



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

PLAINS CO₂ REDUCTION PARTNERSHIP PHASE III

Quarterly Technical Progress Report Task 13 – Deliverable D58/D59

(for the period April 1 – June 30, 2018)

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PLAINS CO₂ REDUCTION PARTNERSHIP PHASE III
Quarterly Technical Progress Report
April 1 – June 30, 2018

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 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 multiyear (2007–2018) development phase, is an extension of the characterization (Phase I) and validation (Phase II) phases and is intended to confirm that commercial-scale CO₂ capture, transportation, and storage can be achieved safely, permanently, and economically over extended periods in the PCOR Partnership region.

This progress report presents an update of Phase III PCOR Partnership activities from April 1 through June 30, 2018.

PCOR Partnership activities continued to focus on the preparation and submittal of comprehensive deliverables and participation in conferences/meetings and workshops. Management of a special issue of the *International Journal of Greenhouse Gas Control* continued as well as revisions of papers through the peer review system. The PCOR Partnership Technical Advisory Board annual meeting was held April 10–11, 2018, in Miami, Florida, and provided advice on final reporting and related key messages from Phase III.

The Bell Creek Story – CO₂ in Action received a 2018 Bronze Telly Award in the category of Television Documentary.

Bell Creek site personnel were trained, and maintenance of the 05-06 OW (observation well) permanent downhole monitor system was handed off to Denbury Onshore, the site operator.

Three tasks continued. In addition to the foregoing, work on the planned public Web site technical upgrade design continued, discussions of plans to upload PCOR Partnership data to NETL's Energy Data eXchange continued, writing of the PCOR Partnership Phase III final report continued, and planning for the PCOR Partnership Annual Membership Meeting continued, which is scheduled to be held September 18–19, 2018, in Washington, D.C.



PLAINS CO₂ REDUCTION PARTNERSHIP PHASE III
Quarterly Technical Progress Report
April 1 – June 30, 2018

INTRODUCTION

The Plains CO₂ Reduction (PCOR) Partnership is one of seven regional partnerships operating under the U.S. Department of Energy (DOE) National Energy Technology Laboratory (NETL) Regional Carbon Sequestration Partnerships (RCSP) Initiative. 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, 2018, 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 Initiative 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 (2007–2018): involves large-volume carbon storage demonstration tests

Phase III is divided into three budget periods (BPs), running from October 1, 2007, to December 31, 2018:

- BP3: October 1, 2007 – September 30, 2009
- BP4: October 1, 2009 – March 31, 2016
- BP5: April 1, 2016 – December 31, 2018

BP1 and BP2 were effective in Phase II.

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

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

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 the 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 CCS 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

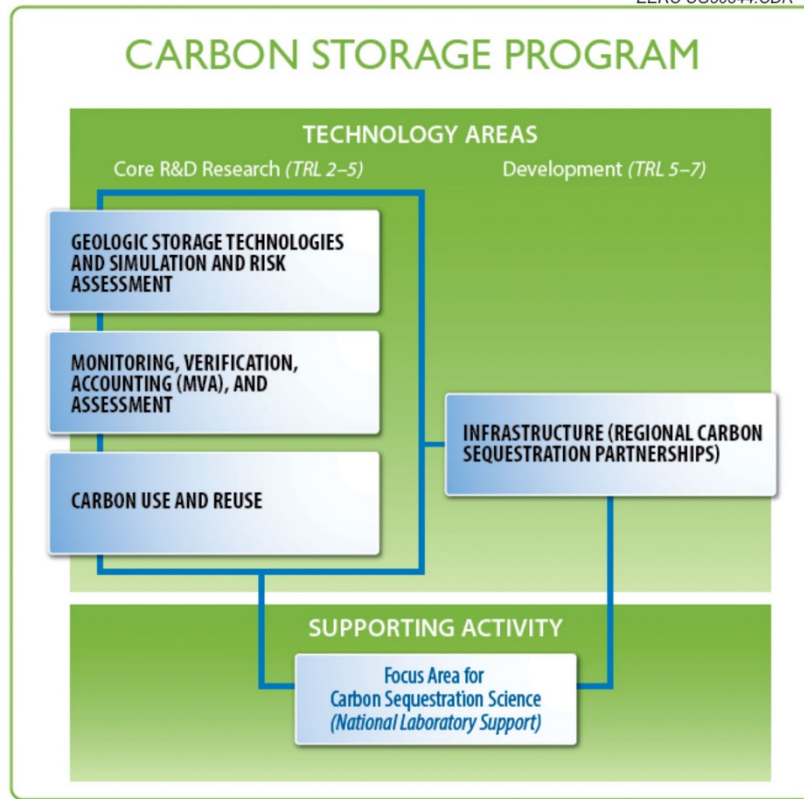


Figure 1. DOE Carbon Storage Program technology areas featuring regional partnerships (courtesy of DOE NETL; “TRL” stands for technology readiness level).

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 tonnes of CO₂ per project. Each of the RCSP large-volume injection tests is designed to demonstrate that the CO₂ storage sites have the potential to store regional CO₂ emissions safely, permanently, and economically for hundreds of years.

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



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

The PCOR Partnership's objectives for the demonstration projects are as follows:
 1) conduct a successful Bell Creek 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) support Spectra's feasibility study of a Fort Nelson demonstration to verify the economic feasibility of using the region's carbonate saline formations for safe, long-term CO₂ storage. During Phase III, the PCOR Partnership will continue to refine storage resource estimates and evaluate other factors relevant to regional storage goals.

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

Table 2. Phase III Responsibility Matrix

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

PROGRESS OF WORK

Task 1 – Regional Characterization

This task ended in Quarter 1 – Budget Period (BP) 5, Year 11 (March 2018).

Task 2 – Public Outreach and Education

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

- Received word from Prairie Public Broadcasting (PPB) that “The Bell Creek Story – CO₂ in Action” (Documentary Deliverable [D] 21) received a 2018 Bronze Telly Award in the category of Television Documentary.
- During the quarter, the PCOR Partnership was represented by EERC personnel at eight meetings/conferences. Specifically, the PCOR Partnership outreach activities included seven oral presentations and four booths. The following quantities of PCOR Partnership outreach materials were distributed:
 - PCOR Partnership documentary entitled “Managing Carbon Dioxide: The Geologic Solution” – 125
 - PCOR Partnership documentary entitled “Global Energy and Carbon: Tracking Our Footprint” – 121
 - PCOR Partnership documentary entitled “The Bell Creek Story: CO₂ in Action” – 140
 - PCOR Partnership documentary entitled “Coal: Engine of Change” – 122
 - PCOR Partnership Atlas, 5th Edition – 170

- Edited the DVD fact sheet to add text about receiving the Bronze Telly Award for the Bell Creek DVD (D21).
- Continued writing the draft outreach paper for the 14th Conference for Greenhouse Gas Control Technologies (GHGT-14).
- Completed and submitted a draft of the Task 2 section for the PCOR Partnership Phase III final report – D62, under Task 13.
- Continued activities associated with **education and teacher education** seminars. The PCOR Partnership outreach team participated in one teacher training workshop and education conference. This activity included introducing PCOR Partnership materials (DVDs, atlas, and Web site awareness) to educators in K–12 schools. A total of 115 teachers were in attendance. Attendee details will be available and provided next quarter. A 4-day coal-focused workshop, the Lignite Energy Council (LEC) Teacher Seminar, presented by the North Dakota LEC, was held June 11–14, 2017, in Bismarck, North Dakota.
- Continued postproduction work on Documentary D22 (“Coal: Engine of Change”), which aired in March 2018, including the following:
 - Received updated video clips from PPB.
 - Completed review of DVD print materials and sent to RelyMedia for DVD production.
 - Received 1000 DVDs from RelyMedia.
- **Conference call** activity this quarter included the following:
 - No monthly Aquistore Outreach Advisory Group phone calls were held this quarter.
 - With regard to the monthly RCSP Program Outreach Working Group (OWG) conference calls:
 - ◆ Participated in the monthly conference call on April 19, 2018.
 - ◆ In lieu of the May monthly conference call, received the expanded outline for the OWG final report from the OWG lead. Began review and comment writing.
 - ◆ Participated in the monthly conference call on June 21, 2018. Discussed the status and path forward for the OWG final report.
- Continued internal discussions and work on the planned PCOR Partnership **public Web site** (www.undeerc.org/pcor) technical upgrade design, including the following:
 - Converted the Coal documentary (D22) to a smaller file size for better streaming.
 - Worked with the programmers to make hover boxes on the CO₂ Sequestration Project page mobile-friendly.
 - Updated the following printer-friendly pages to revamp the site:
 - ◆ What Is CO₂?
 - ◆ What Is CO₂ Sequestration?
 - ◆ CO₂ Sequestration Projects
 - ◆ CCS Rules and Regulations
 - ◆ Terrestrial Sequestration
 - Continued to discuss progress and needs of programming.
 - Continued ongoing identification and repair of broken links.
- Information regarding the **site sessions/visits** to the PCOR Partnership public Web site included the following:
 - There were 4411 sessions/visits to the public Web site (www.undeerc.org/pcor). Traffic decreased 24% from last quarter (5779 sessions/visits).

