington, D.C.
- February 26, 2014: Inspected the Phase II Lignite Field Validation Test site near Kenmare, North Dakota.
- February 27–28, 2014: Attended the SPE Williston Basin Section meeting in Williston, North Dakota.
- March 3–5, 2014: Hosted the third annual TAB meeting in Austin, Texas.
- March 3–5, 2014: Attended the SECARB annual membership meeting in Atlanta, Georgia.
- March 3–5, 2014: Traveled to the Bell Creek Field to observe 3-D seismic activities.
- March 9–13, 2014: Traveled to the Bell Creek area for sampling activities.

- March 17–20, 2014: Traveled to the Bell Creek Field to visit with area landowners.
- March 22–29, 2014: Participated in the CSLF Technical Group Meeting in Seoul, South Korea.
- March 23–28, 2014: Participated in Schlumberber NEXT PetroMod Fundamentals training in Houston, Texas.
- March 24–27, 2014: Inspected the Phase II Lignite Field Validation Test site near Kenmare, North Dakota, and also the Bell Creek Field to download PDM data.
- March 25–27, 2014: Viewed and retrieved Aquistore core in Regina, Saskatchewan, Canada.
- March 31 – April 4, 2014: Traveled to the Bell Creek Field to download data.

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

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