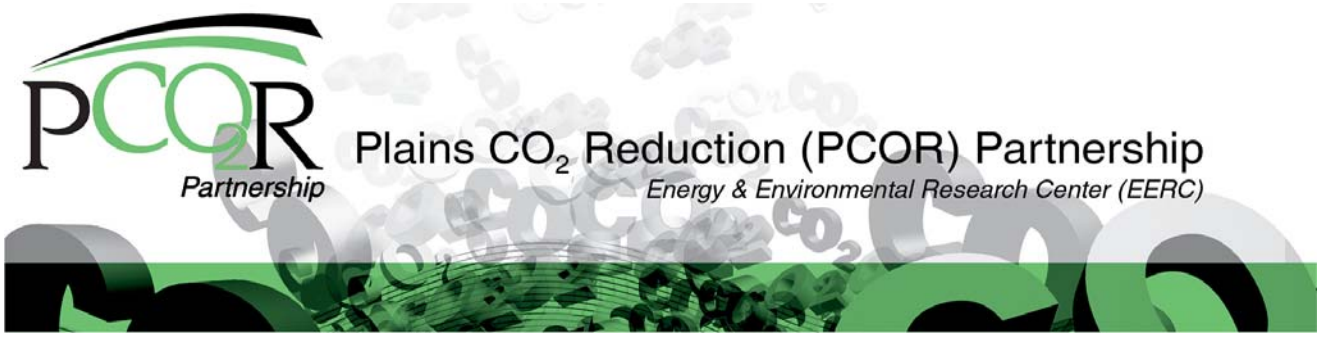

PLAINS CO_2 REDUCTION PARTNERSHIP PHASE III

Quarterly Technical Progress Report
Task 13 – Deliverable D58/D59

(for the period April 1 – June 30, 2014)

Prepared for:

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EXECUTIVE SUMMARY

The Plains CO_2 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.

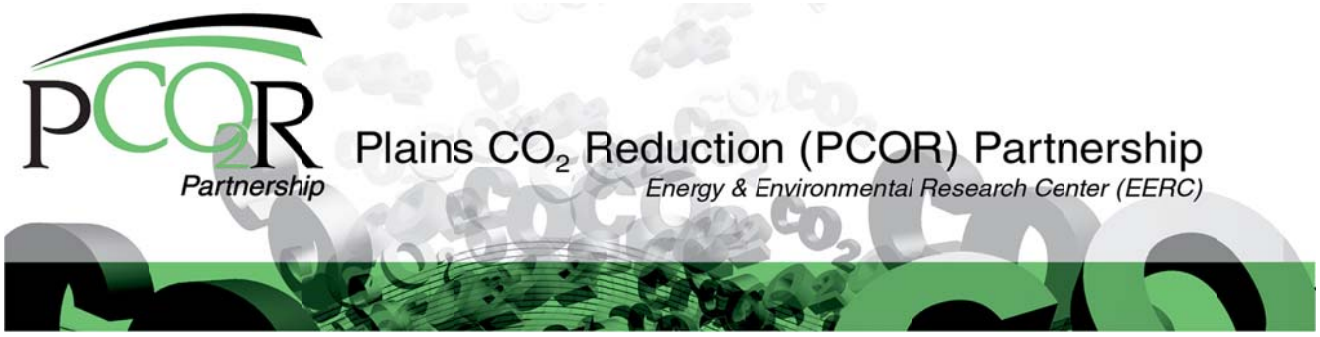
Phase III, the development phase, a 10-year effort (2007–2017), is an extension of the characterization (Phase I) and validation (Phase II) phases. The Phase III efforts of the PCOR Partnership include two large-volume demonstration tests—one in Canada and one in the United States—that focus on injecting carbon dioxide (CO_2) into deep geologic formations for CO_2 storage. Budget Period 4 (Years 3–8 of Phase III) began October 1, 2009.

This progress report presents an update of Phase III PCOR Partnership activities from April 1, 2014, through June 30, 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 – April 2014) over 740,000 metric tons of CO_2. Monthly operational-phase sampling events took place in April and June, but were canceled in May because of poor weather conditions. Planning is under way to collect and process additional 3-D vertical seismic profiling survey points. In addition, approval was received to perform additional repeat pulsed-neutron logs.

Filming has begun on a new 60-minute documentary tentatively entitled “Coal and the Modern Age” with Prairie Public Broadcasting. A 2-week trip to Great Britain in June netted 12 hours of raw footage, including interviews and trips to coal mines and railway museums. In the education arena, presentations were given in June at three teacher seminars and PCOR Partnership outreach materials were disseminated to the participants.

The scope of work for the well-drilling and completion task was completed in June 2014, resulting in a “Drilling and Completion Activity Report” that is currently undergoing DOE NETL review. Regional characterization and modeling and simulation efforts continued this reporting period. In addition, 18 presentations sharing the goals and efforts of the PCOR Partnership were given at 25 different meetings/conferences/workshops, and nine program deliverables, two milestones, and one value-added product were completed.



PLAINS CO_2 REDUCTION PARTNERSHIP PHASE III
Quarterly Technical Progress Report
April 1 – June 30, 2014

INTRODUCTION

The Plains CO_2 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 June 30, 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 River Energy	North Dakota Natural Resources Trust
UND EERC	Halliburton	North Dakota Petroleum Council
Abengoa Bioenergy New Technologies	Hess Corporation	North Dakota Pipeline Authority
Air Products and Chemicals, Inc.	Huntsman Corporation	Otter Tail Power Company
Alberta Department of Energy	Husky Energy Inc.	Outsource Petrophysics, Inc.
Alberta Department of Environment	Indian Land Tenure Foundation	Oxand Risk & Project Management Solutions
Alberta Innovates – Technology Futures	Interstate Oil and Gas Compact Commission	Peabody Energy
ALLETE	Iowa Department of Natural Resources	Petroleum Technology Research Centre
Ameren Corporation	Lignite Energy Council	Petroleum Technology Transfer Council
American Coalition for Clean Coal Electricity	Manitoba Geological Survey	Pinnacle, a Halliburton Service
American Lignite Energy	Marathon Oil Company	Prairie Public Broadcasting
Apache Canada Ltd.	MEG Energy Corporation	Pratt & Whitney Rocketdyne, Inc.
Aquistore	Melzer Consulting	Praxair, Inc.
Baker Hughes Incorporated	Minnesota Power	Ramgen Power Systems, Inc.
Basin Electric Power Cooperative	Minnkota Power Cooperative, Inc.	RPS Energy Canada Ltd.
BillyJack Consulting Inc.	Missouri Department of Natural Resources	Saskatchewan Ministry of Industry and Resources
Biorecro AB	Missouri River Energy Services	SaskPower
Blue Source, LLC	Montana–Dakota Utilities Co.	Schlumberger
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	Suncor Energy Inc.
Computer Modelling Group Ltd.	North American Coal Corporation	TAQA North, Ltd.
Continental Resources, Inc.	North Dakota Department of Commerce Division of Community Services	TGS Geological Products and Services
Dakota Gasification Company	North Dakota Department of Health	University of Alberta
Denbury Onshore LLC	North Dakota Geological Survey	University of Regina
Eagle Operating, Inc.	North Dakota Industrial Commission Department of Mineral Resources, Oil and Gas Division	WBI Energy, Inc.
Eastern Iowa Community College District	North Dakota Industrial Commission Lignite Research, Development and Marketing Program	Weatherford Advanced Geotechnology
Enbridge Inc.	North Dakota Industrial Commission Oil and Gas Research Council	Western Governors' Association
Encore Acquisition Company		Westmoreland Coal Company
Energy Resources Conservation Board/ Alberta Geological Survey		Wisconsin Department of Agriculture, Trade and Consumer Protection
Environment Canada		Wyoming Office of State Lands and Investments
Excelsior Energy Inc.		Xcel Energy
Great Northern Project Development, LP		

The overall mission of the Phase III program is to 1) gather characterization data to verify the ability of the target formations to store carbon dioxide (CO_2), 2) facilitate the development of the infrastructure required to transport CO_2 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 CO_2, 5) facilitate establishment of a technical framework by which carbon credits can be monetized for CO_2 stored in geologic formations, 6) continue collaboration with other RCSPs, and 7) provide outreach and education for CO_2 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 CO_2 injection volumes. A programmatic development phase (Phase III) goal is implementation of large-scale field testing involving at

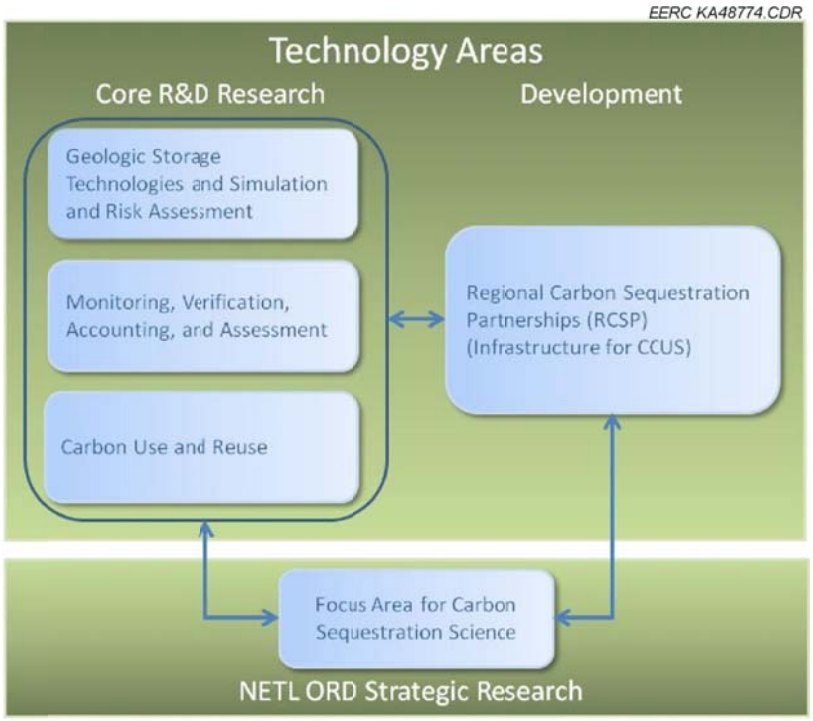


Figure 1. DOE Carbon Storage Program technology areas featuring regional partnerships (courtesy of DOE NETL; CCUS stands for carbon capture, utilization, and storage; ORD stands for Office of Research and Development).

least 1 million tons (Mt) of CO_2 a project. Each of the RCSP's large-volume injection tests is designed to demonstrate that the CO_2 storage sites have the potential to store regional CO_2 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 has concluded its work with Apache Canada Ltd. to further characterize the Zama Acid Gas Enhanced Oil Recovery (EOR), CO_2 Storage, and Monitoring Project in Alberta, Canada as well as its work on a multiyear, binational characterization effort of the basal Cambrian system (Figure 2).