- There were 3786 unique visitors to the public Web site, representing a 25% decrease from last quarter (5078 visitors). In particular, over 90% of these visitors were new to the Web site (visitors whose visit was marked as a first-time visit in this quarter). Of the 4411 sessions/visits, 53% of the Web traffic was domestic, and 47% was international. Table 3 lists the top ten countries for visits to the PCOR Partnership Web site: United States, India, United Kingdom, Canada, Australia, South Korea, Mexico, Philippines, Denmark, and France. There was traffic from 111 countries overall (Figure 3).
- There were 406 sessions/visits originating from within the PCOR Partnership region (an 18% decrease from last quarter) (Figure 4). Approximately 82% of the regional visits originated from the United States, and 18% came from Canada. Visits from within the PCOR Partnership region represent over 9% of the overall traffic to the public Web site (it should be noted that the totals are exaggerated to some degree because the visit location data were aggregated at the state and province levels, even though the PCOR Partnership region formally includes only portions of British Columbia, Montana, and Wyoming).

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

	Country	Sessions/ Visits*	PCOR Partnership State/Province	Visits*
1	United States	2318		
			North Dakota	108
			Minnesota	49
			Wisconsin	44
			Iowa	25
			Nebraska	21
			Missouri	20
			Wyoming	20
			Montana	18
			South Dakota	9
2	India	580		
3	United Kingdom	228		
4	Canada	175		
			Alberta	53
			British Columbia	22
			Saskatchewan	15
			Manitoba	2
5	Australia	61		
6	South Korea	61		
7	Mexico	58		
8	Philippines	54		
9	Denmark	49		
10	France	39		
	Other 101 countries	788		
Total Sessions/Visits		4411	Total PCOR Partnership Visits	406

* Arranged by the number of visits to the site.

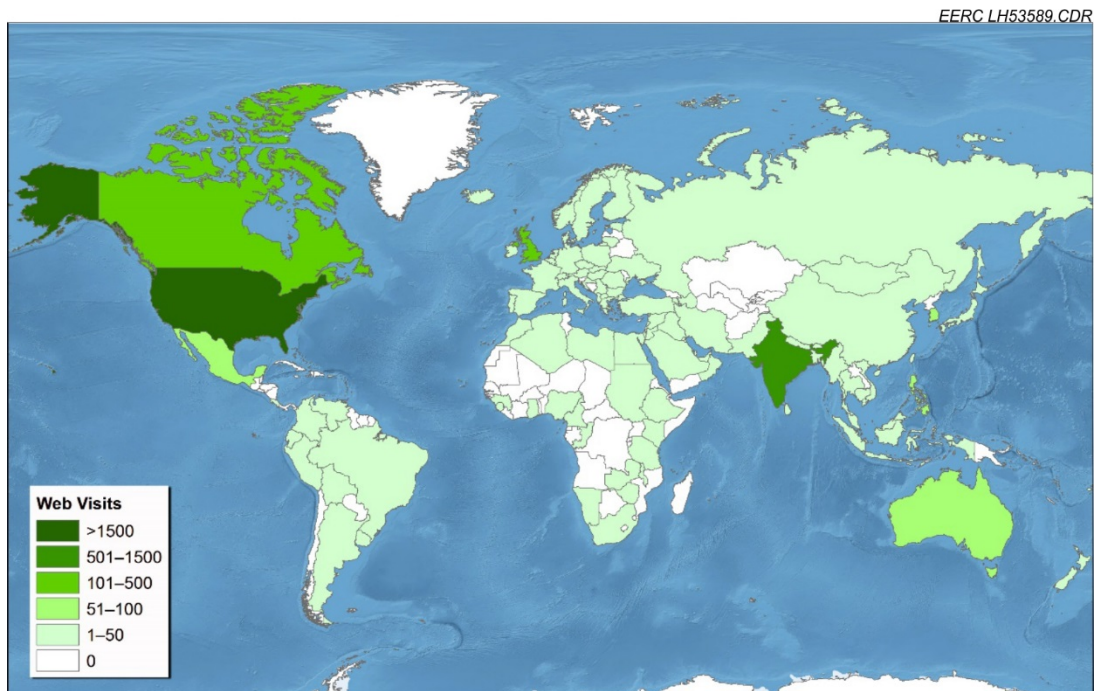


Figure 3. Map of PCOR Partnership Web site global traffic for this reporting period.

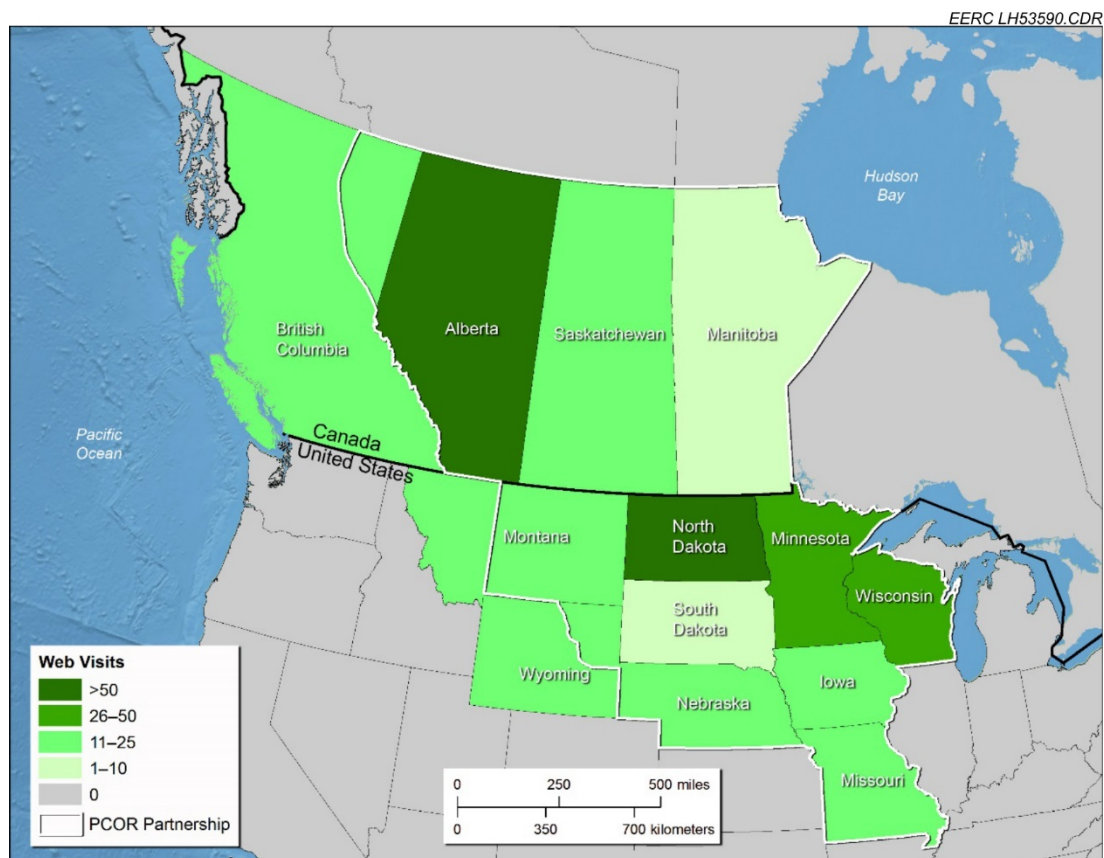


Figure 4. Map of PCOR Partnership Web site regional visits for this reporting period.

- During this reporting period, a breakdown of how visitors came to the PCOR Partnership Web site, also referred to as **traffic sources** (Figure 5), was determined and is provided below:
 - Search traffic refers to the use of search engines such as Google, Bing, and Yahoo. Search traffic accounted for 80% of the overall traffic that came to the public Web site. Google Analytics provides keywords that visitors used to find the public Web site. The top three search phrases were “CO₂,” “carbon sequestration,” and “carbon dioxide sequestration.”
 - Direct traffic consists of those visitors who bookmark or type a specific URL (e.g., www.undeerc.org/pcor) into the Web address bar. It is likely that most of the direct traffic (14%) is from persons familiar with the PCOR Partnership.

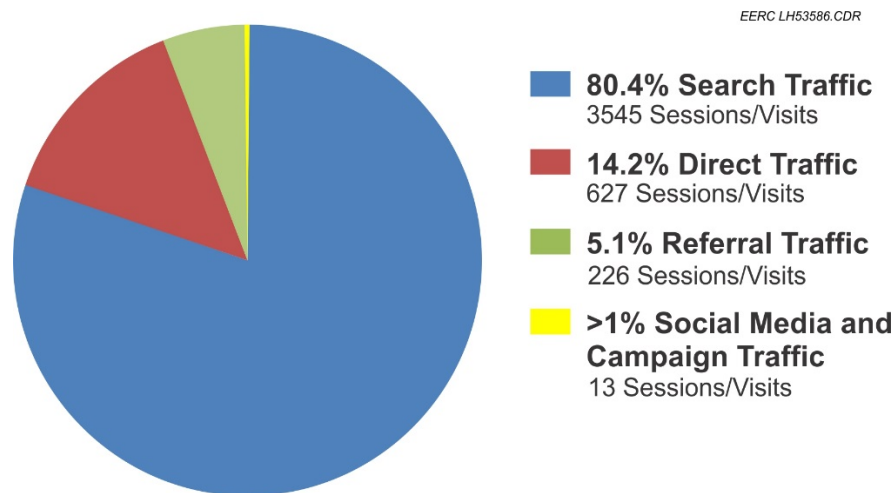


Figure 5. PCOR Partnership public Web site traffic sources for this reporting period.

- Referral site traffic (over 5%) corresponds to the traffic directed to the PCOR Partnership Web page from other sites via links. The top referring Web sites were arthapedia.in (Indian economy and government Web site) and eerc.und.nodak.edu (EERC).
- Less than 1% of site traffic (13 visitors) resulted from teacher campaigns and social interactions such as e-mail or social media sources (e.g., Facebook and YouTube).
- During this reporting period, the **nature of the sessions** to the PCOR Partnership public Web site included 8281 page views (a decrease of approximately 21% from last quarter); the top five pages viewed are listed in Table 4. These five pages make up almost 58% of total page views.
- All seven full-length documentaries and 63 video clips taken from the documentaries have been uploaded to the EERC’s YouTube channel. The top five accessed YouTube videos are listed in Table 5. Because of the volume of material, the videos were organized into seven playlists. Each video description includes one or more links to the PCOR Partnership public Web site. These PCOR Partnership full-length documentaries and video clips are also on the PPB YouTube Channel. These are listed in Table 6. These videos can also be streamed on the PCOR Partnership public Web site.

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

Page Title	Page Views	% Page Views	Page
What Is CO ₂ Sequestration?	2406	29.1	www.undeerc.org/pcor/sequestration/whatissequestration.aspx
What Is CO ₂ ?	1087	13.1	www.undeerc.org/pcor/sequestration/whatisco2.aspx
Terrestrial	462	5.6	www.undeerc.org/pcor/region/terrestrial/default.aspx
Carbon Capture and Storage (CCS)	461	5.6	www.undeerc.org/pcor/sequestration/ccs.aspx
CO ₂ Sequestration Projects	347	4.2	www.undeerc.org/pcor/co2sequestrationprojects/default.aspx

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

Video	Video Length	Views	Est. Minutes Watched	Avg. View Duration
The Phases of Oil Recovery – So Far	2:40	1122	1823	1:40
Reforestation in Brazil	4:41	1086	2341	2:05
Reducing Our Carbon Footprint: The Role of Markets	26:49	1027	5704	5:35
Sequestering Carbon in Wetlands	3:08	170	238	1:25
Installing a Casing-Conveyed Permanent Downhole Monitoring System	19:19	156	794	5:25

Table 6. PCOR Partnership Videos on PPB YouTube Channel Accessed

Video	Video Length	Views	Est. Minutes Watched
Global Energy and Carbon: Tracking Our Footprint	32:36	5229	74,027
Clean Development Mechanism Projects	1:56	265	247
Coal: Engine of Change	56:45	236	2333
CO ₂ EOR and Geologic CO ₂ Sequestration	3:13	219	405
CO ₂ Flooding and Geologic Sequestration	1:00	69	49

- During this reporting period, the PCOR Partnership received **public television exposure** from documentaries broadcast in four states and one Canadian province. A total of six broadcasts aired, with “The Bell Creek Story: CO₂ in Action” airing twice and “Coal: Engine of Change” airing four times. All broadcasts were televised in the PCOR Partnership region.

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

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

Task 3 – Permitting and NEPA Compliance

This task ended in Quarter 1 – BP5, Year 11 (March 2018).

Task 4 – Site Characterization and Modeling

This task ended in Quarter 1 – BP5, Year 10 (March 2017).

Task 5 – Well Drilling and Completion

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

Task 6 – Infrastructure Development

This task ended in Quarter 1 – BP5, Year 11 (March 2018).

Task 7 – CO₂ Procurement

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

Task 8 – Transportation and Injection Operations

This task ended Quarter 4, BP4, Year 8 (September 2015).

Task 9 – Operational Monitoring and Modeling

This task ended in Quarter 1 – BP5, Year 11 (March 2018).

Task 10 – Site Closure

Significant accomplishments for Task 10 for the reporting period included the following:

- Traveled to the Bell Creek Field April 4–6, 2018, to download permanent downhole monitor (PDM) data from 05-06 OW (observation well). Trained and handed off maintenance of the 05-06 OW PDM system to Denbury, the site operator.
- Converted the data collected in early April 2018 from the 05-06 OW PDM system. The EERC will continue to have access to PDM data through request to Denbury.
- Worked on preparing material for the Task 10 section for the PCOR Partnership Phase III final report – D62, under Task 13.

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 11 – Postinjection Monitoring and Modeling

This task ended in Quarter 1 – BP5, Year 11 (March 2018).

Task 12 – Project Assessment

This task ended in Quarter 1 – BP5, Year 11 (March 2018).

Task 13 – Project Management

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

- PCOR Partnership representatives attended the Aquistore Modeling Workshop held April 5, 2018, in Regina, Saskatchewan.
- Hosted the PCOR Partnership Technical Advisory Board (TAB) annual meeting April 10–11, 2018, in Miami, Florida. Seven of the nine TAB members were in attendance. Topics discussed included the current status and final reporting of the PCOR Partnership, carbon capture, utilization, and storage (CCUS) economic and regulatory developments, and ongoing and upcoming projects in the PCOR Partnership region.
- Presented “Results from CSLF-Recognized Projects: Fort Nelson Project and Zama Project” at the Carbon Sequestration Leadership Forum (CSLF) Technical Group Meeting held April 22–23, 2018, in Venice, Italy.
- Presented “The Plains CO₂ Reduction (PCOR) Partnership: Fostering the Deployment of CCUS Technologies” at the United States Energy Association Public Briefing held April 26, 2018, in Washington, D.C.
- Attended and presented a poster entitled “Best Practices for CO₂ Geologic Storage in the PCOR Partnership Region” at GeoConvention 2018 held May 7–9, 2018, in Calgary, Alberta, Canada.
- Attended the Williston Basin Petroleum Conference (WBPC) held May 22–24, 2018, in Bismarck, North Dakota.
- Presented “Enhanced Oil Recovery Opportunities for Montana” at the Montana Energy Summit in Billings, Montana, held May 29 – June 1, 2018.
- Presented “Quantification of Associated CO₂ Storage Through Coupled Reservoir Simulation and Surveillance During an Active CO₂ EOR Project” at the Computer Modelling Group (CMG) Technical Symposium held June 4–5, 2018, in Calgary, Alberta, Canada.
- The EERC hosted the IEAGHG (International Energy Agency Greenhouse Gas R&D Programme) Risk Management Modeling Network Meeting June 18–22, 2018. Although PCOR Partnership funds were not used to host the meeting, PCOR Partnership representatives attended.

- Participated in an Aquistore Science and Engineering Research Committee (SERC) conference call June 6, 2018. Injection continues at Aquistore at 30 tons per day. The Aquistore General Meeting is scheduled for September 12, 2018.
- Submitted a value-added report entitled “Status of CO₂ Capture Technology Development and Application” on April 13, 2018, for review (from Task 6 activities).
- Submitted a value-added report entitled “PCOR Partnership 2017 Annual Membership Meeting: Workshop and Outcomes” on April 17, 2018, for review and received approval April 18, 2018.
- Submitted D66 (Bell Creek Test Site – Simulation Report) Updates 2 and 3 full reports on May 4, 2018. The reports had been under concurrent review by Denbury and were reviewed for any confidential material. Received approval for Update 3 on May 4, 2018, and Update 2 on May 24, 2018. (These were originally submitted under Task 9.)
- Submitted Milestone (M) 67 entitled “PCOR Partnership Technical Advisory Board Meeting Held” to the Federal Project Manager on June 29, 2018, for review.
- Completed a manuscript describing the molecular weight changes in produced crude oil during CO₂ EOR at the Bell Creek reservoir, obtained approval from Denbury to submit the manuscript to a peer-reviewed journal, and submitted the manuscript to *Energy and Fuels* (from Task 9 activities).
- Continued planning and work on D62 – Final Report. Met internally with task leaders to discuss writing assignments. Worked on writing text for tasks.
- Continued management of and activities for a planned special issue of *International Journal of Greenhouse Gas Control*. Activities included the following:
 - Invited peer reviewers.
 - Edited submitted papers.
 - Revised papers based on peer review comments.
 - Submitted two revised papers for additional review.
 - Accepted three revised papers for publication.
- Received notification that all abstracts submitted to GHGT-14 were accepted. Three abstracts were accepted as oral presentations (see below), while the remaining eight abstracts were accepted as posters. Three of the posters will be withdrawn. Continued revisions and internal reviews of draft GHGT-14 papers.
 - “Passive Microseismic Monitoring of CO₂ EOR and Associated Storage Using a Downhole Array in a Noisy Subsurface Environment”
 - “An Improved Numerical Modeling and Simulation Study of the Aquistore CO₂ Storage Project”
 - “Successes and Lessons Learned from 15 years of the PCOR Partnership”
- Worked on an outline, compilation, and writing for a value-added document from the PCOR Partnership best practices manuals.
- Continued planning for the 2018 PCOR Partnership Annual Membership Meeting, including the following:
 - Secured the dates and location of the meeting as September 18–19, 2018, in Washington, D.C.
 - Worked on hotel arrangements.
 - Held planning meetings on June 4 and 28, 2018. Topics discussed included meeting room layout, topics for the meeting, an activity for the meeting, and potential speakers and panelists.

- Completed the Web page (www.undeerc.org/PCOR18/), which is now available to view. Added links as buttons to the PCOR Partnership public Web site and partners-only Web site.
- Sent a “Save the Date” e-mail blast on June 6, 2018.
- Worked on the draft agenda.
- Received request to upload PCOR Partnership Phase II data into the DOE NETL Energy Data eXchange (EDX) in addition to Phase III data. The focus of efforts has been to compile Phase III data. Efforts will now include evaluating Phase II data to determine appropriate content for EDX. Continued discussions of plans to upload PCOR Partnership data to EDX and a pathway for long-term data management, including the following:
 - Began evaluation of Phase II data.
 - Continued work on review of Phase III data for EDX.
 - Proposed the upload schedule provided in Table 7.