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

The PCOR Partnership's objectives are as follows: 1) conduct a successful field demonstration to verify that the region's large number of oil fields have the potential to store significant quantities of CO_2 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 CO_2 storage. During Phase III, the PCOR Partnership will continue to refine storage resource estimates and evaluate other factors relevant to regional storage goals.

The PCOR Partnership plans to achieve its Phase III mission through a series of 16 tasks: 1) Regional Characterization; 2) Public Outreach and Education; 3) Permitting and National Environmental Policy Act (NEPA) Compliance; 4) Site Characterization and Modeling; 5) Well Drilling and Completion; 6) Infrastructure Development; 7) CO_2 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, CO_2 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:

- On April 4, 2014, submitted abstracts to the SEG–SPE–AAPG–SPWLA–EAGE (Society of Exploration Geophysicists–Society of Petroleum Engineers–American Association of Petroleum Geologists–Society of Petrophysicists and Well Log Analysts–European Association of Geoscientists & Engineers) Summer Research Workshop, as follows:
  - "Integrated Modeling and Simulation for Geologic CO_2 Storage in the Basal Saline System of Central North America"
  - "Integrated Modeling and Simulation for CO_2 EOR (enhanced oil recovery) and CO_2 Storage in the Zama Pinnacle Reefs of Alberta Basin, Canada"
- Attended the Enhanced Oil Recovery Institute (EORI) Minnelusa Field Trip and Workshops held in Wyoming on June 1–5, 2014. The purpose of the field trip and the lectures was to acquaint participants with the sedimentology of the Middle and Upper Minnelusa Formation, using outcrops in the Black Hills of Wyoming (Figure 3) and South Dakota. The trip provided a good opportunity to examine in outcrop many of the sedimentary facies that strongly control oil production in the nearby Minnelusa oil play.

Figure 3. The Middle and Upper Minnelusa Formation outcrop at Ranch A in Wyoming (photo courtesy of EORI).

- Continued work on the third target area (Deliverable [D]7, due September 2014), the Minnelusa Formation, as an example of using the saline storage methodology in Wyoming.
- Provided comments on April 10, 2014, to DOE regarding "Progress on the DOE–NETL (National Energy Technology Laboratory) Methodology for Assessing CO_2 Storage Potential in Organic-Rich Shale Formations."
- Met in-house on April 4, 2014, to discuss the DOE "Atlas V" and the path forward.
- Participated in a conference call on April 9, 2014, with DOE and regional partnership personnel to discuss the upcoming Atlas V.
- Answered questions about the PCOR Partnership sources database for the person at NATCARB (National Carbon Sequestration Database and Geographic Information System) whose job it is to incorporate all of the RCSP data into a single data set.
- Began work on papers and posters on basal Cambrian wellbore integrity and CO_2 storage capacity for the 12th International Conference on Greenhouse Gas Control Technologies (GHGT-12) to be held in October in Austin, Texas.
- Prepared an overview of the basal Cambrian system characterization work for inclusion on the public Web site (www.undeerc.org/pcor).
- On May 12, 2014, provided information to a representative of Total with regard to permeability heterogeneity in the basal Cambrian.
- Continued activities to update the content and function of the partners-only **Decision Support System (DSS)**, including the following:
  - Began review of CO_2 source information for the annual update.
  - Updated the oilfield outlines, and included pop-up information that includes the pool data.

  - Updated the North Dakota and Montana PETRA databases with the latest well information.
  - Updated South Dakota well information.
  - Continued gathering data for Canadian oil fields, reservoirs, and wells.
  - Updated field and reservoir data for Alberta.
  - Discussed a plan to upgrade the DSS using Flex 3.6 as well as improvements to the interactive mapping feature, enhanced search capability, improved data exportation, and improved data response time.
- Continued work on several additional **value-added reports**, including the following:
  - Continued information gathering for a regional characterization report summarizing all past and present efforts.
  - Continued work on the report summarizing methods of original oil in place and CO_2 storage calculations.
- With regard to the **Aquistore** Project static modeling and dynamic predictive simulations effort:
  - Discussed project progress with PTRC personnel at the 13th Annual Carbon Capture, Utilization & Storage (CCUS-13) Conference held April 28 – May 1, 2014, in Pittsburgh, Pennsylvania.
  - Received Aquistore's Eclipse simulation model from PTRC, began investigating the simulation results it received from a third-party, and compared them to the model we created.
  - Participated in PTRC SERC (Science and Engineering Research Committee) conference calls on May 8 and June 5, 2014, to discuss the simulation model.
  - Modeling work conducted both by the EERC and a third-party is under review. A PowerPoint presentation documenting comparison between the two models was prepared for discussion during a planned modeling meeting on June 24, 2014, in Edmonton, Alberta, Canada.
  - Reviewed the modeling comparison information that will be discussed during a Webinar on July 17, 2014 (the June 24 meeting in Edmonton was canceled).
- With regard to the **Aquistore** Project core work (12 samples):
  - Initiated lab work in June 2014.
  - Samples were cut and delivered to the EERC NMARL (Natural Materials Analytical Research Laboratory) for x-ray diffraction (XRD) and x-ray fluorescence (XRF) work.
  - Sent core to Wagner Petrophysics for thin-section creation.
  - Began porosity/permeability testing.
  - Began capillary entry pressure testing.

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

- With regard to the Aquistore Project, relative permeability testing on the core is delayed awaiting arrival of necessary equipment parts.

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 19 conferences/meetings and six workshops. Specifically, the PCOR Partnership outreach activities included 16 oral presentations, two poster presentations, and one exhibit booth. The following quantities of PCOR Partnership outreach materials were distributed:
  - PCOR Partnership documentary entitled "Nature in the Balance: CO_2 Sequestration" – 51
  - PCOR Partnership documentary entitled "Reducing Our Carbon Footprint: The Role of Carbon Markets" – 51
  - PCOR Partnership documentary entitled "Out of the Air – Into the Soil" – 67
  - PCOR Partnership documentary entitled "Managing Carbon Dioxide: The Geologic Solution" – 201
  - PCOR Partnership documentary entitled "Global Energy and Carbon: Tracking Our Footprint" – 201
  - PCOR Partnership video short entitled "Installing a Casing-Conveyed Permanent Downhole Monitoring System" – 1
  - "Plains CO_2 Reduction Partnership Atlas, 4th Edition, Revised" – 203
- Uploaded 55 video items (clips and full-length documentaries) to the EERC's YouTube channel (www.youtube.com/user/undeerc/videos?sort=dd&shelf_id=1&view=0).
- On May 30, submitted D17, General Outreach Powerpoint Update.
- Continued an in-house review of outreach products using a standard, industry-accepted framework.
- Provided input to Natural Resources Canada regarding clean electricity generation activities and CCS.
- Began reviewing an RCSP Outreach Working Group (OWG) draft survey about Web-based outreach.
- Continued activities associated with education and teacher education seminars, including the following:
  - On April 28 – May 1, attended CCUS-13 and participated in "Discussion on CCS Education" held April 29, 2014, in Pittsburgh, Pennsylvania.
  - On May 8, participated in a conference call to develop an education activity related to SaskPower's Boundary Dam CCS facility.
  - On May 9, participated in a conference call regarding development of an expert network for CCS educators (in follow-up to meetings at CCUS-13).
  - Presented at the North Dakota–Minnesota Geographic Alliance Education Seminar on June 18, 2014, in Moorhead, Minnesota.
  - Provided a video clip citation and permission to include a clip from the terrestrial documentary to an educator in California to use in his new science curriculum.
  - Submitted two abstracts for presentation at the International Workshop on Public Education, Training, and Community Outreach for Carbon Capture, Utilization, and Storage, scheduled for July 30–31, 2014, in Decatur, Illinois.
- Participated in a number of conference calls this month, including the following:

  - Reviewed materials and participated in a May 20, 2014, Aquistore Outreach Advisory Group conference call.
  - On June 5, 2014, participated in a conference call regarding the SaskPower Carbon Capture Facility Open House scheduled for September 2014.
  - On June 19, 2014, participated in the RCSP OWG conference call. Also completed an OWG questionnaire about the PCOR Partnership public Web site in preparation for a paper and presentation for GHGT-12 scheduled for October 5–9, 2014, in Austin, Texas.
  - On June 30, 2014, participated in an Aquistore Outreach Advisory Group conference call.
- Continued efforts to update the **public Web site** (www.undeerc.org/pcor), including the following:
  - Continued work on the next update report (D13, due July 2014), including a standard operating procedure for tracking Web site activity using Google Analytics.
  - Worked on updating the carbon cycle Web page on the public Web site.
  - Repaired broken links as identified on an ongoing basis.
  - Resolved Google Analytics page consolidation issues for improved report generation.
- Continued collaborative efforts with **Prairie Public Broadcasting (PPB)**, including the following:
  - Continued editing the value-added four-part education presentation video in conjunction with PPB.
  - Provided information about the tentatively titled "Coal and the Modern Age" documentary to World Resources Institute for use in discussions regarding potential filming locations in China.
  - Prepared invitation letters and scheduled interviews for the upcoming trip to Great Britain for filming the "Coal and the Modern Age" documentary.
  - June 3–14, 2014, traveled with a PPB film crew to Great Britain for "Coal and the Modern Age" documentary filming, and captured 12 hours of footage; the schedule included visits to the National Mining Museum – Scotland; National Mining Museum – England (Figure 4); National Railway Museum; Bit Pit Coal Mine; Forncett Industrial Steam Museum; Bressingham Steam and Gardens; and interviews with Dr. Stuart Haszeldine (University of Edinburgh), John Gale (IEA Greenhouse Gas R&D Programme [IEAGHG]), and others.
  - Upon request from the Japan Broadcasting Corporation (via Denbury), checked on the available pipeline raw-format footage that PPB shot.
- Continued efforts to prepare and update **project-related fact sheets**, including the following activities:
  - Completed the 4-page Lignite Field Validation Test site overview fact sheet.
  - Continued value-added updates/revisions to the other Phase II site fact sheets.
  - Continued incorporating a recent language change recommended by Denbury with regard to the Bell Creek project, i.e., replacing "incidental" CO_2 storage with "associated" CO_2 storage in fact sheets, posters, etc.
  - Updated the Bell Creek project and Phase III general fact sheets with revised language as approved by Denbury.

Figure 4. Documentary filming at the National Museum of Coal Mining in Wakefield, England, which included a trip 500 feet underground (June 6, 2014).

- During this reporting period, information regarding the **site visits** to the PCOR Partnership public Web site included the following:
  - There were 3169 visits to the public Web site (www.undeerc.org/pcor). Traffic increased by 48% over last quarter (2135 visits). 17% of these visits were initiated from a mobile device or tablet.
  - There were 2805 unique visitors to the public Web site, representing a 58% increase over last quarter (1773 visitors). In particular, 86% of these visitors (2733 visitors) were new to the Web site (visitors whose visit was marked as a first-time visit in this quarter).
  - Of the 3169 visits, 44% of the Web traffic was domestic and 56% 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 100 countries overall (Figure 5). Notably, the number of visits from India surpassed that of Canada for the second time since 2010 (when Google Analytics tracking was implemented).
  - There were 352 visits originating from within the PCOR Partnership region (Figure 6). Approximately 68% of the regional visits originated from the United States, and 32% came from Canada. Visits from within the PCOR Partnership region comprised 11% 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).

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

	Country	Visits*	PCOR Partnership State/Province	Visits*
1.	United States	1409		
			North Dakota	98
			Minnesota	64
			Wisconsin	30
			Montana	15
			Missouri	9
			Wyoming	7
			Nebraska	6
			Iowa	6
			South Dakota	4
2.	India	385		
3.	Canada	190		
			Alberta	58
			British Columbia	29
			Saskatchewan	16
			Manitoba	10
4.	United Kingdom	176		
5.	Australia	118		
6.	South Africa	100		
7.	Malaysia	61		
8.	Pakistan	60		
9.	Philippines	44		
10.	Netherlands	37		
	Other 90 countries	589		
	Total Visits	**3169**	**Total PCOR Partnership Visits**	**352**

*Arranged by the number of visits to the site.

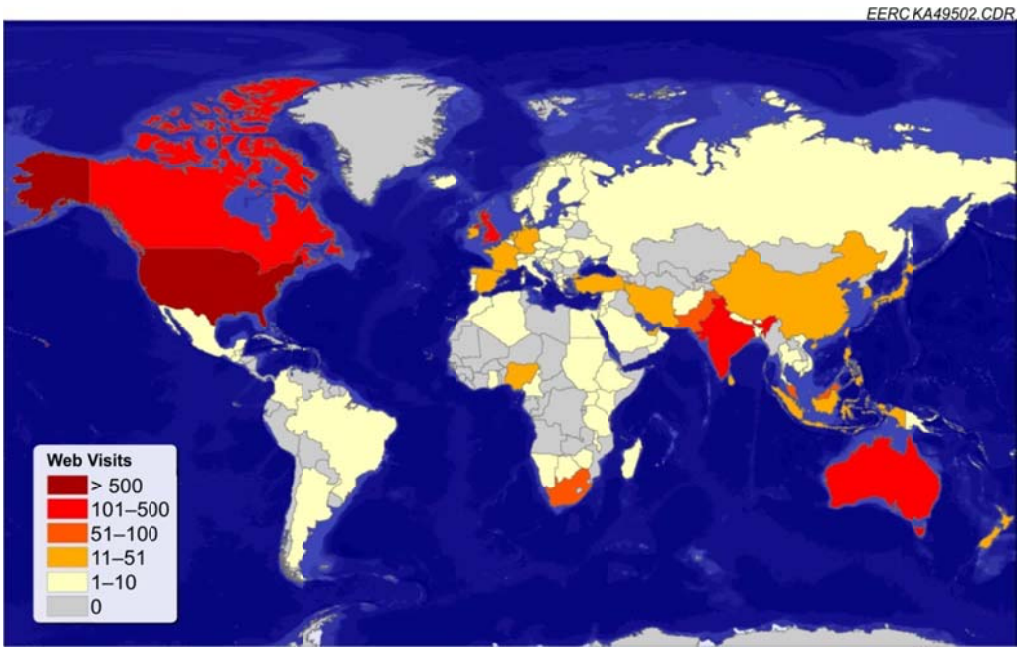


Figure 5. Map of PCOR Partnership Web site global traffic.

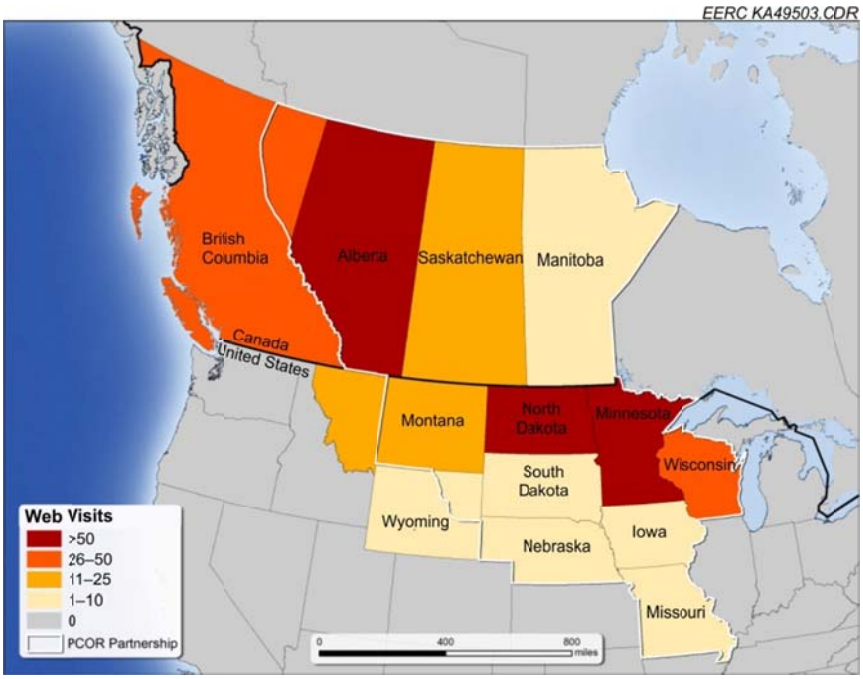


Figure 6. Map of PCOR Partnership Web site regional visits.

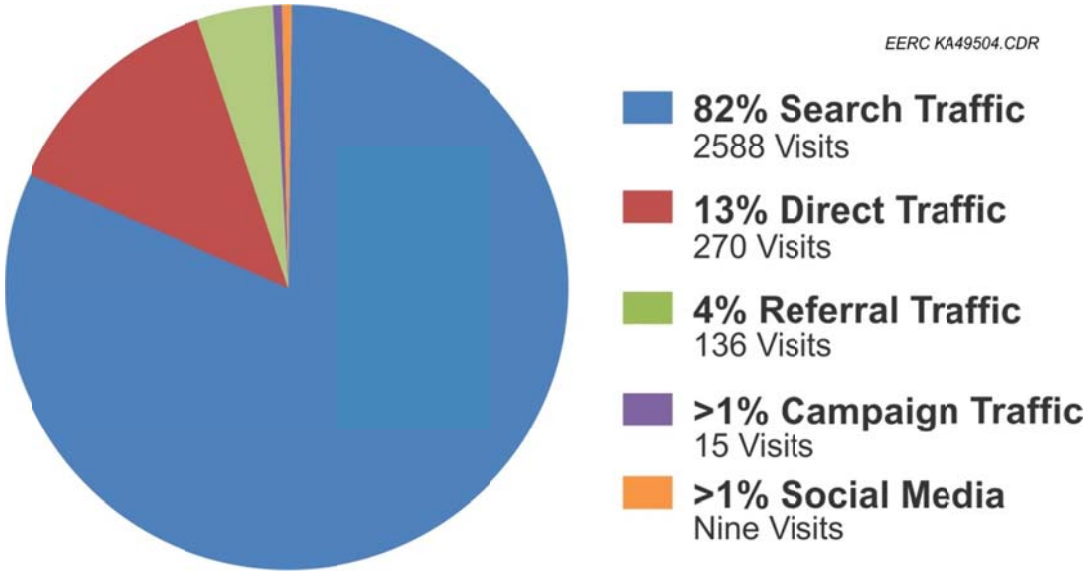


Figure 7. PCOR Partnership public Web site traffic sources.

- 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 82% of the traffic. Google Analytics provides the keywords visitors used. The top keywords used include "carbon sequestration," "what is CO_2?" and "what is carbon sequestration?"
  - Referral site traffic (4%) corresponds to the traffic directed to the PCOR Partnership Web page from other sites via links. The top two referring Web sites were from energy.gov and ndstudies.org.
  - Less than 1% of site traffic resulted from teacher campaigns and social interactions, such as e-mail or social media sources (e.g., Facebook and YouTube).
- During this reporting period, the **nature of the visits** to the PCOR Partnership public Web site included 5298 page views; the top five pages viewed are listed in Table 4. These five pages comprise 61% of total page views.
- During this reporting period, the PCOR Partnership received public television exposure from documentaries broadcast in North Dakota, northwestern Minnesota, and Manitoba. A total of 21 broadcasts aired. The number of telecasts by documentary are as follows: "Out of the Air: Into the Soil" (10), "Managing Carbon Dioxide: The Geologic Solution" (7), and "Global Energy and Carbon: Tracking our Footprint" (6).
- As of April 9, 2014, all five documentaries and 50 video clips taken from the documentaries were 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 as indicated in Table 6. Each video description includes one or more links to the PCOR Partnership public Web site. These videos can also be streamed on the PCOR Partnership public Web site.
- During this reporting period, the PCOR Partnership participated in three teacher training workshops. These activities included dissemination of outreach materials (documentaries, atlas, fact sheets) to educators in K–12 schools.

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

Page Title	Page Views	% Page Views	Page
What Is CO_2 Sequestration	2195	26	www.undeerc.org/pcor/sequestration/whatissequestration.aspx
Home Page	410	13	www.undeerc.org/pcor/
Video Clip Library	229	5.0	www.undeerc.org/pcor/video-clip-library/default.aspx
What Is CO_2	221	4.0	www.undeerc.org/pcor/sequestration/whatisco2.aspx
CO_2 Sequestration Projects	198	3.6	www.undeerc.org/pcor/co2sequestrationprojects/default.aspx

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

Video	Views	Est. Minutes Watched	Avg. View Duration
Reservoir Geology 101: Fluid in the Rocks	100	131	1:18
Carbon Capture and Storage	66	174	2:37
The Phases of Oil Recovery – So Far	56	116	2:03
More Oil from West Texas	55	132	2:24
An Emerging Economy: Household Energy in India	44	106	2:24

Table 6. PCOR Partnership-Related YouTube Channel Videos Arranged by Playlist

Playlist	No. Videos	Playlist Starts	Views	Est. Minutes Watched	Avg. Time in Playlist
Carbon Footprint	10	6	17	8	1:19
Geologic CO_2 Sequestration	9	4	14	7	1:49
Terrestrial CO_2 Sequestration	13	3	14	11	3:31
Carbon Markets	11	2	10	7	3:29
CO_2, Energy, and Climate Change	11	1	8	5	4:52
PCOR Partnership Documentaries	5	5	7	5	0:05
Oil Production	1	1	1	0	0:00
TOTALS	55*	22	71	42	–

* Because some videos occur in more than one playlist, the total number of videos is less than the sum of the playlists.