Table 7. Proposed EDX Upload Schedule

Webinar	January 22, 2018			
RCSP Phase	Phase II		Phase III	
Phase Completion Date	9/30/2009		12/31/2018	
Milestone	Planned Completion	Actual Completion	Planned Completion	Actual Completion
Begin Data Transfer	9/4/18		8/15/18	
50% Data Uploaded	9/25/18		9/5/18	
75% Data Uploaded	10/5/18		9/21/18	
100% Data Uploaded	10/17/18		9/30/18	

- Continued work on compiling information for a potential knowledge-sharing workshop with Denbury. Worked on a draft agenda. Worked on presentations.
- Held a task leader meeting April 24, 2018. The focus of discussion was activities leading to the closeout of PCOR Partnership Phase III, including deliverables, journal articles, conference papers, best practice manuals, site closure, data management and transfer, and the 2018 PCOR Partnership Annual Membership Meeting. The 2018 annual TAB meeting was also discussed.
- Deliverables and milestones completed in April:
 - March monthly update
 - Task 13: D58/D59 – Quarterly Progress Report/Milestone Quarterly Report
- Deliverables and milestones completed in May:
 - April monthly update
- Deliverables and milestones completed in June:
 - May monthly update
 - Task 13: M67 – PCOR Partnership Technical Advisory Board Meeting Held

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

- M60 (Data Submitted to EDX) was moved from Task 1 to Task 13.

Task 14 – RCSP WWG Coordination

This task ended in Quarter 1 – BP5, Year 11 (March 2018).

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

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

Task 16 – Characterization of the Basal Cambrian System

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

PHASE III COST STATUS

The approved BP5 budget along with actual costs incurred and in-kind cost share reported are shown in Table 8. A spending plan for BP5 and actual incurred cost by quarter of cash funds for BP5 are provided in Figure 6 and Table 9.

PHASE III SCHEDULE STATUS

Table 10 lists all deliverables and milestones by quarter, with completion dates, through the end of the reporting period (see Table 11 for the Gantt chart for BP5, Years 9–12).

Table 8. Phase III Budget – BP5

Organization	Approved Budget, \$*	Actual Costs Incurred, \$
DOE Share – Cash	13,946,212	12,109,960
Nonfederal Share	5,711,194	5,781,243
Total	19,657,406	17,891,203

* As of Modification No. 38.

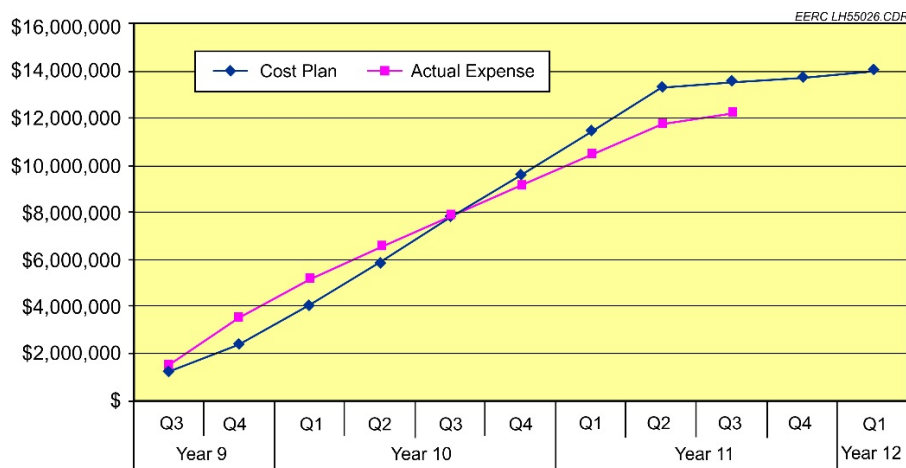


Figure 6. PCOR Partnership Phase III, BP5, Years 9–12 funding (cash only).

Table 9. Phase III, BP5, Years 9–12 Spending Plan

Budget Period 4					Budget Period 5											
Baseline Reporting Quarter	Year 9								Year 10							
	Q1		Q2		Q3		Q4		Q1		Q2		Q3		Q4	
		Cum. BP		Cum. BP		Cum. BP		Cum. BP		Cum. BP		Cum. BP		Cum. BP		Cum. BP
	Q1	Total	Q2	Total	Q3	Total	Q4	Total	Q1	Total	Q2	Total	Q3	Total	Q4	Total
Baseline Cost Plan																
Federal Share	\$ 2,250,000	\$ 62,873,437	\$ 2,250,000	\$ 65,123,437	\$ 1,202,894	\$ 1,202,894	\$ 1,202,894	\$ 2,405,788	\$ 1,623,146	\$ 4,028,934	\$ 1,855,986	\$ 5,884,920	\$ 1,855,986	\$ 7,740,906	\$ 1,855,986	\$ 9,596,892
Nonfederal Share	\$ -	\$ 2,411,971	\$ -	\$ 2,411,971	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Total Planned	\$ 2,250,000	\$ 65,285,408	\$ 2,250,000	\$ 67,535,408	\$ 1,202,894	\$ 1,202,894	\$ 1,202,894	\$ 2,405,788	\$ 1,623,146	\$ 4,028,934	\$ 1,855,986	\$ 5,884,920	\$ 1,855,986	\$ 7,740,906	\$ 1,855,986	\$ 9,596,892
Actual Incurred Cost																
Federal Share	\$ 1,909,898	\$ 57,914,662	\$ 2,562,356	\$ 60,477,018	\$ 1,497,211	\$ 1,497,211	\$ 1,962,929	\$ 3,460,140	\$ 1,623,146	\$ 5,083,286	\$ 1,362,782	\$ 6,446,068	\$ 1,342,971	\$ 7,789,039	\$ 1,319,336	\$ 9,108,375
Nonfederal Share	\$ (4,110)	\$ 2,991,641	\$ 10,655	\$ 3,002,296	\$ 7,501	\$ 7,501	\$ 30,340	\$ 37,841	\$ 10,788	\$ 48,629	\$ 530	\$ 49,159	\$ 14	\$ 49,173	\$ 217	\$ 49,390
Total Incurred Cost	\$ 1,905,788	\$ 60,906,303	\$ 2,573,011	\$ 63,479,314	\$ 1,504,712	\$ 1,504,712	\$ 1,993,269	\$ 3,497,981	\$ 1,633,934	\$ 5,131,915	\$ 1,363,312	\$ 6,495,227	\$ 1,342,985	\$ 7,838,212	\$ 1,319,553	\$ 9,157,765
Variance																
Federal Share	\$ 340,102	\$ 4,958,775	\$ (312,356)	\$ 4,646,419	\$ (294,317)	\$ (294,317)	\$ (760,035)	\$ (1,054,352)	\$ -	\$ (1,054,352)	\$ 493,204	\$ (561,148)	\$ 513,015	\$ (48,133)	\$ 536,650	\$ 488,517
Nonfederal Share	\$ 4,110	\$ (579,670)	\$ (10,655)	\$ (590,325)	\$ (7,501)	\$ (7,501)	\$ (30,340)	\$ (37,841)	\$ (10,788)	\$ (48,629)	\$ (530)	\$ (49,159)	\$ (14)	\$ (49,173)	\$ (217)	\$ (49,390)
Total Variance	\$ 344,212	\$ 4,379,105	\$ (323,011)	\$ 4,056,094	\$ (301,818)	\$ (301,818)	\$ (790,375)	\$ (1,092,193)	\$ (10,788)	\$ (1,102,981)	\$ 492,674	\$ (610,307)	\$ 513,001	\$ (97,306)	\$ 536,433	\$ 439,127

Budget Period 5																
Baseline Reporting Quarter	Year 11								Year 12							
	Q1		Q2		Q3		Q4		Q1							
	Q1	Cum. BP Total	Q2	Cum. BP Total	Q3	Cum. BP Total	Q4	Cum. BP Total	Q1	Cum. BP Total						
Baseline Cost Plan																
Federal Share	\$ 1,855,987	\$ 11,452,879	\$ 1,855,987	\$ 13,308,866	\$ 212,449	\$ 13,521,315	\$ 212,449	\$ 13,733,764	\$ 212,448	\$ 13,946,212						
Nonfederal Share	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -						
Total Planned	\$ 1,855,987	\$ 11,452,879	\$ 1,855,987	\$ 13,308,866	\$ 212,449	\$ 13,521,315	\$ 212,449	\$ 13,733,764	\$ 212,448	\$ 13,946,212						
Actual Incurred Cost																
Federal Share	\$ 1,274,215	\$ 10,382,590	\$ 1,280,520	\$ 11,663,110												
Nonfederal Share	\$ 20,159	\$ 69,549	\$ -	\$ 69,549												
Total Incurred Cost	\$ 1,294,374	\$ 10,452,139	\$ 1,280,520	\$ 11,732,659												
Variance																
Federal Share	\$ 581,772	\$ 1,070,289	\$ 575,467	\$ 1,645,756												
Nonfederal Share	\$ (20,159)	\$ (69,549)	\$ -	\$ (69,549)												
Total Variance	\$ 561,613	\$ 1,000,740	\$ 575,467	\$ 1,576,207												

Table 10. 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 10. Phase III Milestones and Deliverables (continued)

Title/Description	Due Date	Actual Completion Date
Year 2 – Quarter 2 (January–March 2009)		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	1/31/09	1/30/09
M21: Task 14 – Outline of White Paper on Nexus of CO ₂ CCS and Water, Part Subtask 14.2 – White Paper on Nexus of CCS and Water	2/28/09	2/27/09
D24: Task 2 – PCOR Partnership Region Sequestration General Poster	3/31/09	3/31/09
Year 2 – Quarter 3 (April–June 2009)		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	4/30/09	4/30/09
M23: Task 14 – Monthly WWG Conference Call Held	4/30/09	4/15/09
D2: Task 1 – First Target Area Completed	5/29/09	5/29/09
M23: Task 14 – Monthly WWG Conference Call Held	5/29/09	5/29/09
D16: Task 2 – Fort Nelson Test Site Fact Sheet	5/29/09	5/29/09
M24: Task 14 – WWG Annual Meeting Held	5/31/09	5/07/09
M23: Task 14 – Monthly WWG Conference Call Held	6/30/09	6/25/09
Year 2 – Quarter 4 (July–September 2009)		
M23: Task 14 – Monthly WWG Conference Call Held	Not applicable	Not required
D19: Task 2 – Fort Nelson Test Site PowerPoint Presentation	7/31/09	7/31/09
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	7/31/09	7/31/09
M22: Task 14 – Draft White Paper – Nexus of CCS and Water Available for Comments	8/17/09	8/18/09 (DOE) 8/21/09 (WWG)
M23: Task 14 – Monthly WWG Conference Call Held	8/31/09	8/25/09
D1: Task 1 – Review of Source Attributes	9/30/09	9/25/09
D3: Task 3 – 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 10. 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 10. 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 10. 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 10. 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 10. Phase III Milestones and Deliverables (continued)

Title/Description	Due Date	Actual Completion Date
Year 5 – Quarter 4 (July–September 2012)		
D13: Task 2 – Public Site Updates	7/31/12	7/31/12
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	7/31/12	7/31/12
D67: Task 9 – Fort Nelson Test Site – Simulation Report	7/31/12	7/31/12
M23: Task 14 – Monthly WWG Conference Call Held	7/31/12	7/24/12
D66: Task 9 – Bell Creek Test Site – Simulation Report	8/31/12	8/31/12
M23: Task 14 – Monthly WWG Conference Call Held	8/31/12	8/30/12
D1: Task 1 – Review of Source Attributes	9/30/12	9/28/12
D10: Task 1 – DPRS Update	9/30/12	9/28/12
M23: Task 14 – Monthly WWG Conference Call Held	9/30/12	9/27/12
Year 6 – Quarter 1 (October–December 2012)		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	10/31/12	10/31/12
M23: Task 14 – Monthly WWG Conference Call Held	10/31/12	10/25/12
M23: Task 14 – Monthly WWG Conference Call Held	11/30/12	11/28/12
D57: Task 12 – Project Assessment Annual Report	12/31/12	12/28/12
M23: Task 14 – Monthly WWG Conference Call Held	12/31/12	Waived by DOE
Year 6 – Quarter 2 (January–March 2013)		
D32: Task 4 – Bell Creek Test Site – Geomechanical Final Report	1/31/13	1/31/13
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	1/31/13	1/31/13
M23: Task 14 – Monthly WWG Conference Call Held	1/31/13	1/16/13
D14: Task 2 – General Phase III Fact Sheet (update)	2/28/13	2/28/13
M23: Task 14 – Monthly WWG Conference Call Held	2/28/13	2/28/13
D85: Task 6 – Report – Opportunities and Challenges Associated with CO ₂ Compression and Transportation During CCS Activities	3/31/13	Waived by DOE (journal article)
D89: Task 16 – Report – Geochemical Evaluation of the Basal Cambrian System	3/31/13	3/28/13
D99: Task 14 – Water/CCS Nexus-Related Fact Sheet	3/31/13	3/22/13
M23: Task 14 – Monthly WWG Conference Call Held	3/31/13	3/28/13
M36: Task 13 – Annual Advisory Board Meeting Scheduled	3/31/13	3/27/13

Continued . . .

Table 10. 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 9 – Bell Creek Test Site – CO ₂ Injection Initiated	6/30/13	May 2013 – sent 6/25/13
M37: Task 3 – IOGCC (Interstate Oil and Gas Compact Commission) Task Force Subgroup Meeting 2 Held	5/9/13	5/29/13
M42: Task 3 – Findings and Recommendations of the Operational and Postoperational Subgroups Presented to the Carbon Geologic Storage (CGS) Task Force	6/30/13	6/20/13 – sent 6/28/13
Year 6 – Quarter 4 (July–September 2013)		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	7/31/13	7/31/13
D33: Task 4 – Bell Creek Test Site – Geochemical Final Report	7/31/13	7/31/13
M12: Task 4 – Bell Creek Test Site Geochemical Work Completed	7/31/13	7/31/13
M23: Task 14 – Monthly WWG Conference Call Held	7/31/13	7/25/13
D64: Task 4 – Bell Creek Test Site – Site Characterization Report	8/31/13	8/29/13
D66: Task 9 – Bell Creek Test Site – Simulation Report	8/31/13	8/30/13
D81: Task 1 – Regional Carbon Sequestration Atlas (update)	8/31/13	5/1/13
M23: Task 14 – Monthly WWG Conference Call Held	8/31/13	Waived by DOE

Continued . . .

Table 10. 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 10. Phase III Milestones and Deliverables (continued)

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

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Table 10. Phase III Milestones and Deliverables (continued)

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

Continued . . .

Table 10. Phase III Milestones and Deliverables (continued)

Title/Description	Due Date	Actual Completion Date
Year 8 – Quarter 3 (April–June 2015)		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	4/30/15	4/29/15
M23: Task 14 – Monthly WWG Conference Call Held	4/30/15	4/28/15
D17: Task 2 – General Phase III Information PowerPoint Presentation (update)	5/31/15	6/1/15
M23: Task 14 – Monthly WWG Conference Call Held	5/30/15	5/28/15
D85: Task 6 – Report – Opportunities and Challenges Associated with CO ₂ Compression and Transportation During CCUS (carbon capture, utilization, and storage) Activities (update)	5/31/15	5/29/15
M23: Task 14 – Monthly WWG Conference Call Held	6/30/15	6/23/15
M49: Task 9 – Bell Creek Test Site – 1.5 million metric tons of CO ₂ Injected	6/30/15	6/30/15
Year 8 – Quarter 4 (July–September 2015)		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	7/31/15	7/31/15
M23: Task 14 – Monthly WWG Conference Call Held	7/31/15	Waived by DOE
M50: Task 9 – Bell Creek Test Site – 2 years of Near-Surface Assurance Monitoring Completed	7/31/15	7/21/15
D66: Task 9 – Bell Creek Test Site – Simulation Report	8/31/15	8/27/15 Exec. Sum.
M23: Task 14 – Monthly WWG Conference Call Held	8/31/15	Waived by DOE
M51: Task 9 – Bell Creek Test Site – Initial Analysis for First Large-Scale Repeat Pulsed-Neutron Logging Campaign Post-Significant CO ₂ Injection Completed	8/31/15	8/31/15
D1: Task 1 – Review of Source Attributes (update)	9/30/15	9/23/15
D8: Task 3 – Permitting Review – Update 2	9/30/15	9/30/15
D49: Task 8 – Bell Creek Test Site – Transportation and Injection Operations Report	7/31/15	9/29/15
M23: Task 14 – Monthly WWG Conference Call Held	9/30/15	9/30/15
Year 9 – Quarter 1 (October–December 2015)		
D59/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	10/31/15	10/31/15
M23: Task 14 – Monthly WWG Conference Call Held	10/31/15	10/29/15
M23: Task 14 – Monthly WWG Conference Call Held	11/30/15	Waived by DOE
D57: Task 12 – Project Annual Assessment Report	12/31/15	12/31/15
M24: Task 14 – WWG Annual Meeting Held	12/31/15	8/20/15
M53: Task 9 – Expanded Baseline and Time-Lapse 3-D Surface Seismic Survey Completed	12/31/15	12/17/15

Continued . . .

Table 10. Phase III Milestones and Deliverables (continued)

Title/Description	Due Date	Actual Completion Date
Year 9 – Quarter 2 (January–March 2016)		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	1/31/16	1/31/16
M23: Task 14 – Monthly WWG Conference Call Held	1/31/16	1/27/16
M54: Task 9 – Initial Processing and Analysis of Historic InSAR Data Completed	1/31/16	1/26/16
D14: Task 2 – General Phase III Fact Sheet (update)	2/29/16	2/26/16
D93: Task 1 – Geological Modeling and Simulation Report for the Aquistore Project (Update 2)	2/29/16	2/29/16
M23: Task 14 – Monthly WWG Conference Call Held	2/29/16	Waived by DOE
D11: Task 2 – Outreach Plan (update)	3/31/16	3/28/16
D45: Task 6 – Bell Creek Test Site – Infrastructure Development Report	3/31/16	3/31/16
M23: Task 14 – Monthly WWG Conference Call Held	3/31/16	Waived by DOE
M36: Task 13 – Annual Advisory Board Meeting Scheduled	3/31/16	3/31/16
M56: Task 9 – Life Cycle Analysis for Primary and Secondary Recovery Oil Completed	3/31/16	3/31/16
M58: Task 9 – Bell Creek Test Site – Completion of 2.75 million metric tons of CO ₂ Stored	3/31/16	3/22/16
Year 9 – Quarter 3 (April–June 2016)		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	4/30/16	4/29/16
D17: Task 2 – General Phase III Information PowerPoint Presentation (update)	5/31/16	5/31/16
D101: Task 14 – WWG Web Site Content Update 1	5/31/16	5/31/16
M57: Task 9 – Life Cycle Analysis for EOR at the Bell Creek Field Completed	5/31/16	5/26/16
M23: Task 14 – WWG Conference Call Held	6/30/16	4/27/16
Year 9 – Quarter 4 (July–September 2016)		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	7/31/16	7/29/16
D13: Task 2 – Public Site Updates	7/31/16	7/21/16
D16: Task 2 – Fort Nelson Test Site Fact Sheet (update)	8/31/16	8/29/16
D66: Task 9 – Bell Creek Test Site – Simulation Report (update)	8/31/16	8/31/16
D102: Task 13 – Best Practices Manual – Adaptive Management Approach	8/31/16	8/31/16
M59: Task 9 – Completed the PCOR Partnership Adaptive Management Approach Best Practices Manual	8/31/16	8/31/16

Continued . . .