- A total of 48 teachers representing 23 different school districts attended two of these events, with eight teachers previously attending (It should be noted that no information has been provided with respect to the Lignite Energy Council [LEC] event at this time).
- Two teacher events were held in Minnesota and one in North Dakota. They are listed as follows:
  - A 4-day coal-centric teacher seminar presented by the North Dakota LEC (presentation given and materials disseminated) held June 16–19, 2014, in Bismarck, North Dakota.
  - A 3-day geography-focused teacher workshop presented jointly by the Minnesota Alliance for Geographic Education and the North Dakota Geography Alliance (presentation given and materials disseminated) held June 17–19, 2014, in Moorhead, Minnesota.
  - A 2-day teacher training institute presented by PPB (presentation given and materials disseminated) held June 24–25, 2014, in Moorhead, Minnesota.

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

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

Task 3 – Permitting and NEPA Compliance

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

- Hosted and attended the 6th Annual Regulatory Roundup meeting June 24 and 25, 2014, in Deadwood, South Dakota. Eleven persons attended the meeting, with representation from North Dakota, the Interstate Oil and Gas Compact Commission (IOGCC), Alberta Energy, The CETER Group, Melzer Consulting, and Premier Oil Recovery.
- Attended the IOGCC Midyear Meeting in Biloxi, Mississippi, held May 18–20, 2014. At the request of the state of North Dakota, provided an update on the North Dakota Industrial Commission (NDIC) Department of Mineral Resources (DMR) Oil and Gas Division's (OGD's) Class VI primacy application to the U.S. Environmental Protection Agency (EPA)–IOGCC Memorandum of Understanding (MOU) Committee.
- Attended the British Columbia Natural Gas Symposium held June 3–4, 2014, in Vancouver, British Columbia, Canada.
- On April 30, 2014, participated in the EPA Underground Injection Control (UIC) Financial Responsibility Implementation Training Webinar.
- Continued review of the EPA proposed rule for carbon emissions from existing stationary sources.
- On May 8, 2014, participated in the C2ES (Center for Climate and Energy Solutions) Webinar series entitled "Water for Energy and Energy for Water: An Overview of Water/Energy Issues from National and Federal Perspectives" (www.c2es.org/science-impacts/adaptation/water-energy-webinar-series).
- Reviewed comments from DOE on the IOGCC Operational and Postoperational Liability Report. Had discussions with key staff and DOE regarding the comments.
- Continued review of DOE's FutureGen 2.0 Project Class VI permit applications.
- 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).
- 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 May 20 and June 16.

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 the 48th U.S. Rock Mechanics–Geomechanics Symposium in Minneapolis, Minnesota, May 30 – June 5, 2014, including workshops on petroleum geomechanics testing and the role of geomechanics in geothermal reservoir engineering.
- **Bell Creek** test site activities included the following:
  - With regard to geomechanical efforts, the following activities occurred:
    - Updated geomechanical parameters (including Young's modulus, Poisson's ratio, unconfined compressive strength, and in situ stresses) in the 1-D mechanical earth model (MEM) in Techlog and Petrel.
    - Continued constructing the 3-D MEM and geomechanical modeling and simulations.
    - Incorporated logs from five wells into the 1-D MEM, prepared 3-D seismic data conversion, set up 3-D geomechanical gridding, and populated geomechanical properties.
  - Continued work on Bell Creek characterization, including the following:
    - Built the structural framework for the Version 3 geologic model.
    - Verified structural top picks and log data for the 748 wells within the Bell Creek Field, using core descriptions from the EERC, Denbury, and Exxon.
    - Created training images to be used in the facies modeling for the Version 3 geologic model.
    - Compiled a new PETRA database with all characterization data to be used in current and future modeling efforts.
  - Traveled to the Bell Creek site on June 22–23, 2014, to attend safety training and to visit the monitoring sites and well.
  - Worked on reviewing and testing RadExPro seismic software.
  - Submitted Milestone (M) 45, First Full Repeat of Pulsed-Neutron Logging (PNL) Campaign Completed, on June 9, 2014.
  - With regard to Applied Geology Laboratory activities:
    - With regard to the 60 feet of full-diameter 33-14R core (collected April 2013):
      - 46 thin sections arrived from Wagner Petrophysics.
- Completed photography and analysis of all 46 slides.

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:

- Completed the internal reference document entitled “Baseline Surface and Near-Surface Soil Gas and Water Monitoring at the Bell Creek Oil Field.”
- Submitted D44, Drilling and Completion Activity Report, on May 30, 2014. This report includes:
  - Drilling and completion of the 05-06 OW characterization and monitoring well.
  - Drilling and installation of two Fox Hills water-monitoring wells (MW0504 and MW3312) into the lowermost regional underground source of drinking water (USDW).
  - Drilling and completion of the 04-03 OW geophone well.
  - Coring and logging of the 33-14R and 56-14R wells during drilling operations.

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

- Note: This task ended Quarter 3, BP4, Year 7 (June 2014).

Task 6 – Infrastructure Development

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

- Continued work on a journal article about the attenuation of variable CO_2 sources for use in EOR. The journal selected is “Energy & Environmental Science” (www.rsc.org/publishing/journals/ee/about.asp).
- Researched several additional capture technologies for the update to the existing capture technology overview.
- Continued work with Ramgen and/or Dresser–Rand on the list of possible sites for a field demonstration of the SuperCompressor.

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 – CO_2 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.
- Discussed approaches for a report about the surface facilities at Bell Creek.

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:

- Prepared materials and templates from PCOR Partnership data (these templates can be used for actual simulation and history-matching projects) for the Computer Modelling Group Ltd. (CMG) and CMOST™ in-house training. This training consisted of two half-days (May 7–8, 2014). Approximately ten EERC geologists and reservoir engineers attended this training.
- Attended the 2014 CMG Technical Symposium held June 3 and 4, 2014, in The Woodlands, Texas, and presented "Implementation of Detailed Reservoir Simulation to Demonstrate CO_2 EOR and Storage in the Bell Creek Field" and "Tools for Interfacing and Integrating CMG Software with Other Software Packages."
- Several EERC staff members attended the Williston Basin Petroleum Conference (WBPC) held May 20–22, 2014, in Bismarck, North Dakota.
- Continued **Bell Creek** site activities, including the following:
  - Cumulative CO_2 injection is 741,528 metric tons through April 30, 2014 (Table 7).
  - Submitted M46, 1 Year of Injection Completed, on June 26, 2014 (note: May injection data are not yet publically available).
  - Hosted a WebEx meeting on May 27, 2014, with Denbury regarding potential miscibility testing at Bell Creek.

Table 7. Bell Creek CO_2 Injection Totals May 2013 – April 2014

	February 2014 Injection, Mcf	March 2014 Injection, Mcf	April 2014 Injection, Mcf
Total, Mscf	2,165,741	1,914,491	1,919,902
Total, U.S. tons*	123,877	109,506	109,815
Total, metric tons*	112,488	99,439	99,720
Cumulative Total, Mscf[+]	10,442,239	12,356,730	14,276,632
Cumulative Total, U.S. tons*[+]	597,280	706,785	816,601
Cumulative Total, metric tons*[+]	542,369	641,808	741,528

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.

- Finalized and implemented a Bell Creek data management policy and standard operating procedure on May 15, 2014, to improve data security, accessibility, versioning control, and collaboration efficiency for the project team. Held in-house training, reviewed new organizational and security procedures, and transferred all Bell Creek data to a dedicated server. Currently, the Bell Creek project consists of over 600,000 individual electronic files and over 1 TB of data.
- With regard to **modeling and simulation** activities:
  - On April 2, 2014, hosted a WebEx meeting with Denbury regarding the 2013 simulation update. Additional simulation runs were developed and conducted to better approximate current and planned injection operations and to inform future monitoring and accounting activities. Held a conference call with Denbury to discuss simulation results in the context of operations.
  - Continued work on D66, Simulation Update, due August 2014.
  - Worked on the history match of Phase 1 (May 2013 – April 2014) CO_2 injection data.
  - Worked on preparing data for the Phase 2 simulations, including cutting the geomodel from full-field 3-D geologic model (Version 2) for injection/production and reservoir pressure history matching.
- With regard to **injection-phase seismic** efforts:
  - Discussed plans for a repeat vertical seismic profile (VSP) survey centered on the 05-06 OW and 04-03 OW wells.
  - Performed time-to-depth conversions and fracture identification on the 3-D seismic data set.
  - Used predictive simulation results to create a cross section to help select shot points for repeat 2-D seismic line. Also selected shot points around the 04-03 OW monitoring well that have high probability of detecting CO_2.
  - Held a conference call on April 9, 2014, with SIGMA^3 to discuss passive seismic monitoring results.
  - Held a WebEx meeting with SIGMA^3 to discuss the repeat 3-D VSP processing.
  - Discussed processing VSP shot points with Denbury and SIGMA^3.
- Continued analysis of **pressure gauge response** from the 05-06 OW well, including the following:
  - Installed a backup data interrogator and data acquisition unit on the 05-06 OW well and sent the primary interrogator to PROMORE for repair and refurbishment.
  - Downloaded and processed permanent downhole monitoring (PDM) data through June 2, 2014.
  - Continued review and analysis of Bell Creek AZMI (above-zone monitoring interval) pressure gauge analysis which concluded that the AZMI is competently sealed and isolated from the reservoir and is isolated from zones directly overlying the top of cement which are in contact with the annular space in offset wellbores, including:
    - Analysis of casing pressure testing of the 05-06 OW well.
    - Pressure differential transient analysis.
    - Pressure/temperature correlation analysis.

    - Hydrostatic pressure gradient and subnormal pressure analysis of the AZMI.
    - Temperature gradient profile analysis.
    - Seismic and microseismic analysis.
  - Continued work on developing a methodology to allocate pressure response from the PDM system to individual production/injection wells.
  - Constructed stratigraphic columns for the observation well and surrounding wells to help with interpretation of upper pressure gauge response in the observation well.
- With regard to **injection-phase PNL** activities:
  - Hosted a meeting on April 17, 2014, at the EERC to discuss the PNL processing with Schlumberger and Denbury personnel.
  - Held a Webinar and conference call with Denbury on June 26, 2014, to discuss current and future PNL work.
  - Received approval on June 27, 2014, to conduct additional PNLs.
- With regard to **injection-phase sampling** activities (see Task 5):
  - Continued development of an internal 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 to improve data accessibility and efficiency of analysis between the project team.
  - Completed periodic review of near-surface operational monitoring activities, and began planning to update sampling frequency and extent for the second year of injection monitoring based on the first year of monitoring results.
  - Completed data analysis and processing of the February 2014 monthly sampling event, comprising ten soil gas profile station (SGPS) locations (35 total samples) and two Fox Hills Formation groundwater-monitoring wells.
  - Completed data analysis and processing of the March 2014 monthly sampling event, comprising ten SGPS/adjacent Phase 1 samples (44 total samples) and two Fox Hills Formation groundwater-monitoring wells.
  - Completed the monthly April 2014 sampling event and completed data analysis and processing. This event comprised ten SGPS/Phase 1/interspaced locations (127 total samples) and two Fox Hills Formation groundwater-monitoring wells.
  - Acquired and analyzed a sample of CO_2 from the incoming supply stream (prior to comingling with recycle) on May 7, 2014, for chemical composition and isotope content analysis.
  - Collected and archived isotope content and chemical composition analysis (from Isotech Laboratories) for the March 19, 2014, Lost Cabin incoming CO_2 supply sample.
  - Established a revised near-surface monitoring sampling protocol in May 2014 to augment soil gas- and water-sampling strategies and make better use of available resources based on first year, near-surface monitoring results. The strategy includes collecting additional samples and analysis: Phase 2 soil gas samples as well as field parameters for select groundwater locations adjacent to the injection phases. The current approach is to sample on a quarterly basis

instead of monthly. We continue to evaluate sampling protocols to ensure resources are deployed efficiently, with the next update being performed after the planned September full-field sampling event.

- ♦ Conducted the June 2014 sampling event and included the modified quarterly sampling protocol, i.e., 210 soil gas samples plus the two Fox Hills groundwater samples were submitted for analyses (awaiting analytical results).
- ♦ Acquired a sample of CO_2 from the incoming supply stream as well as a blended recycled stream sample on June 18, 2014, for chemical composition and isotope content analysis.
- ♦ To summarize, soil gas and water monitoring has been conducted throughout 24 sampling events during the baseline and operational phases:
  - o Baseline (November 2011 – April 2013): six quarterly full-field and five monthly events.
  - o Since injection (May 22, 2013): 11 monthly events, one annual full-field repeat, and one quarterly sampling effort to the end of this reporting period (June 30, 2014).

- Continued **Fort Nelson** site activities, including the following:
  - Continued work on the Best Practices Manual – Fort Nelson Feasibility Study (D100).
  - Presented a poster at CCUS-13 (Figure 8).

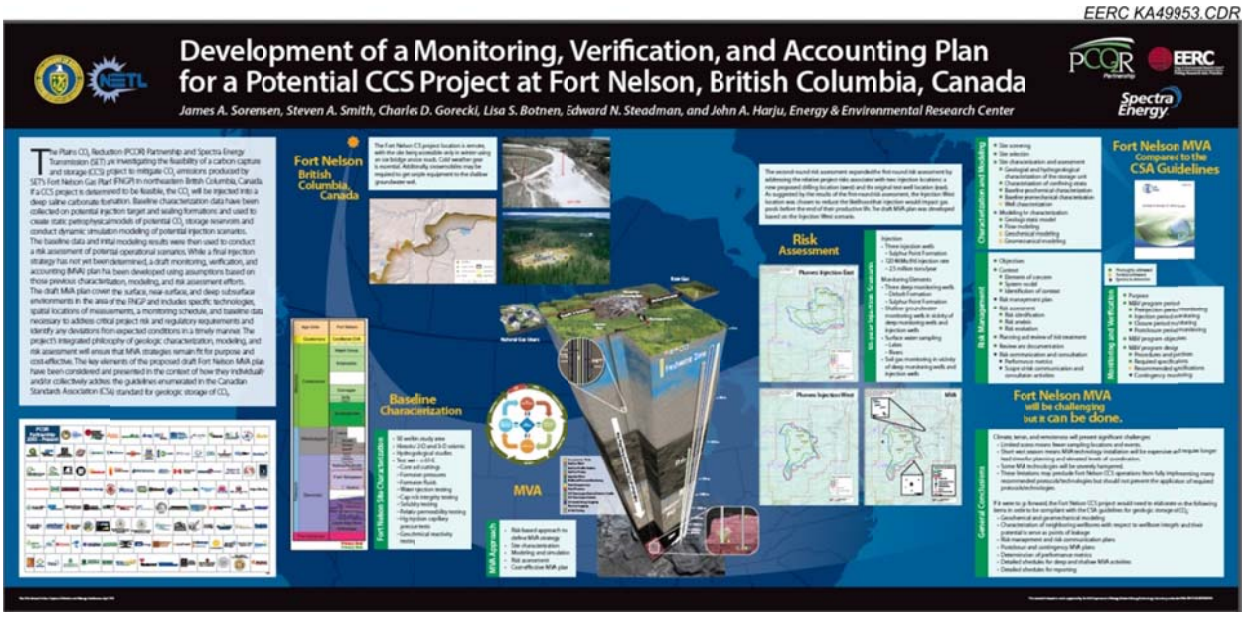


Figure 8. Fort Nelson CCS Feasibility Project poster presented at CCUS-13 (April 2014).

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

- The quarterly May sampling event, originally scheduled during the week of May 18, 2014, was rescheduled to June 16, 2014, because of rainy weather and poor field conditions.

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:

- The annual assessment report for Program Year (PY) 7 (October 1, 2013, to September 30, 2014), is due on December 31, 2014.

Task 13 – Project Management

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

- Welcomed new partner Sejong University (Seoul, South Korea) on April 30, 2014.
- Welcomed new partner Outsource Petrophysics, Inc. (Mendota Heights, Minnesota) on May 13, 2014.
- Presented at CCUS-13, on the following:
  - "Carbon Dioxide Storage Potential of the Basal Saline System in the Alberta and Williston Basins of North America"
  - "The Plains CO_2 Reduction Partnership's Adaptive Management Strategy for CO_2 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"
- Continued planning for the 2014 PCOR Partnership Annual Membership Meeting scheduled for September 16 and 17, 2014, at the Embassy Suites in downtown Denver, Colorado.
- On June 27, 2014, hosted a Technical Advisory Board (TAB) Webinar focused on laboratory analysis performed to estimate the minimum miscibility pressure (MMP) for Bell Creek oil.
- Began planning for a brief TAB meeting to be held in conjunction with the annual membership meeting.

- Attended and presented a poster at the 4th EAGE CO_2 Storage Workshop in Stavanger, Norway.
- On April 25, 2014, provided positive feedback to DOE NETL in response to the technical readiness level assessment and score for the Bell Creek project.
- On May 2, 2014, received notifications of acceptance from GHGT-12. Thirteen PCOR Partnership-related abstracts received acceptance notifications, i.e., five oral and eight posters. Will determine which to present and notify the conference of the same.
- On June 10, 2014, determined that ten PCOR Partnership-related abstracts will be presented (five oral and five posters) and papers prepared as follows:
  - "A Rapid Method for Determining CO_2–Oil MMP (minimum miscibility pressure) and Visual Observations of CO_2–Oil Interactions at Reservoir Conditions" (oral)
  - "Application of Canadian Standards Association Guidelines for Geologic Storage of CO_2 Toward the Development of a Monitoring, Verification, and Accounting Plan for a Potential CCS Project at Fort Nelson, British Columbia, Canada" (oral)
  - "A Workflow to Determine CO_2 Storage in Deep Saline Formations" (oral)
  - "The Rising Tide of Digital Communications: Implications for CCUS Outreach" (oral, via OWG)
  - "Guidance for States and Provinces on Operational and Postoperational Liability in the Regulation of Carbon Geologic Storage" (oral)
  - "Evaluation of Large-Scale Carbon Dioxide Storage Potential in the Basal Saline System in the Alberta and Williston Basins in North America" (poster)
  - "Characterization and Time-Lapse Monitoring Utilizing Pulsed-Neutron Well Logging at an Incidental CO_2 Storage Demonstration" (poster)
  - "A Regional Wellbore Evaluation of the Basal Cambrian System" (poster)
  - "The Nexus of Water and CCS: A Regional Carbon Sequestration Partnership Perspective" (poster)
  - "Model Development of the Aquistore CO_2 Storage Project" (poster)
- Recommended and received authorization to send two employees to participate in RECS (Research Experience in Carbon Sequestration) held June 1–10, 2014, in Birmingham, Alabama.
- On May 8, 2014, followed up with a representative of the CCOP (Coordinating Committee for Geoscience Programmes in East and Southeast Asia) about potential membership in the PCOR Partnership and potential synergistic activities.
- Participated in conference calls with BillyJack Consulting to discuss TAB activities and other business.
- Working on four abstracts for submittal to the DOE Carbon Storage R&D Project Review meeting; topics include the Aquistore, Zama, Basal Cambrian, and Fort Nelson projects.
- Continued efforts toward a value-added programmatic risk management plan update (including an updated Bell Creek risk assessment) to be completed by August 2014, including the following:
  - Held an in-house meeting on April 1, 2014, to complete risk registry scores.
  - Held a meeting on April 16, 2014, to discuss the risk assessment.
- On April 9, 2014, presented information about the PCOR Partnership before the North Dakota Public Service Commission.

- On April 11, 2014, held a call with Spectra management to discuss the status of the Fort Nelson project and current provincial events.
- Hosted visitors from PTRC and the Saskatchewan Research Council on April 14, 2014.
- Conducted monthly task leader meetings on April 1, May 6, and June 17, 2014. Topics discussed included updates on the Bell Creek, Fort Nelson, Aquistore, and Basal Cambrian projects; an overview of the TAB meeting; review of upcoming conferences and deliverables; and updates from each task leader present.
- Deliverables and milestones completed in April:
  - Task 13: D58/D59 – Quarterly Progress Report/Milestone Quarterly Report
  - Task 14: M23 – Monthly WWG Conference Call Held
- Deliverables and milestones completed in May:
  - April monthly update
  - Task 2: D17 – General Phase III Information PowerPoint Presentation (Update)
  - Task 14: D101 – WWG Web Site Content
  - Task 14: M23 – Monthly WWG Conference Call Held
- Deliverables and milestones completed in June:
  - May monthly update
  - Task 5: D44 – Bell Creek Test Site – Drilling and Completion Activities Report
  - Task 4: M45 – Bell Creek Test Site – First Full-Repeat of Pulsed-Neutron Logging Campaign Completed
  - Task 9: M46 – Bell Creek Test Site – 1 Year of Injection Completed
  - Task 14: M23 – Monthly WWG Conference Call Held

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

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

Task 14 – RCSP WWG Coordination

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

- On April 7, 2014, participated in a WWG conference call to discuss the latest fact sheet (D99, due October 2014).
- Continued development of an outline for the latest fact sheet (D99) focused on future protection of water resources.
- Held the monthly conference call on April 24, 2014. Agenda items included the following:
  - Discussed progress on fact sheet development.
  - Reviewed proposed WWG Web site content.
  - Discussed potential for collaboration with the OWG.
  - Presented regional partnership updates.
- Began preparing for the upcoming WWG Annual Meeting to be held August 11, 2014, in conjunction with the 2014 Carbon Storage R&D Project Review meeting scheduled for August 12–14, 2014, in Pittsburgh, Pennsylvania.