Table 10. Phase III Milestones and Deliverables (continued)

Title/Description	Due Date	Actual Completion Date
Year 9 – Quarter 4 (July–September 2016) (continued)		
D1: Task 1 – Review of Source Attributes (update)	9/30/16	9/29/16
D8: Task 3 – Permitting Review – Update 3	9/30/16	9/29/16
D55: Task 11 – Bell Creek Test Site – Cost-Effective Long-Term Monitoring Strategies Report	9/30/16	9/30/16
M23: Task 14 – WWG Conference Call Held	9/30/16	9/28/16
Year 10 – Quarter 1 (October–December 2016)		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	10/31/16	10/27/16
D21: Task 2 – Bell Creek Test Site 30-minute Documentary	10/31/16	10/31/16
D105: Task 9 – Comparison of Non-EOR and EOR Life Cycle Assessments	10/31/16	10/31/16
D15: Task 2 – Bell Creek Test Site Fact Sheet (update)	11/30/16	11/30/16
M52: Task 9 – Initial Analysis of Extended Pulsed-Neutron Logging Campaign Data Completed	11/30/16	11/29/16
D57: Task 12 – Project Assessment Annual Report	12/31/16	12/30/16
D81: Task 1 – Regional Carbon Sequestration Atlas (update)	12/31/16	12/30/16
D106: Task 14 – Special Issue of IJGGC – Nexus of Water and Carbon Capture and Storage	12/31/16	12/29/16
M23: Task 14 – WWG Conference Call Held	12/30/16	11/16/16
M24: Task 14 – WWG Annual Meeting Held	12/31/16	8/18/16
M36: Task 13 – Annual Advisory Board Meeting Scheduled	12/31/16	12/28/16
Year 10 – Quarter 2 (January–March 2017)		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	1/31/17	1/31/17
D22: Task 2 – Energy from Coal 60-minute Documentary	1/31/17	1/31/17
D76: Task 3 – Regional Regulatory Perspective	1/31/17	1/31/17
D35: Task 4 – Bell Creek Test Site – Best Practices Manual – Site Characterization	3/31/17	3/31/17
M23: Task 14 – WWG Conference Call Held	3/31/17	3/30/17
M60: Task 1 – Data Submitted to EDX	3/31/17	3/7/17
M63: Task 9 – Initial Analysis of Processed InSAR Data Completed	3/31/17	3/31/17

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Table 10. Phase III Milestones and Deliverables (continued)

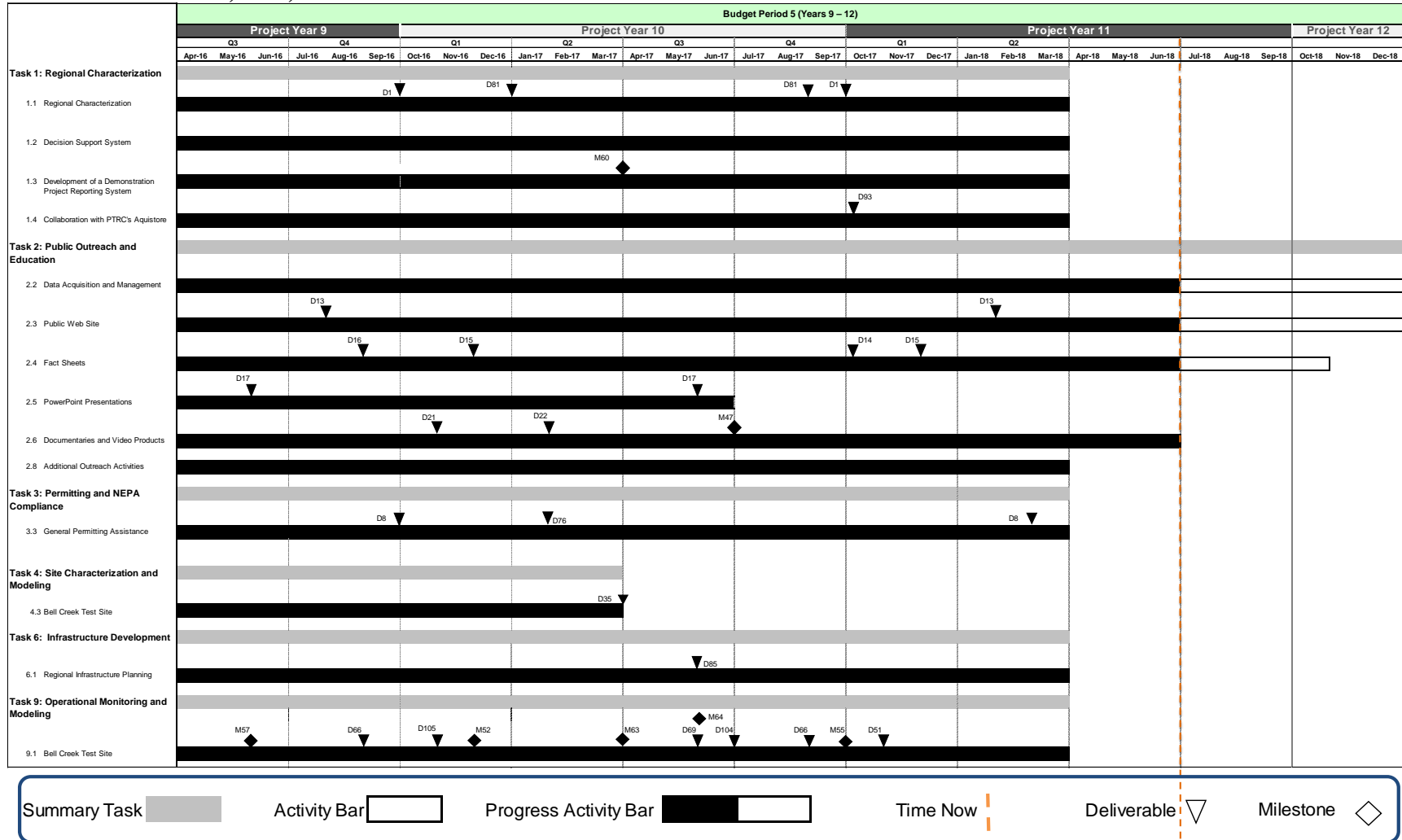
Title/Description	Due Date	Actual Completion Date
Year 10 – Quarter 3 (April–June 2017)		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	4/30/17	4/27/17
D17: Task 2 – General Phase III Information PowerPoint Presentation (update)	5/31/17	5/31/17
D69: Task 9 – Best Practices Manual – Simulation Report	5/31/17	5/31/17
D85: Task 6 – Report – Opportunities and Challenges Associated with CO ₂ Compression and Transportation During CCUS Activities	5/31/17	5/31/17
D101: Task 14 – WWG Web Site Content Update 1	5/31/17	5/23/17
D104: Task 9 – Analysis of Expanded Seismic Campaign	6/30/17	6/30/17
M64: Task 9 – Initial Analysis of Expanded Seismic Campaign Data Completed	6/30/17	6/27/17
M23: Task 14 – WWG Conference Call Held	6/30/17	6/28/17
M47: Task 2 – Bell Creek Test Site 30-minute Documentary Broadcast	6/30/17	6/19/17
Year 10 – Quarter 4 (July–September 2017)		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	7/31/17	7/27/17
D66: Task 9 – Bell Creek Test Site – Simulation Report (Update 6)	8/31/17	8/30/17
D81: Task 1 – PCOR Partnership Atlas (update)	8/31/17	8/31/17
D103: Task 13 – Best Practices Manual – Programmatic Risk Management	8/31/17	8/29/17
D1: Task 1 – Review of Source Attributes (update)	9/30/17	9/27/17
M23: Task 14 – WWG Conference Call Held	9/30/17	8/2/17
M55: Task 9 – Investigation of Crude Oil Compositional Changes during CO ₂ EOR Completed	9/30/17	9/25/17
M62: Task 14 – Research Related to Water and CCS Nexus Completed	9/30/17	9/25/17
Year 11 – Quarter 1 (October–December 2017)		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	10/31/17	10/31/17
D14: Task 2 – General Phase III Fact Sheet (update)	10/31/17	10/7/17
D51: Task 9 – Best Practices Manual – Monitoring for CO ₂ Storage and CO ₂ EOR	10/31/17	10/31/17
D93: Task 1 – Geological Modeling and Simulation Report for the Aquistore Project (Update 3)	10/31/17	10/7/17
D15: Task 2 – Bell Creek Test Site Fact Sheet (update)	11/30/17	10/7/17

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Table 10. Phase III Milestones and Deliverables (continued)