- Held the monthly conference call on May 21, 2014. Agenda items included the following:
  - Discussed progress on fact sheet development.
  - Reviewed proposed WWG Web site content.
  - Discussed potential for collaboration with the OWG.
  - Presented regional partnership updates.
- Distributed the conference call notes from March and April.
- On May 22, 2014, participated in the May OWG call to formally invite the OWG to participate in the WWG Annual Meeting.
- On May 30, submitted D101, WWG Web Site Content.
- Scheduled and held the monthly conference call on June 26, 2014. Agenda items included the following:
  - Discussed progress on fact sheet development.
  - Discussed the WWG Annual Meeting agenda.
  - Discussed goals for working with OWG, participants in GHGT-12, and the fact that the next call will be replaced by a WebEx on the WECSim model.
  - Presented regional partnership updates.
- Distributed the conference call notes from May.

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

- Requested and received DOE NETL's approval to hold a WebEx in place of the July conference call milestone (M23) and approval to waive August's call in lieu of the WWG Annual Meeting taking place on August 11, 2014.

Task 15 – Further Characterization of the Zama Acid Gas EOR, CO_2 Storage, and Monitoring Project

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

Task 16 – Characterization of the Basal Cambrian System

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

PHASE III COST STATUS

The approved BP4 (Modification No. 28) budget along with actual costs incurred and in-kind cost share reported are shown in Table 8. A spending plan for BP4 and actual incurred cost by quarter of cash funds for BP4 are provided in Figure 9 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 BP4, Years 7 and 8).

Table 8. Phase III Budget – BP4

Organization	Approved Budget*, $	Actual Costs Incurred, $
DOE Share – Cash	60,124,121	45,481,656
Nonfederal Share – Cash	2,411,971	2,778,333
Nonfederal Share – In-Kind	33,483,776	33,251,859
Total	96,019,868	81,511,848

*As of Mod. 28.

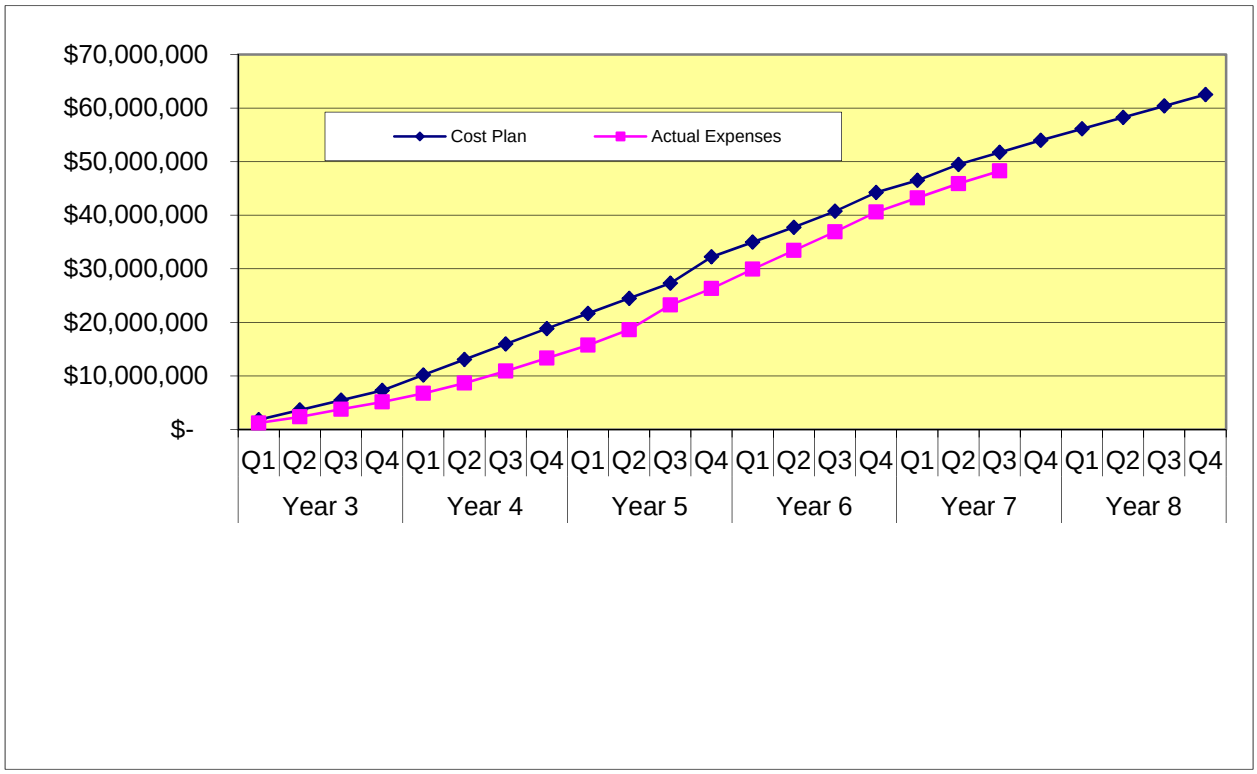


Figure 9. PCOR Partnership Phase III, BP4, Years 3–8 funding (cash only).

Table 9. 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	$ 2,349,302	$45,481,656										
NonFederal Share	$ 62,881	$ 2,748,257	$ 14,980	$ 2,763,237	$ 15,096	$ 2,778,333										
Total Incurred Cost	$2,642,188	$43,236,559	$ 2,659,032	$45,895,591	$ 2,364,398	$48,259,989										
Variance																
Federal Share	$ (325,811)	$ 3,604,085	$ 333,303	$ 3,937,388	$ (95,806)	$ 3,841,581										
NonFederal Share	$ (62,881)	$ (336,286)	$ (14,980)	$ (351,266)	$ (15,096)	$ (366,362)										
Total Variance	$ (388,692)	$ 3,267,799	$ 318,323	$ 3,586,122	$ (110,902)	$ 3,475,219										

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 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 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
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 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 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 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: Task14 – 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	
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	
D100: Task 9 – Fort Nelson Test Site – Best Practices Manual – Feasibility Study	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	
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 CO_2 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	

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	
M23: Task 14 – Monthly WWG Conference Call Held	4/30/15	
D17: Task 2 – General Phase III Information PowerPoint Presentation (update)	5/31/15	
M23: Task 14 – Monthly WWG Conference Call Held	5/30/15	
M23: Task 14 – Monthly WWG Conference Call Held	6/30/15	

Table 11. Phase III, BP4, Years 7–8 Gantt Chart

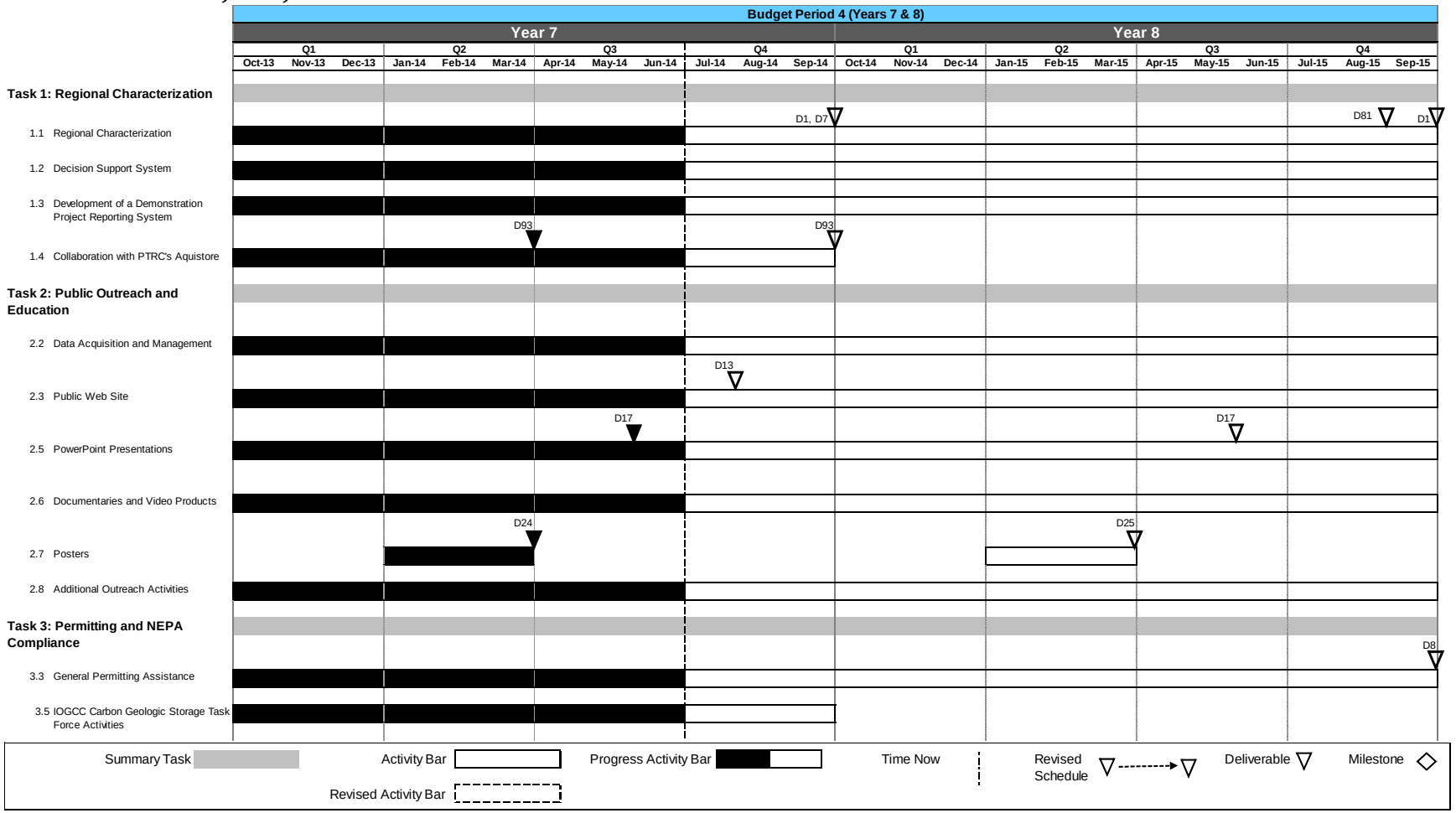

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Table 11. Phase III, BP4, Years 7–8 Gantt Chart (continued)

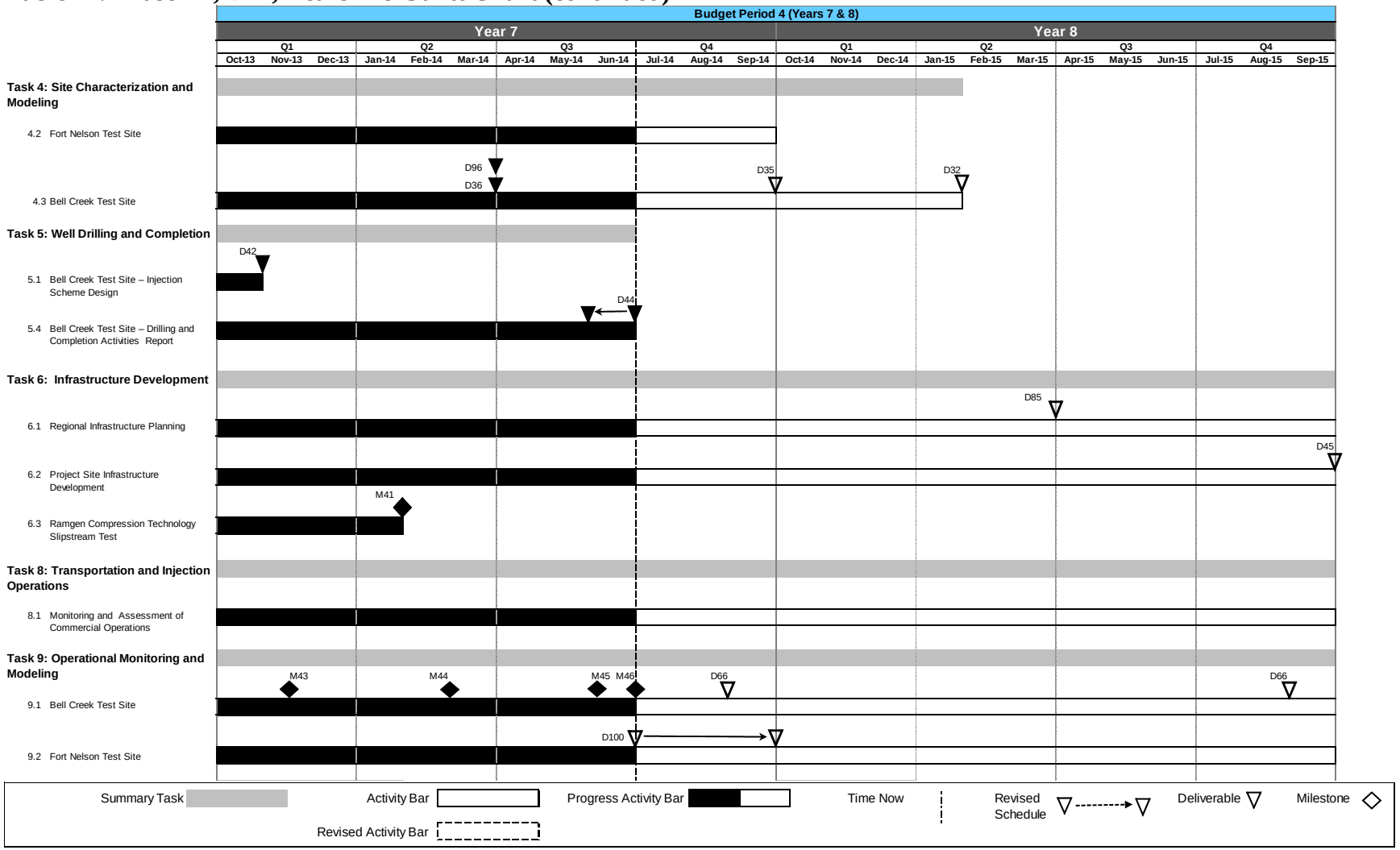

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Table 11. Phase III, BP4, Years 7–8 Gantt Chart (continued)

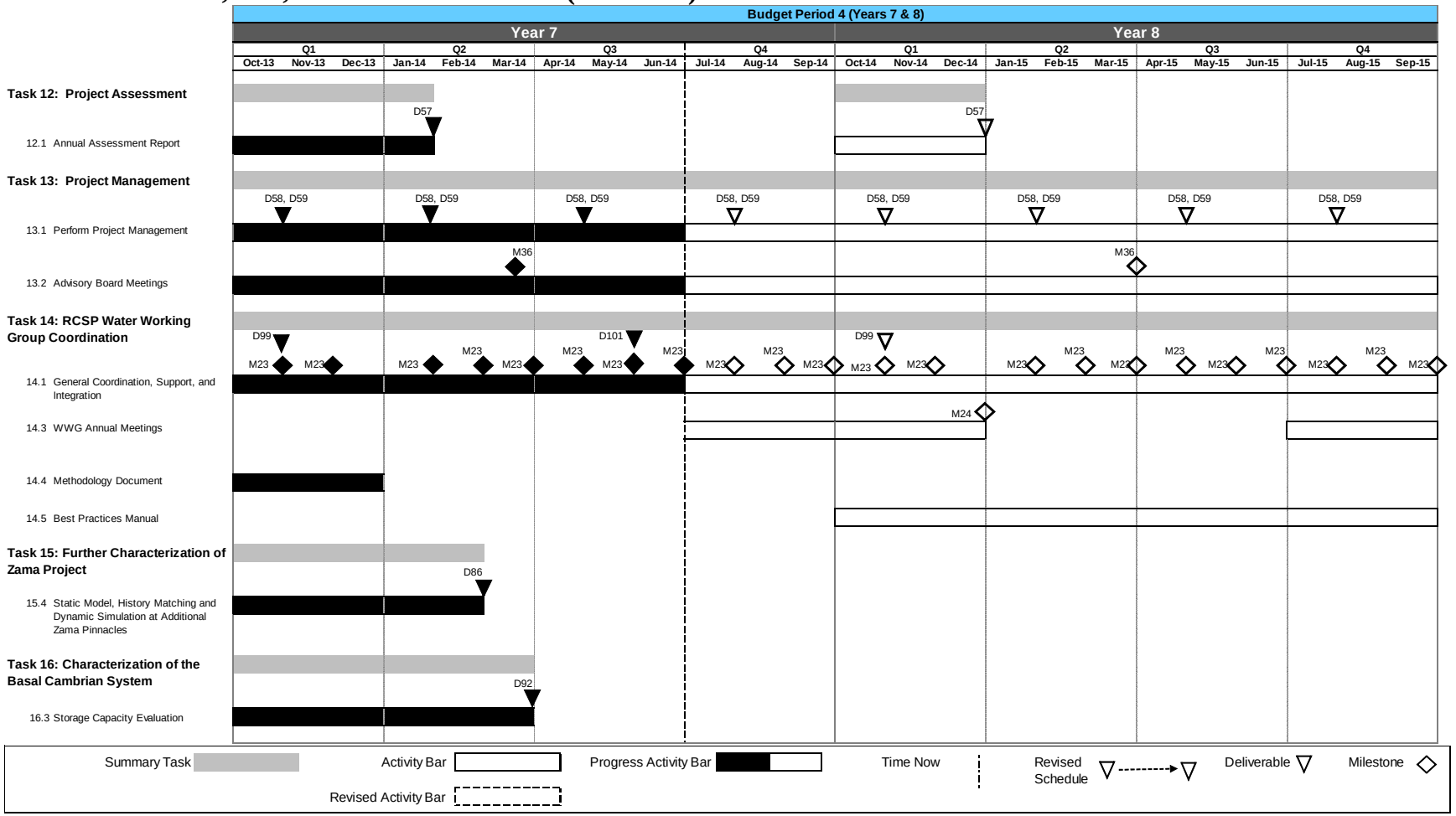

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Table 11. Phase III BP4, Years 7–8 Gantt Chart (continued)

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	M43	BC Test Site – First Full-Repeat Sampling of the Groundwater- and Soil Gas- Monitoring Program Completed
D22	Energy from Coal 60-Minute Documentary	D85	Report – Opportunities and Challenges Associated with CO_2 Compression and Transportation During CCUS Activities	M44	BC Test Site – First 3-D VSP Repeat Surveys Completed
D24	PCOR Partnership Region CO_2 Storage General Poster	D86	Updated Regional Technology Implementation Plan for Zama	M45	BC Test Site – First Full-Repeat of Pulsed-Neutron Logging Campaign Completed
D25	BC Test Site Poster (Update)	D92	Report – Storage Capacity and Regional Implications for Large-Scale Storage in the Basal Cambrian System	M46	BC Test Site – 1 Year of Injection Completed
D32	BC Test Site – Geomechanical Report	D93	Report – Geological Modeling and Simulation for the Aquistore Project		
D35	BC Test Site – Best Practices Manual – Site Characterization	D96	BC Test Site – 3-D Seismic Acquisition and Characterization Report		
D36	BC Test Site – Wellbore Leakage Final Report	D99	Nexus of Water and CCS Fact Sheet		
D42	BC Test Site – Injection Experimental Design Package	D100	FN Test Site – Best Practices Manual– Feasibility Study		
D44	BC Test Site – Drilling and Completion Activities Report	D101	WWG Web Site Content Update		
D45	Report – Infrastructure Development				4/28/2014

PHASE III PRODUCTS OR TECHNOLOGY TRANSFER ACTIVITIES

During the reporting period, six abstracts were submitted, four abstracts were accepted for oral presentation, nine abstracts were accepted for poster presentation, and 18 presentations (16 oral and two poster) were given at 25 different meetings/conferences/workshops. In addition, a quarterly progress report, nine deliverables (three draft and six approved), two milestones (both approved), and one value-added product were completed.

Abstracts

Submitted

Gao, P., Gorecki, C.D., Braunberger, J.R., Ayash, S.C., Steadman, E.N., and Harju, J.A., 2014, Modeling and simulation of acid gas injection for enhanced oil recovery and long-term storage in Zama pinnacle reefs [abs.]: Carbon Storage R&D Project Review Meeting: Developing the Technologies and Infrastructure for CCS, Pittsburgh, Pennsylvania, August 12–14, 2014.

Peck, W.D., Klenner, R.C.L., Liu, G., Gorecki, C.D., Ayash, S.C., Steadman, E.N., and Harju, J.A., 2014, Model development of the Aquistore CO_2 storage project [abs.]: Carbon Storage R&D Project Review Meeting: Developing the Technologies and Infrastructure for CCS, Pittsburgh, Pennsylvania, August 12–14, 2014.

Peck, W.D., Liu, G., 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.]: Carbon Storage R&D Project Review Meeting: Developing the Technologies and Infrastructure for CCS, Pittsburgh, Pennsylvania, August 12–14, 2014.