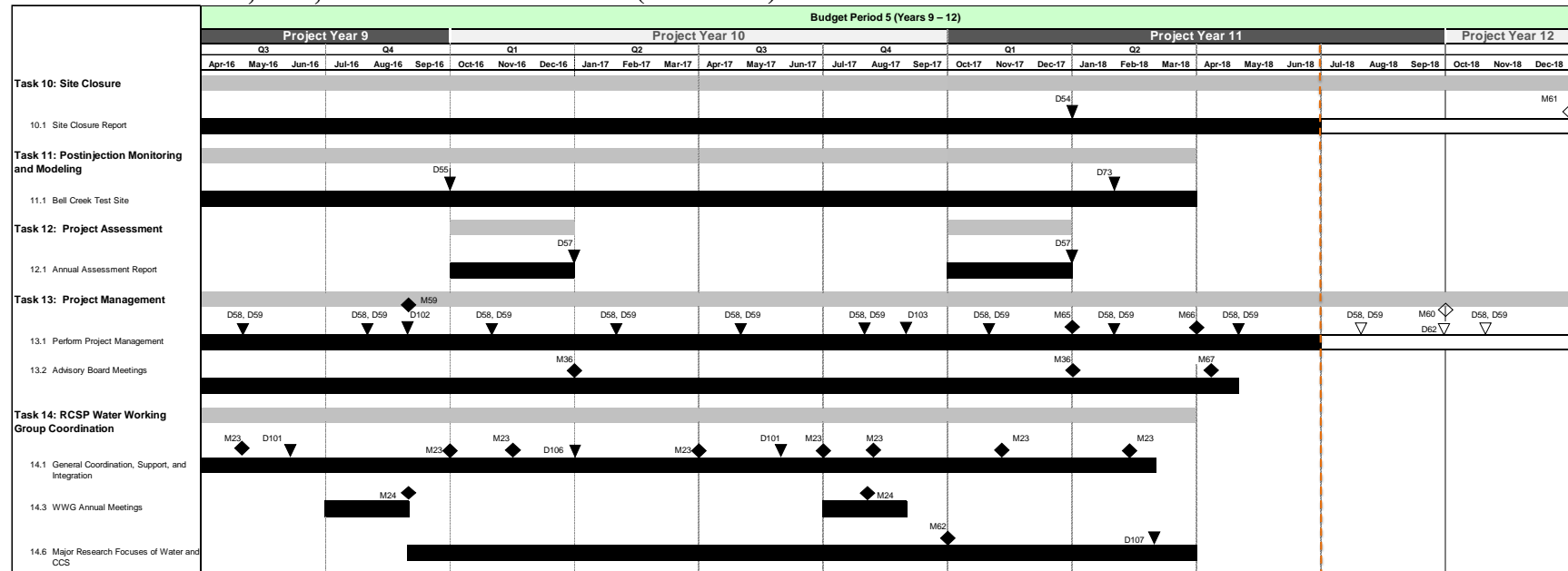
Title/Description	Due Date	Actual Completion Date
Year 11 – Quarter 1 (October–December 2017) (continued)		
D54: Task 10 – Report – Site Closure Procedures	12/31/17	12/28/17
D57: Task 12 – Project Assessment Annual Report	12/31/17	12/29/17
M23: Task 14 – WWG Conference Call Held	12/31/17	11/9/17
M24: Task 14 – WWG Annual Meeting Held	12/31/17	8/2/17
M36: Task 13 – Annual Advisory Board Meeting Scheduled	12/31/17	12/28/17
M65: Task 13 – PCOR Partnership Annual Membership Meeting and Workshop Held	12/31/17	12/29/17
Year 11 – Quarter 2 (January–March 2018)		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	1/31/18	1/31/18
D13: Task 2 – Public Site Updates	1/31/18	1/29/18
D73: Task 11 – Bell Creek Test Site –Monitoring and Modeling Fate of CO ₂ Progress Report	1/31/18	1/31/18
D8: Task 3 – Permitting Review – Update 4	2/28/18	2/23/18
D107: Task 14 – Journal Article or Topical Report – Major Research Focuses for Water and CCS	2/28/18	2/28/18
M23: Task 14 – Monthly WWG Conference Call Held	3/31/18	2/6/18
M66: Task 13 – Submission of Draft Papers on Associated Storage to Special Issue of <i>International Journal of Greenhouse Gas Control (IJGGC)</i>	3/31/18	3/29/18
Year 11 – Quarter 3 (April–June 2018)		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	4/30/18	4/30/18
M67: Task 13 – Annual PCOR Partnership Technical Advisory Board Meeting Held	6/30/18	4/9/18
Year 11 – Quarter 4 (July–September 2018)		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	7/31/18	
M60: Task 13 – Data Submitted to EDX	9/30/18	
D62: Task 13 – Final Report	9/30/18	
Year 12 – Quarter 1 (October–December 2018)		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	10/31/18	
M61: Task 10 – Site Closure for Bell Creek Test Completed	12/31/18	

Table 11. Phase III, BP5, Years 9–12 Gantt Chart



Continued . . .

Table 11. Phase III, BP5, Years 9–12 Gantt Chart (continued)



Summary Task

Activity Bar

Progress Activity Bar

Time Now

Deliverable ▾

Milestone ◆

Key for Deliverables (D) ▾			Key for Milestones (M) ◆		
D1	Review of Source Attributes	D62	Final Report	M23	WWG Conference Call Held
D8	Permitting Review	D66	BC Test Site – Simulation Report	M24	WWG Annual Meeting Held
D13	Public Site Updates	D69	BC Test Site – Best Practices Manual – Simulation	M36	Annual Advisory Board Meeting Scheduled
D14	General Phase III Fact Sheet	D73	Report – Monitoring and Modeling Fate of Stored CO ₂	M47	BC Test Site 30-minute Video Broadcast
D15	BC Test Site Fact Sheet	D76	Regional Regulatory Perspective	M52	BC Test Site – Initial Analysis of Extended Pulsed-Neutron Logging Campaign Data Completed
D16	Fort Nelson Test Site Fact Sheet	D81	Regional Carbon Sequestration Atlas	M55	Investigation of Crude Oil Compositional Changes During CO ₂ EOR Completed
D17	General Phase III Information PowerPoint Presentation	D85	Report – Opportunities and Challenges Associated with CO ₂ Compression	M57	Life Cycle Analysis for EOR Completed
D21	BC Test Site 30-minute Documentary	D93	Report – Geological Modeling and Simulation for the Aqstore Project	M59	Adaptive Management Approach Best Practices Manual Completed
D22	Energy from Coal 60-minute Documentary	D101	WWG Web Site Content Update	M60	Data Submitted to EDX
D35	BC Test Site – Best Practices Manual – Site Characterization	D102	Best Practices Manual – Adaptive Management Approach	M61	Site Closure for Bell Creek Test Completed
D51	BC Test Site – Best Practices Manual – Monitoring for CO ₂ Storage and CO ₂ EOR	D103	Best Practices Manual – Programmatic Risk Management	M62	Research Related to Water and CCS Nexus Completed
D54	Report – Site Closure Procedures	D104	BC Test Site – Analysis of Expanded Seismic Campaign	M63	Initial Analysis of Processed InSAR Data Completed
D55	BC Test Site – Cost-Effective Long-Term Monitoring Strategies Report	D105	Comparison of Non-EOR and EOR Life Cycle Assessment	M64	Initial Analysis of Expanded Seismic Campaign Data Completed
D57	Project Assessment Annual Report	D106	Special Issue of IJGGC – Nexus of Water and Carbon Capture and Storage	M65	2017 PCOR Partnership Annual Meeting and Workshop Held
D58	Quarterly Progress Report	D107	Journal Article or Topical Report – Major Research Focuses of Water and CCS	M66	Submission of Draft Papers on Associated Storage to Special Issue of IJGGC
D59	Milestone Quarterly Report			M67	Annual PCOR Partnership Advisory Board Meeting Held

December-17

PHASE III PRODUCTS OR TECHNOLOGY TRANSFER ACTIVITIES

During the reporting period, 11 abstracts were submitted and accepted (three oral, five poster, and three withdrawn), and five oral presentations were given. In addition, a quarterly progress report, one milestone, and two value-added products were completed (one approved). Two deliverables from a previous quarter also received approval. For more detail, see the Meetings/Travel section.

Abstracts

Accepted for Presentation

- Barajas-Olalade, C., Burnison, S.A., Hamling, J.A., and Gorecki, C.D., 2018, Passive microseismic monitoring of CO₂ EOR and associated storage using a downhole array in a noisy subsurface environment [abs.]: 14th International Conference on Greenhouse Gas Control Technologies (GHGT-14), Melbourne, Australia, October 21–25, 2018.
- Dalkhaa, C., Pekot, L.J., Oster, B.S., Bosshart, N.W., Jiang, T., Salako, O., Sorensen, J.A., Wildgust, N., Nickel, E., and Gorecki, C.D., 2018, An improved numerical modeling and simulation study of the Aquistore CO₂ storage project [abs.]: 14th International Conference on Greenhouse Gas Control Technologies (GHGT-14), Melbourne, Australia, October 21–25, 2018.
- Gorecki, C.D., Ayash, S.C., Peck, W.D., Wildgust, N., Hamling, J.A., Sorensen, J.A., Pekot, L.J., Daly, D.J., Klapperich, R.J., Jensen, M.D., Steadman, E.N., and Harju, J.A., 2018, Successes and lessons learned from 15 years of the PCOR Partnership [abs.]: 14th International Conference on Greenhouse Gas Control Technologies (GHGT-14), Melbourne, Australia, October 21–25, 2018.

Accepted for Poster

- Daly, D.J., Crocker, C.R., Crossland, J.L., and Gorecki, C.D., 2018, PCOR Partnership outreach—an evolving regional capability based on RCSP outreach best practices [abs.]: 14th International Conference on Greenhouse Gas Control Technologies (GHGT-14), Melbourne, Australia, October 21–25, 2018.
- Jin, L., Pekot, L.J., Salako, O., Ge, J., Peterson, K.J., Burnison, S.A., Bosshart, N.W., Jiang, T., Hamling, J.A., Wildgust, N., and Gorecki, C.D., 2018, Determining the long-term fate of CO₂ storage associated with an enhanced oil recovery project [abs.]: 14th International Conference on Greenhouse Gas Control Technologies (GHGT-14), Melbourne, Australia, October 21–25, 2018.
- Klapperich, R.J., Nakles, D.V., Steadman, E.N., Gorecki, C.D., Locke, R., III, McPherson, B., McNemar, A., and McLing, T., 2018, Nexus of water and CCS—findings of the Water Working Group (WWG) of the Regional Carbon Sequestration Partnerships [abs.]: 14th International Conference on Greenhouse Gas Control Technologies (GHGT-14), Melbourne, Australia, October 21–25, 2018.
- Reed, S.Y.F., Burnison, S.A., Bosshart, N.W., Hamling, J.A., Ge, J., and Gorecki, C.D., 2017, Viability of InSAR as a monitoring tool in challenging terrain—Bell Creek, Montana [abs.]:

14th International Conference on Greenhouse Gas Control Technologies (GHGT-14), Melbourne, Australia, October 21–25, 2018.

Smith, S.A., Beddoe, C.J., Heebink, L.V., Kurz, B.A., and Hamling, J.A., 2018, Evaluation of measured differences in liquid versus gas permeability and identification of potential causes [abs.]: 14th International Conference on Greenhouse Gas Control Technologies (GHGT-14), Melbourne, Australia, October 21–25, 2018.

Withdrawn

Hamling, J.A., Nakles, D.V., Bosshart, N.W., Botnen, B.W., and Leroux, K.M., 2017, Applications and benefits of observation wells for commercial CO₂ storage [abs.]: 14th International Conference on Greenhouse Gas Control Technologies (GHGT-14), Melbourne, Australia, October 21–25, 2018.

Pekot, L.J., Hamling, J.A., Klapperich, R.J., and Wildgust, N., 2018, Applied modeling and monitoring of the fate of injected CO₂ for the management of geologic CO₂ storage [abs.]: 14th International Conference on Greenhouse Gas Control Technologies (GHGT-14), Melbourne, Australia, October 21–25, 2018.

Wildgust, N., Hamling, J.A., and Gorecki, C.D., 2017, Clarifying the relationship between enhanced oil recovery and the associated storage of injected CO₂ [abs.]: 14th International Conference on Greenhouse Gas Control Technologies (GHGT-14), Melbourne, Australia, October 21–25, 2018.

Presentations

Ayash, S.C., and Gorecki, C.D., 2018, The Plains CO₂ Reduction (PCOR) Partnership—fostering the deployment of CCUS technologies: Presented at the United States Energy Association Public Briefing, Washington, D.C., April 26, 2018.

Ayash, S.C., Gorecki, C.D., and Steadman, E.N., 2018, PCOR Partnership Technical Advisory Board Meeting 2018. Presented at the 2018 PCOR Partnership Technical Advisory Board Meeting, Miami, Florida, April 10–11, 2018.

Gorecki, C.D., and Ayash, S.C., 2018, Enhanced oil recovery opportunities for Montana: Presented at the Montana Energy Summit, Billings, Montana, May 30, 2018.

Gorecki, C.D., and Ayash, S.C., 2018, Quantification of associated CO₂ storage through coupled reservoir simulation and surveillance during CO₂ EOR: Presented at the Computer Modelling Group Technical Symposium 2018, Calgary, Alberta, June 4–6, 2018.

Sorensen, J.A., Smith, S.A., Harju, J.A., Steadman, E.N., and Gorecki, C.D., 2018, Results from CSLF-recognized projects—Fort Nelson project and Zama project: Presented at the Carbon Sequestration Leadership Forum CSLF Technical Group Meeting, Venice, Italy, April 23, 2018.

Deliverables/Milestones

Draft Submitted

Ayash, S.C., and Gorecki, C.D., 2018, PCOR Partnership technical advisory board meeting held: Plains CO₂ Reduction (PCOR) Partnership Phase III draft Task 13 Milestone M67 for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592, Grand Forks, North Dakota, Energy & Environmental Research Center, June.

Approved

Gorecki, C.D., Peck, W.D., Ayash, S.C., Hamling, J.A., Steadman, E.N., Harju, J.A., Braunberger, J.R., Pu, H., Bailey, T.P., Bremer, J.M., Gao, P., and Liu, G., 2013, Bell Creek test site – simulation report: Plains CO₂ Reduction (PCOR) Partnership Phase III Task 9 Deliverable D66 Update 2 executive summary for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592, EERC Publication 2018-EERC-05-16, Grand Forks, North Dakota, Energy & Environmental Research Center, August.

Liu, G., Braunberger, J.R., Pu, H., Gao, P., Gorecki, C.D., Ge, J., Klenner, R.C.L., Bailey, T.P., Dotzenrod, N.W., Bosshart, N.W., Ayash, S.C., Hamling, J.A., Steadman, E.N., and Harju, J.A., 2014, Bell Creek test site – simulation report: Plains CO₂ Reduction (PCOR) Partnership Phase III Task 9 Deliverable D66 (Update 3) executive summary for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592, EERC Publication 2018-EERC-05-08, Grand Forks, North Dakota, Energy & Environmental Research Center, August.

Progress Reports

Monthlies

Gorecki, C.D., Steadman, E.N., Peck, W.D., Daly, D.J., Hamling, J.A., Jensen, M.D., Harju, J.A., Pekot, L.J., Heebink, L.V., Klapperich, R.J., and Ensrud, J.R., 2018, Plains CO₂ Reduction (PCOR) Partnership: Phase III monthly report (March 1–31, 2018) 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.

Gorecki, C.D., Steadman, E.N., Peck, W.D., Daly, D.J., Hamling, J.A., Jensen, M.D., Harju, J.A., Pekot, L.J., Heebink, L.V., Klapperich, R.J., and Ensrud, J.R., 2018, Plains CO₂ Reduction (PCOR) Partnership: Phase III monthly report (April 1–30, 2018) for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592, Grand Forks, North Dakota, Energy & Environmental Research Center, April.

Gorecki, C.D., Steadman, E.N., Peck, W.D., Daly, D.J., Hamling, J.A., Jensen, M.D., Harju, J.A., Pekot, L.J., Heebink, L.V., Klapperich, R.J., and Ensrud, J.R., 2018, Plains CO₂ Reduction (PCOR) Partnership: Phase III monthly report (May 1–31, 2018) for U.S.

Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592, Grand Forks, North Dakota, Energy & Environmental Research Center, June.

Quarterlies

Gorecki, C.D., Harju, J.A., Steadman, E.N., Romuld, L., Sorensen, J.A., Daly, D.J., Hamling, J.A., Jensen, M.D., Peck, W.D., Klapperich, R.J., Heebink, L.V., Pekot, L.J., Ensrud, J.R., and Votava, T.J., 2018, Plains CO₂ Reduction Partnership Phase III: Task 13 Deliverable D58/D59 quarterly technical progress report (January 1 – March 31, 2018) for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592 and North Dakota Industrial Commission Contract Nos. FY08-LX111-162 and G-015-030, Grand Forks, North Dakota, Energy & Environmental Research Center, April.

Value-Added Products

Draft Submitted

Jensen, M.D., and Gorecki, C.D., 2018, Status of CO₂ capture technology development and application: Draft value-added report 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.

Draft Submitted and Approved

Wildgust, N., Glazewski, K.A., Ayash, S.C., Peck, W.D., and Gorecki, C.D., 2018, PCOR Partnership 2017 annual membership meeting—workshop and outcomes: Plains CO₂ Reduction (PCOR) Partnership Phase III value-added report for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592, EERC Publication 2018-EERC-04-08, Grand Forks, North Dakota, Energy & Environmental Research Center, April.

MEETINGS/TRAVEL

Representatives from the PCOR Partnership incurred travel costs for their participation in the following seven meetings/conferences, two workshops, one field trip, and one project management site trip:

- April 4–6, 2018: traveled to Regina, Saskatchewan, Canada, to attend the Aquistore Modeling Workshop.
- April 4–6, 2018: traveled to Gillette, Wyoming, to download data from 05-06 OW and to train Denbury personnel.
- April 9–12, 2018: traveled to Miami, Florida, to host the PCOR Partnership TAB Meeting.

- April 20–25, 2018: traveled to Venice, Italy, to present at the CSLF Technical Group Meeting.
- April 25–26, 2018: traveled to Washington, D.C., to present at a public briefing at the U.S. Energy Association.
- May 5–13, 2018: traveled to Calgary, Alberta, to attend GeoConvention 2018.
- May 22–24, 2018: traveled to Bismarck, North Dakota, to attend the WBPC.
- May 29 – June 1, 2018: traveled to Billings, Montana, to present at the Montana Energy Summit.
- June 3–6, 2018: traveled to Calgary, Alberta, to attend and present at the CMG Technical Symposium.
- June 19–22, 2018: traveled to Watford City, North Dakota, to attend the field trip associated with the IEAGHG Combined Modelling and Risk Management Network Meeting held in Grand Forks, North Dakota.

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