Sorensen, J.A., Smith, S.A., Gorecki, C.D., Botnen, L.S., 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.]: Carbon Storage R&D Project Review Meeting: Developing the Technologies and Infrastructure for CCS, Pittsburgh, Pennsylvania, August 12–14, 2014.

Submitted and Accepted for Poster Presentation

Liu, G., Braunberger, J.R., Gorecki, C.D., Gao, P., Peck, W.D., Steadman, E.N., and Harju, J.A., 2014, Integrated modeling and simulation for CO_2 EOR and CO_2 storage in the Zama pinnacle reefs of Alberta Basin, Canada [abs.]: 2014 SEG–SPE–AAPG–SPWLA–EAGE Summer Research Workshop, San Diego, California, August 3–8, 2014.

Submitted and Rejected

Braunberger, J.R., Klenner, R.C.L., Peck, W.D., Liu, G., Gorecki, C.D., Steadman, E.N., and Harju, J.A., 2014, Integrated modeling and simulation for geologic carbon dioxide storage in the basal saline system of Central North America [abs.]: 2014 SEG–SPE–AAPG–SPWLA–EAGE Summer Research Workshop, San Diego, California, August 3–8, 2014.

Accepted for Poster

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 CO_2 storage demonstration [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.

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.

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.

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Accepted for Presentation

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.

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 CO_2/oil MMP and visual observations of CO_2/oil interactions at reservoir conditions [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 CO_2 storage potential in deep saline formations [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 CO_2 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.

Accepted for Poster and Declined by Author

Gao, P., Gorecki, C.D., Braunberger, J.R., Ayash, S.C., Steadman, E.N., and Harju, J.A., 2014, Demonstrating acid gas EOR and CO_2 storage technologies in Devonian-aged pinnacle reefs [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 CO_2 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 CO_2 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.

Presentations

Botnen, L.S., 2014, IOGCC Carbon Storage Task Force operational and postoperational liability: Presented at the Plains CO_2 Reduction (PCOR) Partnership Regulatory Roundup, Deadwood, South Dakota, June 24–25, 2014.

Daly, D.J., 2014, Energy and CO_2 management—carbon capture and storage: Presented at the 2014 Lignite Education Seminar, Bismarck, North Dakota, June 16–19, 2014.

Daly, D.J., 2014, The PCOR Partnership Program: Presented at the Prairie Region Teacher Training Institute – Integrating Regional History, Culture, Science and the Arts, Moorhead, Minnesota, June 24–25, 2014.

Daly, D.J., and Crocker, C.R., 2014, Energy and carbon—the big picture: Presented at Cultivating Geographic Connections in the Red River Valley: A Crossroads of Agriculture, Reinvention, and Innovation – Minnesota Alliance for Geographic Education and the North Dakota Geography Alliance, Moorhead, Minnesota, June 18, 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: Presented at the 13th Annual Carbon Capture, Utilization & Storage Conference, Pittsburgh, Pennsylvania, April 28 – May 1, 2014.

Gorecki, C.D., 2014, Bell Creek modeling and simulation: Presentation for the Denbury Resources Inc. Webinar, April 2, 2014.

Gorecki, C.D., 2014, Plains CO_2 Reduction (PCOR) Partnership update: Presented at the Plains CO_2 Reduction (PCOR) Partnership Regulatory Roundup, Deadwood, South Dakota, June 24–25, 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 CO_2 Reduction (PCOR) Partnership adaptive management strategy for CO_2 storage: Presented at the 13th Annual Carbon Capture, Utilization & Storage Conference, Pittsburgh, Pennsylvania, April 28 – May 1, 2014.

Gorecki, C.D., Dotzenrod, N.W., Liu, G., and Braunberger, J.R., 2014, Tools for interfacing and integrating CMG software with other software packages: Presented at the Computer Modelling Group 2014 Technical Symposium, The Woodlands, Texas, June 3–4, 2014.

Gorecki, C.D., Pu, H., Gao, P., and Liu, G., 2014, Implementation of detailed reservoir simulation to demonstrate CO_2 EOR and storage in the Bell Creek Field: Presented at the Computer Modelling Group 2014 Technical Symposium, The Woodlands, Texas, June 3–4, 2014.

Hamling, J.A., Gorecki, C.D., and Braunberger, J.R., 2014, PNL acquisition summer 2014: Presentation for the Denbury Resources Inc. Webinar, June 26, 2014.

Hamling, J.A., Kalenze, N.S., Klapperich, R.J., and Azzolina, N., 2014, Bell Creek Data Management standard operating procedure (SOP): Presented at the Data Management Group Kickoff Meeting, Grand Forks, North Dakota, May 15, 2014.

Hawthorne, S.B., 2014, Laboratory investigations related to CCS and EOR—rocks, fluids, and video tape: Presentation for the Plains CO_2 Reduction (PCOR) Technical Advisory Board Webinar, June 27, 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: Presented at the 13th Annual Carbon Capture, Utilization & Storage Conference, Pittsburgh, Pennsylvania, April 28 – May 1, 2014.

Steadman, E.N., 2014, Carbon dioxide utilization and enhanced oil recovery (EOR): Presented at the Canada–U.S. Clean Energy Dialogue 3rd Binational CCS Conference, Edmonton, Alberta, May 6, 2014.

Steadman, E.N., 2014, Oil & Gas Group update: Presented at the Oil & Gas Group update meeting, Grand Forks, North Dakota, June 10, 2014.

Poster Presentations

Gorecki, C.D., Hamling, J.A., Ayash, S.C., Steadman, E.N., and Harju, J.A., 2014, The Plains CO_2 Reduction Partnership Program—addressing CO_2 storage through EOR: Poster presented at the 4th European Association of Geoscientists & Engineers (EAGE) CO_2 Geological Storage Workshop, Stavanger, Norway, April 23–25, 2014.

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: Poster presented at the 13th Annual Carbon Capture, Utilization & Storage Conference, Pittsburgh, Pennsylvania, April 28 – May 1, 2014.

Deliverables/Milestones

Draft

Heebink, L.V., Smith, S.A., Hamling, J.A., Gorecki, C.D., Steadman, E.N., and Harju, J.A., 2014, Bell Creek test site – drilling and completion activities report: Plains CO_2 Reduction (PCOR) Partnership Phase III draft Task 5 Deliverable D44 for U.S. Department of Energy

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

Approved

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 CO_2 Reduction (PCOR) Partnership Phase III 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, April.

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Progress Reports

Monthlies

Gorecki, C.D., Steadman, E.N., Peck, W.D., Daly, D.J., Botnen, L.S., Sorensen, J.A., Hamling, J.A., Jensen, M.D., Harju, J.A., Anagnost, K.K., and Klapperich, R.J., 2014, Plains CO_2 Reduction (PCOR) Partnership: Phase III monthly report (April 1–30, 2014) for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592, Grand Forks, North Dakota, Energy & Environmental Research Center, May.

Gorecki, C.D., Steadman, E.N., Peck, W.D., Daly, D.J., Botnen, L.S., Sorensen, J.A., Hamling, J.A., Jensen, M.D., Harju, J.A., Anagnost, K.K., and Klapperich, R.J., 2014, Plains CO_2 Reduction (PCOR) Partnership: Phase III monthly report (May 1–31, 2014) 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., Botnen, L.S., Klapperich, R.J., Peck, W.D., Anagnost, K.K., and Votava, T.J., 2014, Plains CO_2 Reduction Partnership Phase III Task 13 Deliverable D58/59 quarterly technical progress report (January 1 – March 31, 2014) 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.

Meeting Minutes

Klapperich, R.J., and Tennyson, M., 2014, Minutes—Regional Carbon Sequestration Partnership Water Working Group monthly conference call: March 25, 2014.

Klapperich, R.J., Tennyson, M., and Vikara, D., 2014, Minutes—Regional Carbon Sequestration Partnership Water Working Group monthly conference call: April 24, 2014.

Klapperich, R.J., 2014, Minutes—Regional Carbon Sequestration Partnership Water Working Group monthly conference call: May 21, 2014.

MEETINGS/TRAVEL

Representatives from the PCOR Partnership attended and/or participated in the following 11 meetings/conferences, six workshops, eight project management site trips, and one training opportunity in this reporting period:

- March 31 – April 4, 2014: Traveled to the Bell Creek Field to download data.
- April 13–17, 2014: Traveled to the Bell Creek area for sampling activities.
- April 14, 2014: Attended a meeting with Sigma^3 in Denver, Colorado.
- April 16, 2014: Attended a meeting with PPB in Fargo, North Dakota.
- April 21–25, 2014: Chaired a workshop at the 4th EAGE CO_2 Workshop in Stavenger, Norway.
- April 28 – May 1, 2014: Presented at the 13th CCUS Conference in Pittsburgh, Pennsylvania.
- May 5–8, 2014: Attended the U.S.–Canada Clean Energy Dialogue Third CCS Binational Conference in Edmonton, Alberta, Canada.
- May 5–9, 2014: Traveled to the Bell Creek area for sampling activities.
- May 14–16, 2014: Attended a meeting with the North Dakota Petroleum Council in Bismarck, North Dakota.
- May 18–21, 2014: Attended the IOGCC Midyear Meeting in Biloxi, Mississippi.
- May 18–26, 2014: Traveled to the Bell Creek area for sampling activities.
- May 19–23, 2014: Presented at WBPC in Bismarck, North Dakota.
- May 20–23, 2014: Traveled to the Bell Creek area for sampling activities.
- May 30 – June 5, 2014: Attended the 48th Annual U.S. Rock Mechanics–Geomechanics Symposium in Minneapolis, Minnesota.

- June 1–5, 2014: Attended the Enhanced Oil Recovery Institute Minnelusa field trip and workshops in Gillette, Wyoming.
- June 1–10, 2014: Attended the RECS Program in Birmingham, Alabama.
- June 2–5, 2014: Attended the British Columbia Natural Gas Symposium in Vancouver, British Columbia, Canada.
- June 2–5, 2014: Presented at the CMG 2014 Technical Symposium in The Woodlands, Texas.
- June 3–14, 2014: Traveled to Edinburgh, Scotland, with a PPB film crew to conduct interviews for an upcoming documentary.
- June 8–16, 2014: Traveled to the Bell Creek area for sampling activities.
- June 16–19, 2014: Presented at the LEC Teacher Workshop in Bismarck, North Dakota.
- June 17–18, 2014: Presented at the North Dakota–Minnesota Geographic Alliance in Moorhead, Minnesota.
- June 17–22, 2014: Traveled to the Bell Creek area for sampling activities.
- June 22–23, 2014: Traveled to Miles City, Montana, for a Bell Creek site visit.
- June 23–25, 2014: Presented at the PCOR Partnership Regulatory Roundup in Deadwood, South Dakota.
- June 24, 2014: Presented at the Prairie Region Teacher Training Institute in Moorhead, Minnesota.

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